



המכון הלאומי לחקר שרותי הבריאות ומדיניות הבריאות (ע"ר)  
The Israel National Institute for Health Policy Research

# The 7<sup>th</sup> International Jerusalem Conference on Health Policy

September 15-16, 2019



## HEALTH AND HEALTHCARE IN THE AGE OF INNOVATION



**PROGRAM & BOOK OF ABSTRACTS**

Co-Chairs: Prof. Ran Balicer (IL) and Prof. Isaac Kohane (US)



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## **Dear Colleagues,**

We are delighted to welcome so many of you, from many different countries, to the 7<sup>th</sup> International Jerusalem Conference on Health Policy.

We live in exciting times, in which technological acceleration drive profound changes in all walks of life. Health and Healthcare have not been seriously disrupted by these changes to date, but it is suggested that this steady state is very likely to change, soon.

This promise, or threat, depends on one's point of view, is most relevant to discuss in Israel in light of its designation as one of the world's health-tech key innovation hubs. Our theme for this year's conference is "Health and Healthcare in the Age of Innovation", as we aim to provide a platform for exchanging ideas and innovative approaches, and for exploring the dynamic evolution of health policy and healthcare practices worldwide, acknowledging the complexities and uncertainties in this field in this exciting era.

We have structured the conference into four broad sub-themes, each led by a pair of Israeli and global scholars, that will help us on the journey to realize the potential of this age of innovation. Christian Lovis and Kira Radinsky lead our Data-Driven Care track, and will discuss how shall we harness the potential of advanced analytics and healthcare big data. Daniel Kraft and Rafael Beyar will discuss the Uber'ization of Healthcare, and whether the new models of care provision provide inferior care to the masses. Peter Neumann and Dan Greenberg will look into Innovation in Health Economics, and the Economics of Healthcare Innovation, And Hal Wolf and Avi Israeli will elucidate New Challenges and Threats in the Age of Innovation - in Ethics, Equity and Privacy Risks.

Global leaders will be addressing the conference in plenary and parallel sessions. For the first time, we will include special 'Meet the Expert' sessions and rapid innovation talks throughout the conference.

Wishing us all a successful and inspiring conference, and a lovely time in Jerusalem.

***Prof. Ran Balicer (Israel) and Prof. Isaac Kohane (US), Co-Chairs***





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## Scientific Committee

Chairs:

**Prof. Ran Balicer**, Clalit Health Services, Ben-Gurion University of the Negev, IL

**Prof. Isaac Kohane**, Harvard Medical School, US

**Prof. Alik Aviram**, The Israel National Institute for Health Policy Research, IL

**Prof. Rafael Beyar**, Rambam Health Care Campus, IL

**Prof. Dan Greenberg**, Ben-Gurion University of the Negev, IL

**Prof. Zamir Halpren**, The Israel National Institute for Health Policy Research, IL

**Prof. Avi Israeli**, Hebrew University - Hadassah Faculty of Medicine, IL

**Prof. Daniel Kraft**, Singularity University, NASA Research Park, US

**Prof. Christian Lovis**, Universite de Geneve, Switzerland

**Prof. Orly Manor**, The Israel National Institute for Health Policy Research, IL

**Prof. Peter J. Neumann**, Tufts University, US

**Prof. Kira Radinsky**, Technion-Israel Institute of Technology, IL

**Prof. Varda Shalev**, Maccabi Healthcare Services, IL

**Prof. Amir Shmueli**, The Hebrew University of Jerusalem, IL

**Dr. Ahuva Weiss-Meilik**, Tel-Aviv Sourasky Medical Center, IL

**Mr. Harold F. Wolf III**, Healthcare Information and Management Systems Society (HIMSS), US

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Chair:

**Prof. Limor Aharonson-Daniel**, Ben-Gurion University of the Negev, IL

**Prof. Alik Aviram**, The Israel National Institute for Health Policy Research, IL

**Prof. Rachel Nissanholtz-Gannot**, Myers-JDC-Brookdale Institute, IL

# SCIENTIFIC PROGRAM



## Sunday, September 15, 2019

08:00-09:00 *Registration, Coffee, ePoster & Start-Up Exhibitions*

### 09:00-11:00 **Plenary I: Opening Session**

***Chairs: Ran Balicer (IL) & Isaac Kohane (US),  
Conference Co-Chairs***

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**Greetings:**

**Orly Manor**, *Chairwoman, Board of Directors, The Israel  
National Institute For Health Policy Research (IL)*

**Moshe Bar Siman Tov**, *Director General, Ministry of Health (IL)*

**Isaac Kohane**, *Harvard University (US), Conference Co-Chair*

HOW CAN PATIENTS ACCELERATE INNOVATION IN MEDICINE?

**John Halamka**, *Beth Israel Lahey Health Technology  
Exploration Center (US)*

THE FUTURE OF DIGITAL HEALTH

**Divya Chander**, *Stanford University & Singularity  
University (US)*

HOW HUMAN AUGMENTATION WILL PROMOTE HUMAN EVOLUTION  
OR MAKE US VULNERABLE TO BE HACKED

11:00-11:30 *Coffee Break, ePoster & Start-Up Exhibitions*

**11:30–13:00 Plenary II**

**Chair: Dina Ben-Yehuda,**  
**Hebrew University-Hadassah (IL)**

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**Harpreet Sood, NHS (UK)**

DEVELOPING A WORKFORCE FOR A 21<sup>ST</sup> CENTURY HEALTH SYSTEM

**Track Introduction:**

**Topic A: Christian Lovis, University of Geneva (Switzerland),**  
*Co-Chair Track A*

BIGDATA AND AI IN HEALTH: HYPE AND CHALLENGES

**Topic B: Daniel Kraft, Singularity University (US),**  
*Co-Chair Track B*

SUPER CONVERGENCE AND THE REIMAGINATION & REINVENTION  
 OF HEALTH & MEDICINE

**Topic C: Peter Neumann, Tufts Medical Center (US),**  
*Co-Chair Track C*

ECONOMICS AND HEALTH INNOVATION: CAN WE DISRUPT OUR WAY  
 TO BETTER VALUE IN HEALTH CARE?

**Topic D: Harold Wolf, HIMSS (US),**  
*Co-Chair Track D*

DETOUR AHEAD! THE ROAD TO DIGITAL HEALTH INNOVATION:  
 NAVIGATING RISKS TO UNLEASH REWARDS

**13:00–14:00** *Lunch, ePoster & Start-Up Exhibitions*

**14:00-15:30 Parallel Session 1**

**Topic A / Hall 1**

**DATA-DRIVEN CARE –  
REALIZING THE PROMISE**

**BIG DATA AND BEYOND**

**Chair: Christian Lovis**

**Innovation Slot:**

**Marc Abramowicz (Switzerland)**

GENOMIC DATA AND THE PROMISE OF  
GENOMIC MEDICINE

**Presentation:**

**Ingrid Wolfe (UK)**

POPULATION HEALTH CARE FOR  
CHILDREN WITH ONGOING CONDITIONS

**Gideon Koren (IL)**

REPURPOSING MEDICATIONS BY USING  
MACCABI HEALTH SERVICE ELECTRONIC  
DATABASE

**Kandarp Talati (India)**

INDIA'S NATIONAL FAMILY HEALTH  
SURVEY (2015-16) BIG DATA AWAITS  
ADVANCED ANALYTICS AND ARTIFICIAL  
INTELLIGENCE APPLICATIONS TOWARDS  
STRENGTHENING PUBLIC HEALTH  
OUTREACH AND OUTCOMES

**Sharon Hovav (IL)**

AN AI-BASED MULTI-CRITERION  
APPROACH TO ENHANCE THE  
EFFECTIVENESS OF VACCINATION  
STRATEGIES

**Topic B / Hall 2**

**UBER'IZATION OF HEALTHCARE –  
DREAM OR NIGHTMARE?**

**INNOVATION IN THE CLINICAL  
ARENA**

**Chair: Rafael Beyar**

**Innovation Slot:**

**Nissim Alon (IL)**

LEUMIT DIGITAL FROM VISION TO  
REALITY

**Presentation:**

**Orly Tamir (IL)**

MEASURING THE QUALITY OF A  
THERAPEUTIC MEETING USING  
OBJECTIVE-STRUCTURED CLINICAL  
SIMULATION (OSCS) – THE CASE OF  
DIABETES EDUCATORS

**Liat Lerner-Geva (IL)**

THE ISRAELI NATIONAL COMMITTEE FOR  
SEX SELECTION BY PRE-IMPLANTATION  
GENETIC DIAGNOSIS (PGD) FOR NON-  
MEDICAL REASONS: A UNIQUE HEALTH  
POLICY

**Shmuel Prints (IL)**

A WEB-BASED DISCUSSION FOR  
DIFFICULT-TO-SOLVE CASES: A  
PROMISING EXPERIENCE IN A LARGE  
PHYSICIAN NETWORK

**Dan Yamin (IL)**

PERSONAL AND SOCIAL PATTERNS  
PREDICT INFLUENZA VACCINATION  
DECISION

**14:00–15:30 Parallel Session 1****Topic C / Hall 3**

**INNOVATION IN HEALTH ECONOMICS, AND THE ECONOMICS OF HEALTHCARE INNOVATION**

**THE VALUE OF INNOVATIVE HEALTHCARE INTERVENTIONS**

*Chair: Amir Shmueli*

**Topic D / Hall 4**

**NEW CHALLENGES AND THREATS IN THE AGE OF INNOVATION**

**CONFRONTING NEW TECHNOLOGIES**

*Chair: Itamar Grotto*

**Presentation:****Omer Ben-Aharon (IL)**

MATURE VERSUS REGISTRATION STUDIES OF IMMUNO-ONCOLOGY AGENTS: DOES VALUE IMPROVE WITH TIME?

**Erez Yerushalmi (UK)**

QUANTIFYING A MINIMUM SOCIAL VALUE OF PUBLIC HEALTH CARE: A GENERAL EQUILIBRIUM MODEL APPLIED TO ISRAEL

**Irit Chudner (IL)**

CHOOSING VIDEO INSTEAD OF IN-CLINIC CONSULTATIONS IN PRIMARY CARE: DISCRETE CHOICE EXPERIMENT AMONG KEY STAKEHOLDERS: PATIENTS, PRIMARY CARE PRACTITIONERS AND POLICY MAKERS

**Yuval Levy (IL)**

THE POSITIVE INFLUENCE OF APPMEDIC VOLUNTEER'S INTERVENTION IN THE EMERGENCY DEPARTMENT ON PATIENT AND FAMILY SATISFACTION

**Innovation Slot:****Eyal Zimlichman (IL)**

WHAT'S HOLDING BACK DISRUPTIVE INNOVATION IN HEALTHCARE?

**Presentation:****Fabio Gomes (Brazil)**

USE OF MACHINE LEARNING MODELS FOR "SUPERVISED CLASSIFICATION" OF LEGISLATIVE PROPOSALS RELATED TO HEALTH IN THE BRAZILIAN NATIONAL CONGRESS

**Shirly Bar-Lev (IL)**

FORGOTTEN ON THE SIDE OF THE INFORMATION HIGHWAY: COGNITIVE BARRIERS TO ELDERS ENGAGEMENT WITH DIGITAL TECHNOLOGY

**Jhaki Mendoza (Philippines)**

USING DIGITAL DIARIES TO RESEARCH PATHWAYS OF HYPERTENSION CARE: EXPERIENCES FROM ENGAGING WITH PEOPLE WITH HYPERTENSION IN THE PHILIPPINES

**Vasiliki Foufi (Switzerland)**

DEID: DE-IDENTIFICATION OF CLINICAL NARRATIVE DATA IN FRENCH, GERMAN AND ITALIAN

**Topic A / Hall 1**

**Alina Vodonos (US)**

BURDEN OF MORTALITY DUE TO AMBIENT FINE PARTICULATE AIR POLLUTION (PM2.5) IN ISRAEL

**Raida Daeem (IL)**

BARRIERS TO TREATMENT IN ISRAELI ARAB MINORITY ADOLESCENTS WITH MENTAL HEALTH PROBLEMS: RESULTS FROM THE GALILEE STUDY

**Topic B / Hall 2**

**Noa Dagan (IL)**

AUTOMATIC EVALUATION OF ROUTINE COMPUTED TOMOGRAPHY SCANS FOR PREDICTION OF OSTEOPOROTIC FRACTURES

**Elevator Pitch:**

**Deborah Katz (Canada)**

THE APPROPRIATE USE OF ANTIPSYCHOTICS: SUPPORTING QUALITY IMPROVEMENT IN SUPPORTIVE LIVING

**Ilaria Corazza (Italy)**

BUILDING BIG DATA FROM PAEDIATRIC PATIENT EXPERIENCE: A NEW MODEL FOR PREMS COLLECTION AND UTILISATION

**Liora Valinsky (IL)**

BARRIERS TO COMPLETING COLONOSCOPY AFTER A POSITIVE FECAL OCCULT BLOOD TEST

**Jamilya Sadykova (Kazakhstan)**

PARTIAL SMOKING BAN BREAKS THE PROMISE OF SMOKE FREE ENVIRONMENT IN KAZAKHSTAN

**Orit Stein Reisner (IL)**

USE THE DATA TO MAKE THE CHOICE: SELECTING THE BEST SMOKING CESSATION SERVICE FOR PEOPLE WITH SERIOUS MENTAL ILLNESS (SMI)

**Elevator Pitch:**

**Aviva Yoselis (IL)**

PATIENT NAVIGATION IN A VIRTUAL WORLD: USING ENGLISH SPEAKING IMMIGRANTS AS A MODEL FOR TELEHEALTH ADVOCACY

**Ilan Yehoshua (IL)**

MACCABI RED – UBERIZATION OF MINOR TRAUMA AND SEMI URGENT MEDICAL CARE IN PRIMARY CARE SETTING

**Shlomo Yaacobi (IL)**

CLINICAL TRIALS IN ADVANCED THERAPIES – ISRAEL IS ON THE MAP

**Alexander Gamus (IL)**

CLINICAL OUTCOMES, QOL AND COSTS ANALYSES OF TELEMEDICINE APPLICATION IN LOWER EXTREMITIES ULCERS TREATMENT



**Topic C / Hall 3****Maya Siman-Tov (IL)**

MINIMIZING ABUSE OF EMERGENCY CALL CENTER SERVICES: IS TECHNOLOGY THE RIGHT SOLUTION?

**Eduardo Schejter (IL)**

HPV-DNA-PRIMARY SCREENING IN ISRAEL IS MORE EFFICIENT THAN CYTOLOGICAL SCREENING (PAP TEST)

**Susanna Mordechay (IL)**

IS FRONTAL TRIAGE AN EFFECTIVE ALTERNATIVE TO PHYSICIAN REFERRAL-BASED TRIAGE? A PROSPECTIVE COHORT STUDY

**Elevator Pitch:****Alla Vishkautzan (IL)**

MANAGING DRUG SHORTAGES - THE ISRAELI EXPERIENCE (2013-2018)

**Ahuva Spitz (IL)**

NURSING ASSISTANTS - INNOVATIVE INTERVENTION

**Tal Morginstin (IL)**

BUDGET-IMPACT OF DRUGS FOR ORPHAN DISEASES (ORPHAN DRUGS) IN THE ISRAELI HEALTH BASKET: A LONGITUDINAL ANALYSIS

**Ariel Hammerman (IL)**

ALLOCATION OF RESOURCES AMONG MEDICAL FIELDS IN UPDATING THE ISRAELI 'HEALTH BASKET', IS THERE A 'CANCER PREMIUM'?

**Topic D / Hall 4****Motti Haimi (IL)**

PHYSICIANS' EXPERIENCES, ATTITUDES AND CHALLENGES IN A PEDIATRIC TELEMEDICINE SERVICE

**Zoe Co (US)**

VARIABLE PERFORMANCE IN THE COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE) EVALUATION TOOL: AREAS FOR IMPROVEMENT

**Elevator Pitch:****Luz Angela Torres López (Colombia)**

SOCIOECONOMIC POSITION AND CANCER SCREENING AMONG WOMEN IN ISRAEL

**José Luis Sandoval (Switzerland)**

USING INDIVIDUAL-LEVEL GEOGRAPHIC DATA TO UNCOVER SOCIOECONOMIC STATUS-INDEPENDENT SPATIAL CLUSTERS OF MAMMOGRAPHY ADHERENCE IN GENEVA

**Yael Wolff Sagy (IL)**

EXPLORING SOCIOECONOMIC DISPARITIES IN DIABETES QUALITY INDICATORS IN ISRAELI ADULTS

15:30-16:00 *Coffee Break, ePoster & Start-Up Exhibitions*

**16:00-18:00 Plenary III**

***Chair: Shlomo Mor-Yosef, NIHP (IL)***

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**Ran Balicer**, *Clalit Health Services (IL), Conference Co-Chair*  
THE LIGHT AND DARK SIDE OF PREDICTION IN HEALTHCARE  
PRACTICE

**Roundtable 1**

**Chair: Lisa Simpson**, *AcademyHealth (US)*  
THE IMPLEMENTATION GAP

**Ashish Jha**, *Harvard University (US)*

**Vivian Tseng**, *William T. Grant Foundation (US)*

**Haim Bitterman**, *Assuta Ashdod Hospital (IL)*

**Roundtable 2**

**Chair: Charles Kahn**, *Federation of American Hospitals  
(FAH) (US)*

HOSPITAL OF THE FUTURE

**Fabrice Brunet**, *University of Montreal (Canada)*

**Osnat Levtzion-Korach**, *Shamir Medical Center  
(Assaf Harofeh) (IL)*

**Eyal Zimlichman**, *Sheba Medical Center (IL)*

18:00-22:00 **DINNER & SOCIAL EVENT**

## Monday, September 16, 2019

08:00-09:00 *Registration, Coffee, ePoster & Start-Up Exhibitions*

### 09:00-10:30 Plenary IV

***Chair: Avi Israeli, Hebrew University-Hadassah (IL),  
Co-Chair Track D***

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***Harold Wolf, HIMSS (US)***

TO SOLVE HEALTH ECOSYSTEM CHALLENGES, WE WILL HAVE TO  
TAKE RISK!

***Daniel Kraft, Singularity University (US)***

THE FUTURE OF MEDICINE: WHERE CAN TECHNOLOGY TAKE US?

***David Nash, Jefferson College of Population Health (US)***

DEVELOPING AN ACCREDITATION FRAMEWORK FOR GRADUATE  
PROGRAMS IN HEALTHCARE QUALITY AND SAFETY - A GLOBAL  
PERSPECTIVE

10:30-11:00 *Coffee Break, ePoster & Start-Up Exhibitions*

**11:00–13:00 Parallel Session 2**

**Topic A / Hall 1**

**DATA-DRIVEN CARE –  
REALIZING THE PROMISE**

**MAKING AN IMPACT AT SCALE**

*Chair: Varda Shalev*

**Innovation Slot:**

**David Nash (US)**

BUILDING THE FIRST COLLEGE OF  
POPULATION HEALTH IN THE USA –  
LESSONS LEARNED

**Noam Shomron (IL)**

AI AND GENOMICS

**Presentations:**

**Edward Meinert (UK)**

A CASE STUDY EXAMINING THE COST  
MEASUREMENTS IN PRODUCTION  
AND DELIVERY OF A BLENDED MASSIVE  
OPEN ONLINE COURSE (MOOC) ON THE  
USE OF DATA SCIENCE IN HEALTHCARE  
USING REAL WORLD EVIDENCE

**Rilwan Raji (Nigeria)**

USING QUALITY DATA TO STRENGTHEN  
ROUTINE IMMUNIZATION IN NIGERIA;  
EXPERIENCE WITH ROUTINE  
IMMUNIZATION (RI) LOTS QUALITY  
ASSURANCE SAMPLING (LQAS)

**Daniella Beller (IL)**

FIRST YEAR OF THE FIRST POPULATION  
BASED BIOBANK IN ISRAEL

**Topic B / Hall 2**

**UBER'IZATION OF HEALTHCARE –  
DREAM OR NIGHTMARE?**

**INNOVATION IN HEALTH DELIVERY  
SYSTEMS**

*Chair: Ahuva Weiss-Meilik*

**Innovation Slot:**

**Marta Gaia Zanchi (Spain) & Yona  
Vaisbuch (US)**

NEED-DRIVEN METHODOLOGY FOR  
DATA-DRIVEN CARE IN HOSPITAL  
INNOVATION CENTERS

**Presentations:**

**Dror Raif (IL)**

FETAL TELE-MONITOR SYSTEM –  
CENTRAL ANALYSIS, QUALITY CONTROL  
AND ARCHIVING – PRELIMINARY  
ACCOUNT OF THE FIRST YEAR

**Raphael Onyango (Kenya)**

DOES STAFFING LEVELS OF HEALTH-  
CARE WORKERS IMPACT RETENTION  
IN HIV CARE AND TREATMENT; A  
RETROSPECTIVE COHORT ANALYSIS OF  
DATA FROM RIFT-VALLEY IN KENYA?

**Robert Klempfner (IL)**

FEASIBILITY, SAFETY, AND  
EFFECTIVENESS OF A NOVEL  
MOBILE APPLICATION IN CARDIAC  
REHABILITATION

**11:00–13:00 Parallel Session 2****Topic C / Hall 3**

**INNOVATION IN HEALTH ECONOMICS, AND THE ECONOMICS OF HEALTHCARE INNOVATION**

**ECONOMICS OF HEALTHCARE INNOVATION, CARE DELIVERY AND PAYMENT SCHEMES**

*Chair: Dan Greenberg*

**Innovation Slot:**

**Peter J. Neumann (US)**

MEASURING THE VALUE OF NEW DRUGS: THE LATEST FROM THE US

**Presentations:**

**Joseph Mendlovic (IL)**

THE NEED FOR DIFFERENTIAL TARIFFS IN ISRAEL IN THE ERA OF AGING POPULATION AND EMERGING TECHNOLOGY: CARDIAC SURGERY AS A CASE STUDY

**Marcello Di Pumo (Italy)**

AN INNOVATIVE NON-ECONOMIC INCENTIVE TO INCREASE VACCINE ADHERENCE AMONG HCWS: COST-CONSEQUENCE ANALYSIS AND EVALUATION OF SUSTAINABILITY

**Leah Wapner (IL)**

PHYSICIAN REMUNERATION IN THE AGE OF INNOVATION

**Topic D / Hall 4**

**NEW CHALLENGES AND THREATS IN THE AGE OF INNOVATION**

**CONFRONTING POLICY ISSUES**

*Chair: Nir Kaidar*

**Innovation Slot:**

**Stephen C. Schoenbaum (US)**

CHALLENGES AND THREATS IN AN ERA OF INNOVATION IN HEALTH PROFESSIONS EDUCATION AND COLLABORATIVE PRACTICE

**Stuart H. Altman (US)**

LIMITING HEALTH SPENDING IN THE US: IMPACT ON INNOVATION

**Presentations:**

**Colby C. Uptegraft (US)**

DIGITIZING UNITED STATES AIR FORCE MEDICAL STANDARDS TO CREATE A DECISION-SUPPORT TOOL

**Bruce Rosen (IL)**

INNOVATION AND THE ISRAEL JOURNAL OF HEALTH POLICY RESEARCH (IJHPR)

**Michael Gluck (US)**

DISRUPTING HEALTH SERVICES RESEARCH IN THE US: NEED, OPPORTUNITIES, AND RISKS

**Topic A / Hall 1**

**Aman Kumar Singh (India)**

INNOVATIVE ADOPTION OF TECHNOLOGY FOR IMPROVING POPULATION BASED SCREENING OF COMMON NON COMMUNICABLE DISEASES IN INDIA

**Vincent Mor (US)**

BIG DATA AS A CATALYST FOR POLICY RESEARCH, PHARMACO-EPIDEMIOLOGY AND CLUSTER RANDOMIZED CLINICAL TRIALS

**Rachel Wilf Miron (IL)**

TOWARDS A NATIONAL SYSTEM FOR MEASURING AND PUBLIC REPORTING OF WAITING TIME FOR COMMUNITY-BASED SPECIALIST CARE

**Topic B / Hall 2**

**Fowie Ng (Hong Kong)**

NEW MODEL OF 'INTERNET + HEALTHCARE': CASE STUDY OF ONLINE HEALTH SERVICES IN CHINA

**Sandra Gomez Ventura (Honduras)**

FEASIBILITY OF TELEHEALTH IN HONDURAS

**Leonardo Villani (Italy)**

DIGITAL PATIENT PORTALS AND HEALTH OUTCOMES, SYSTEM EFFICIENCY AND PATIENT ATTITUDES: A SYSTEMATIC REVIEW

**Shlomit Avni (IL)**

IS UBER'IZATION OF RELATIONS POSSIBLE? EXAMINING THE PROS AND CONS OF TELE-CARE MODELS USING POVERTY-AWARE THEORIES

**Elevator Pitch:**

**Yael Applbaum (IL)**

HOME SWEET HOME

**Yongnian Liu (China)**

HEALTH SERVICE INTEGRATED CONSTRUCTION IN AGRICULTURAL & PASTORAL VILLAGES AND TOWNSHIPS OF QINGHAI, CHINA

**Alex Galper (IL)**

PRO (PATIENT REPORTED OUTCOMES) IMPLEMENTATION AT SHEBA MEDICAL CENTER

**Myriam Aburbbeh (IL)**

PLANNING FOR SPECIALISTS: CAN WE PREDICT THE NUMBER OF NEW SPECIALISTS?

**Topic C / Hall 3****Ruth Waitzberg (IL)**

THE 2013-14 EXPANSION OF ACTIVITY-BASED HOSPITAL PAYMENT IN ISRAEL: AN EVALUATION OF THE EFFECTS ON INPATIENT ACTIVITY OF 15 PROCEDURES

**Angela Irony (IL)**

HOME HOSPITAL VS. INSTITUTIONAL TREATMENT FOR SUB-ACUTE CARE PATIENTS – AN INNOVATIVE SETTING IMPACTING HEALTH ECONOMICS

**Ayelet Berg-Warman (IL)**

THE MINISTRY OF HEALTH FINANCIAL INCENTIVE PROGRAM TO IMPROVE DIAGNOSIS AND TREATMENT OF INFECTIOUS DISEASES IN NURSING HOMES

**Avi Herbon (IL)**

AN OPTIMAL CHARGING SCHEME FOR HUMAN EMBRYOS' STORAGE SERVICE: A SOURCE FOR A SECONDARY MARKET

**Elevator Pitch:****Orly Silbinger (IL)**

THE IMPACT OF CHILD INJURY ON THE ISRAELI ECONOMY

**Fabio Gomes (Brazil)**

LONG TERM IMPACT FROM INNOVATIONS IN NATIONAL HEALTH SYSTEMS: THE CASES OF BRAZIL AND ISRAEL

**Ronit Endevelt (IL)**

A NATIONWIDE POLICY PROJECT TO PROMOTE CONSUMPTION OF HEALTHY NUTRITION IN ISRAEL

**Eyal Ariely (IL)**

WHERE TO GO IN AN EMERGENCY? DETERMINANTS OF CHOICE OF OUT OF HOURS SERVICES IN MEUHEDET

**Topic D / Hall 4****Mieke Deschodt (Switzerland)**

IMPLEMENTATION OF AN INTEGRATED NURSE-LED CARE PROGRAM FOR COMMUNITY-DWELLING OLDER ADULTS IN CANTON BASELSTADT: THE INSPIRE PROJECT

**Ardita Kongjonaj (Albania)**

VARIATIONS IN INFANT AND CHILDHOOD VITAMIN D SUPPLEMENTATION PROGRAMS ACROSS EUROPE AND FACTORS INFLUENCING ADHERENCE

**Richard Dale (Sweden)**

MAKING SENSE OF DATA – BUILDING BRIDGES BETWEEN BIostatisticians AND POLICYMAKERS

**Idris Guessous (Switzerland)**

POPULATION-REPORTED OUTCOMES

**Elevator Pitch:****Oren Miron (US)**

OVERDOSE FROM PRESCRIPTION OPIOIDS IN ADOLESCENCE, 1999-2017

**Ronit Pinchas-Mizrachi (IL)**

THE HEALTH OF "ANSWER SEEKERS" – ADDRESSING THE NEEDS OF YOUNG ISRAELIS MOVING FROM THE ULTRA-ORTHODOX TO THE SECULAR COMMUNITY

13:00–14:00 *Lunch, ePoster & Start-Up Exhibitions*

13:15–14:00 **MEET THE EXPERT OVER LUNCH - Hall 5**

A unique opportunity to interact with global key opinion leaders over round tables

\*Pre-registration required

**14:00–15:30 Plenary V**

***Chair: Gabi Bin Nun, Ben-Gurion University of The Negev (IL)***

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***Ashish Jha, Harvard University (US)***

HOW DIGITAL TECHNOLOGY WILL TRANSFORM GLOBAL HEALTH:  
SAVING LIVES AND SAVING MONEY

**Roundtable 3**

***Chair: Martin McKee, London School of Hygiene & Tropical Medicine (UK)***

INNOVATION AND DISPARITIES: THE SOLUTION OR THE PROBLEM?

***Maxine Mackintosh, University College London (UK)***

***Nachman Ash, Maccabi Healthcare Services (IL)***

***Noa Dagan, Clalit Health Services (IL)***

15:30–16:00 *Coffee Break, ePoster & Start-Up Exhibitions*



**16:00–17:30 Plenary VI: Closing Session**

*Chair: Orly Manor, NIHP (IL)*

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**Roundtable 4**

**Chair: Kira Radinsky, Technion (IL)**

EXCITING SCIENCE TRANSFORMING HEALTHCARE: A GLIMPSE INTO THE (NEAR) FUTURE

**Divya Chander, Stanford University & Singularity University (US)**

**Uri Shalit, Technion (IL)**

**Noam Shomron, Tel Aviv University (IL)**

**ePoster Awards****Closing Remarks:**

**Isaac Kohane, Harvard University (US)**

**Ran Balicer, Clalit Health Services (IL)**

17:30–18:30 **CLOSING COCKTAIL RECEPTION**



# BIOGRAPHIES

## INVITED SPEAKERS & CHAIRPERSONS





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## Prof. Marc J. Abramowicz

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Prof. Abramowicz is a clinical geneticist, Professor at the University of Geneva and Head of the division of Genetic Medicine of the University Hospitals of Geneva (HUG), Geneva, Switzerland.



He is also a Professor of medical genetics at the Université Libre de Bruxelles, Belgium, and has been heading the Medical Genetics dept of University Hospital Erasme, Brussels, Belgium, 2009–2017.

He heads the recently created Center of Genomic Medicine of the HUG, Geneva, an interdisciplinary platform currently aiming at identifying the molecular causes of undiagnosed disease, allowing for precision medicine in Mendelian inherited genetic disease, with a perspective for genetic predisposition to common disease in the future.

Marc Abramowicz is a founding member of the Global Genomic Medicine Collaborative (G2MC) where he co-chairs the Evidence working group since 2014.

Prof. Abramowicz has authored more than 100 research papers relating to genetics or genomics in peer-reviewed journals.

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## Mr. Nissim Alon

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Mr. Alon is the President and CEO of Leumit Healthcare Services.



The organization has 340 branches all over the country.

The annual budget is NIS 5.2 billion. It has 750,000 members, 3,000 employees and 1600 independent contracted doctors.

Prior to his current position, Mr. Alon held various positions in Leumit: VP Organization Administration and Human Resources,

VP Operation, Tel Aviv District Director and Jerusalem District Director. In addition, at the outset of his career in healthcare services he was branch director in Meohedet HMO in Jerusalem.

Mr. Alon holds an MBA from Hebrew University in Jerusalem, and a BA in Political Science and Criminology from Bar Ilan University in Ramat Gan. He is a graduate of the IDF College for Command and Staff.

Mr. Alon lectures in the Health Systems Administration Department in Hadassah and Peres Academic College. He is a member of the Israel Health National Council, and was the CEO of the Israel Diabetes Association, 1993–1994.

Between 1976–1988, he served in the IDF in Command and Staff positions, after which he served for 11 years in reserve duty. Rank – Lt. Col. (Res).

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## Prof. Nachman Ash

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Born in Israel 1961. Received his MD degree from Sackler School of Medicine, Tel Aviv University on 1986. Completed his residency in Internal Medicine at the Sheba Medical Center on 1997.



In 2001 received MS degree in Medical Informatics from the Harvard-MIT Division of Health, Sciences and Technology, Boston, USA.

Prof. Ash has also a Master degree in political sciences from the University of Haifa.

Prof. Ash has been a military physician for 25 years. He retired in the rank of Brigadier General on 2011, after completing intensive 4 years as the Surgeon General of the IDF.

Between Jan 2012 and July 2013 served as a senior Deputy Director General for Health Informatics in the Ministry of Health.

On August 2013 Prof. Ash joined Maccabi Healthcare Services (MHS) as the chief Director of “Sharon” district. A year later he was promoted to be the Director of the Health Division of MHS, a position that he currently holds.

Nachman Ash is a Professor at Ariel University, the school of Health Sciences, the department of health systems management.

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## Prof. Ran Balicer

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Director, Clalit Research Institute; Director of Innovation, Clalit Health Services; Professor, Public Health Department, Faculty of Health Sciences, Ben-Gurion University of the Negev, Israel



Prof. Ran Balicer, MD, Ph.D., MPH serves as Founding Director of the Clalit Research Institute, the WHO Collaborating Center on Non-Communicable Diseases Research, Prevention and Control.

In Parallel, he serves as Director of Innovation for Clalit - Israel's largest healthcare organization. In these roles, he is responsible for strategic planning of novel organization-wide interventions for improving healthcare quality, reducing disparities and increasing effectiveness. These include the introduction of innovative data-driven tools into practice - predictive modeling, real-life effectiveness studies, decision support tools and proactive care models.

Prof. Balicer also serves as a Full Professor and as Track Director in the MPH program at the Ben-Gurion University, Israel. His research is focused on the study of extensive clinical databases in care provision and policymaking, health systems integrated care and quality management.

Prof. Balicer serves as Chair of the Israeli Society for Quality in Healthcare, He also serves as a Board Member of the International Foundation for Integrated Care, and in senior advisory roles to the World Health Organization (WHO) Regional Office for Europe.



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## Mr. Moshe Bar Siman Tov

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Moshe Bar Siman Tov is the Director General of the Ministry of Health of the State of Israel since June 2015. Mr. Bar Siman Tov previously served as the Ministry for Economic Affairs to the United States, Based in Washington, DC.



Mr. Bar Siman Tov has served for 11 consecutive years in the Budget-Division at the Israeli Ministry of Finance. In his last role at the budget division, Mr. Bar Siman Tov was the senior Deputy Director of the Budget Division, Responsible for the social expenditure in the Israeli national budget, including healthcare, education, employment & the welfare system. The role consisted of building the national budget, as well as promoting reforms and structural changes in these fields, negotiating with the national unions for salary agreements and representing the Ministry of Finance in public committees. In his last months at the ministry, Moshe was involved in the intensive negotiations over the fate of the Hadassah University Hospital in Jerusalem.

He started working in the budgets division in 2003 in the area of employment and social services, including responsibility for overseeing the budgets of the National Insurance Institute, Social Services Ministry and others. He later coordinated the budgets of the health system. He was appointed one of the ministry's six deputy directors in 2009. Mr. Bar Siman Tov holds an M.A and B.A in Economics and Business Administration from the Hebrew University of Jerusalem.

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## Prof. Dina Ben-Yehuda

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Professor Ben-Yehuda received her medical degree from the Ben-Gurion University Medical School (1974-1980).



She then continued her medical training as an intern and resident at Hadassah University Hospital (1981-1985) specializing in Hematology. Her training in basic research started at the Hebrew University Medical School and the Lautenberg Center for Immunology at the Hebrew University and was completed at the Sloan Kettering Institute for Cancer Research in New York (1990-1992).

Since returning to Israel, Professor Ben-Yehuda has set up her own laboratory which does both molecular diagnostics of hematologic diseases and basic research.

In April 2000, Professor Ben-Yehuda was appointed to be the Director of the Hematology Department in Hadassah University Hospital.

In September 2006 Professor Ben-Yehuda was appointed to be Director of The Division of Hematology (Hematology Dept., Bone Marrow Transplantation Dept. and Blood Bank).

In October 2017 Professor Ben-Yehuda was nominated Dean of the Faculty of Medicine of the Hebrew University, Jerusalem.

Professor Ben-Yehuda is extensively involved in clinical work as well as research and teaching and was awarded prizes for outstanding teacher in the Faculty of Medicine.

She participates in world-wide clinical trials and is well recognized in her international activities in the scientific community (guest lecturer, Chair of the Israel Society of Hematology, member of editorial boards).

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## Prof. Rafael Beyar

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Women's Division/Dr. Phillip and Sara Gotlieb, Professor of Medicine and Biomedical Engineering, and Former Dean the Rappaport Faculty of Medicine, Technion. Founder and Co-Chairman, Innovations in Cardiovascular Interventions Meeting.

Immediate Past Director & CEO, Rambam Health Care Campus. President, International Friends Associations, Rambam Health Care Campus. Chairman, Steering Committee, Helmsley Health Discovery Tower; Chairman, Founding Committee, Eyal Ofer Heart Hospital.

Rafael Beyar (Rafi) is the immediate former Director and CEO of Rambam Health Care Campus (2006–2019). He is a Professor of Medicine and Biomedical Engineering at the Technion, and served as Dean of the Ruth & Bruce Rappaport Faculty of Medicine (1999–2004). Under his term as Dean, the Johns Hopkins Technion–Collaboration Program was established, and Professors Hershko and Chiechanover were awarded the 2004 Nobel Prize in Chemistry.

Beyar received an MD from Tel Aviv University (1977), DSc in Biomedical Engineering from the Technion (1983), and MPH from the Bloomberg School of Public Health, Johns Hopkins University (2008). His clinical training was at Rambam and at Johns Hopkins Cardiology. He served as the Director of Interventional Cardiology at Rambam from 1996–2006. During his term as Rambam's Director, Beyar successfully guided the hospital through the 2006 Second Lebanon War, during which the hospital was under fire. Following the war, Beyar led the hospital through the Vision of Adam program, a program planned in partnership with Eitan and Ariella Wertheimer, emphasizing the intertwining of superb medical care and healing environment with technology, and humanity, concomitant with education, research, and innovation. Beyar also established Rambam MedTech, and spearheaded the hospital's role for establishment of the MindUp Incubator on Digital Health. Among his national posts, Beyar was chair of the Israeli Basket committee (2010–2014) and serves as the Chair of the Steering committee for the Israeli Organ Transplant Center.

A practicing interventional cardiologist, innovative researcher, inventor, and entrepreneur, Beyar co-authors more than 300 publications and 15 books, is the recipient of numerous awards. He co-founded successful medical device companies for coronary stents and a first-in-the-world robotic coronary intervention, now used worldwide. He founded and co-chairs with Prof. Chaim Lotan the Innovation in Cardiovascular Interventions meeting (ICI) since 1996.

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## Prof. Gabi Bin Nun

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Prof. Gabi Bin Nun worked at the Ministry of Health for 30 years. His last position in the Ministry was the Deputy Director General for Health Economics and Health Insurance.



Gabi was one of the architects and designers of the Israel's National Health Insurance Law (1995) and since then has played a central role in its implementation and evaluation.

Since 2008 Gabi is an Associate Professor in the Department of Health Systems Management at the Faculty of Management at Ben-Gurion University of the Negev in Israel.

His research focus is in the field of health policy, health economics and health care systems and he has published books and articles in these fields.

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## Prof. Haim Bitterman

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Director, Assuta-Ashdod Hospital.

Professor of Medicine (Emeritus). Faculty of Medicine, Technion – Israel Institute of Technology, Haifa, Israel.



### Training:

M.D. Hebrew University Medical School, Jerusalem, Israel.

1977–1982: Residency in Internal Medicine, Carmel Hospital, Israel.

1985–1987: Research fellowship in Cardiovascular Physiology, Thomas Jefferson Medical College. Philadelphia, PA, USA.

2001: Visiting Professorship. Department of Cardiovascular Medicine. Stanford University, Palo Alto, CA, USA.

### Appointments:

1989: Director, Department of Medicine, Carmel Hospital, Haifa, Israel.

1997: Associate Professor of Medicine. Faculty of Medicine, Technion, Haifa, Israel.

1999–2004: Vice Dean, Faculty of Medicine, Technion.

2000–2013: European Federation of Internal Medicine – Administrative council.

2003–2009: Chairman of Medicine, Carmel Hospital, Haifa.

2005–2011: President of the Israel Association of Internal Medicine.

2009– : Professor of Medicine. Faculty of Medicine, Technion, Haifa.

2009–2015: Clalit Health Services, Israel – Chief Medical Officer.

2016–: Director, Assuta-Ashdod Hospital.

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## Dr. Fabrice Brunet

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Born in France, Dr. Brunet has been working in the field of health and social services for over thirty years. He is currently President and Chief Executive Officer of the Hospital Center of the University of Montreal (CHUM) since September 2015. Previously, he was CHU Sainte-Justine's President and CEO from January 2009 to September 2018 and the CEO of the two hospitals from September 2015 to 2018. On July 14, 2018, he was knighted the Legion of Honor by France for his entire career in the health field.

Dr. Brunet has excellent leadership, initiative and experience to face complex challenges ahead. He promotes the integration of innovation, healthcare and services, teaching, research and management, to improve the health and well-being of patients.

His main research interests include hospital management and health systems integration, artificial intelligence, communication and medical information technologies, continuous improvement of quality of care and safety of the patient, international collaboration and transfer of know-how.

Over the course of his career, Dr. Brunet has been named Clinical Professor in the Department of Pediatrics at the University of Montreal, Professor of Intensive Care in France and Medicine at the University of Toronto, Head of Intensive Care Unit and Medical Director of the Telemedicine Program at St. Michael's Hospital in Toronto. Since February 2017, he has also been president of the University of Montreal Health Network (RUIS), having been its vice-president since 2009.

His many achievements include the construction of a critical care clinical research program and a cardiac surgery center in Paris, a hospital project in St. Petersburg, Russia and the creation of a university resuscitation center and intensive care in Toronto. Many modernization projects were carried out under his guidance, including the construction of a new research center and a building of specialized care units at CHU Sainte-Justine for a budget of \$1.5 billion and a new campus the CHUM for a budget of \$3.5 billion.

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## Dr. Divya Chander

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Dr. Chander is a physician and neuroscientist who trained at Harvard, UCSD, UCSF, and the Salk Institute.

She has been on the Anesthesiology Faculty at Stanford University since 2008 and Neuromedicine Faculty at Singularity University since 2010.



Her postdoctoral training in optogenetic technology was conducted in the laboratories of Karl Deisseroth and Luis de Lecea at Stanford, where she used light-activated ion channels inserted in DNA to study sleep and consciousness switches in brains.

In the operating room, she applies EEG technology to understand what human brains look like when they lose and regain consciousness, and has recently developed a precision medicine initiative aimed at understanding genetic variability in responses to anesthetic drugs. Her goal is to understand the neural mechanisms of consciousness and eventually utilize this knowledge to develop improved algorithms to create better brain monitors. She is currently working on applications of neural wearable devices to crossover consumer and medical markets.

Dr. Chander shares a parallel passion for space exploration.

During her lifetime, it is her deepest desire to see a well-developed architecture to sustain human and robotic exploration of our solar system and beyond. An alumnus of the International Space University.

Dr. Chander has performed remote simulations of trauma rescues, anesthesia, and surgery in Mars analogue settings with physicians in the US, France, and the Concordia base in Antarctica.

Currently, she is involved with a consortium that is studying the effect of microgravity and radiation on the nervous system, cardiovascular system, cognition, and sleep.

Dr. Chander anticipates using many of the brain read-out technologies applied to her clinical practice to understanding nervous system development and plasticity within the space microgravity environment to better enable short and long-duration space missions.

She welcomes collaborations and joint ventures in the domains of neuroscience/ consciousness studies and space neurophysiology.

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## Dr. Noa Dagan

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Noa Dagan has an MD and an MPH degree from the Hebrew University. She is currently the Chief Data Officer of the Clalit Research Institute at Clalit Health Services. In addition, she is a public health resident and a PhD student in the Computer Science department at Ben-Gurion University.



Dr. Dagan is currently focusing on the development and research of data and AI driven solutions in medicine, to promote preventive and proactive care. She leads the entire lifecycle of data and AI-driven interventions, from concept design, through machine-learning modeling, to implementation (when model results are deployed directly to patients or their physicians).

Her PhD work focuses on practical implementations of machine-learning algorithms on clinical data. Clinical areas of interest currently include prevention of cardiovascular events and osteoporotic fractures. Dr. Dagan is also exploring algorithms to improve the fairness of machine-learning models.



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## Prof. Dan Greenberg

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Professor and Chairman, The Department of Health Systems Management, The School of Public Health, The Faculty of Health Sciences and the Guilford–Glazer Faculty of Business and Management at Ben-Gurion University of the Negev, Israel.



Prof. Greenberg teaches on comparative healthcare systems, health technology assessment and management, and economic evaluation of technologies in healthcare.

Since 2008, he is also affiliated with the Center for the Evaluation of Value and Risk in Health (CEVR) at The Institute for Clinical Research and Health Policy Studies at Tufts Medical Center, Boston, MA, and is an adjunct faculty at the Tufts University School of Medicine.

Prof. Greenberg received his doctorate degree from the Ben-Gurion University of the Negev in 2001.

During 2001–2004 he completed a 3-year post-doctoral research fellowship at the Harvard Clinical Research Institute & Cardiovascular Division, Beth Israel Deaconess Medical Center, and Harvard Medical School, initially as a Fulbright Scholar, and was a Visiting Scientist at the Department of Health Policy and Management at the Harvard School of Public Health from 2003–2006.

His research focuses on the economic evaluation of healthcare technologies, health technology policy, diffusion of innovation, medical decision-making and outcomes research.

Prof. Greenberg authored or co-authored some 100 papers and book chapters and published his work in leading medical and health policy journals, such as the *British Medical Journal*, *Annals of Internal Medicine*, *Journal of the National Cancer Institute*, *Journal of Clinical Oncology*, *Health Affairs*, and *Value in Health*. Dan was Associate editor for *Value in Health*, and is Editor-in-chief for *Value in Health Regional Issues*, the official journals of the International Society for Pharmacoeconomics and Outcomes Research (ISPOR), Topic editor for *Clinical Therapeutics (Pharmacoeconomics, Outcomes, and Health Policy)* and member of the editorial board of *Applied Health Economics and Health Policy*.

He is a member of the board of directors of Clalit, the largest HMO in Israel (4.5 million members), co-founder and the current President of the Israeli Society for Pharmacoeconomics and Outcomes Research (ISPOR–Israel Regional Chapter).

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## Prof. Itamar Grotto

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Associate Director General  
Israeli Ministry of Health, Israel

### About the Role

The Associate Director General of the Israel Ministry of Health leads the regulatory activities of the hospitals and community services, as well as of preventive services and Public Health. He also serves as the Director of the Health Division of the Ministry of Health

### Fields of Responsibility

- ◆ Preventive services policy, management and operation
- ◆ Health Promotion
- ◆ Emergency Preparedness
- ◆ Environmental Health
- ◆ Food safety
- ◆ Supervision of Public and Private Hospitals: General, Psychiatric and Geriatric
- ◆ Regulation and supervision of Community Services
- ◆ Quality Measurement
- ◆ Information Technology, Digital Health and Cyber Security



### Professional Highlights

Prof. Itamar Grotto is a Public Health Physician and an Epidemiologist. He serves as the Associate Director General of the Israeli Ministry of Health (MoH) since 2017. In his previous position starting in 2007, he served as the Director of Public health Services of the MoH. In that capacity, he led a major change in the preventive services, and updated the immunization basket. He also led a National Health Promotion program aimed to prevent obesity and related diseases. During his time in service, the fields of Environmental Health and Food Safety underwent through major regulatory reforms. In 2013, Prof. Grotto led the response of the Israeli MoH to the silent transmission of wild poliovirus, which resulted in polio re-eradication from Israel with no clinical cases. Prof. Grotto served also as the Head of the Army Health branch in the Military Corps of the Israel Defense Force and retired as a Lieutenant Colonel. Prof. Grotto is also an active member of the Public Health School of Ben-Gurion University in Israel. His main research activities are in the fields of infectious diseases epidemiology and health behaviors among adolescents and young adults, as well as public health policy development. Prof. Grotto authored in more than 200 scientific publications. On May 2018, Prof. Itamar Grotto was elected as a member of the Executive Board of the World Health Organization as a representative of Israel and the European Region.

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## Prof. John D. Halamka

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Executive Director, Beth Israel Lahey Health Technology Exploration Center.

John D. Halamka, M.D., leads innovation for Beth Israel Lahey Health. Previously, he served for over 20 years as the chief information officer (CIO) at the Beth Israel Deaconess Healthcare System. He is chairman of the New England Healthcare Exchange Network (NEHEN), and a practicing emergency physician. He is also the International Healthcare Innovation professor at Harvard Medical School.



Dr. Halamka completed his undergraduate studies at Stanford University, where he received a degree in medical microbiology and a degree in public policy with a focus on technology issues. He entered medical school at the University of California, San Francisco and simultaneously pursued graduate work in bioengineering at the University of California, Berkeley focusing on technology issues in medicine. He completed his residency at Harbor-UCLA Medical Center in the Department of Emergency Medicine.

As the leader for innovation at the \$7 billion Beth Israel Lahey Health, he oversees digital health relationships with industry, academia, and government worldwide. As a Harvard professor, he has served the George W. Bush administration, the Obama administration, and national governments throughout the world planning their healthcare IT strategy. In his role at BIDMC, Dr. Halamka was responsible for all clinical, financial, administrative, and academic information technology, serving 3,000 doctors, 12,000 employees, and 1,000,000 patients.

Dr. Halamka has authored a dozen books about technology-related issues, hundreds of articles and thousands of posts on the popular Geekdoctor blog.

He runs Unity Farm in Sherborn, MA and serves as caretaker for 250 animals, 30 acres of agricultural production and a cidery/winery.

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## Prof. Avi Israeli

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Professor Abraham (Avi) Israeli is the Chairman of the Board of Trustees of The Israel National Institute for Health Policy Research, The Chief Scientist of the Israel Ministry of Health, and the Head of the Health Policy, Health Care Management and Health Economics Department at the Hebrew University - Hadassah Faculty of Medicine.

Prior to this, he was the Director General of the Israel Ministry of Health (2003–2009) and the Director - General of Hadassah Medical Organization (1998–2001).

He holds the Dr. Julien Rozan Chair of Family Medicine and Health Promotion at the Hebrew University - Hadassah Medical School, Jerusalem (since 1996) and teaches there regularly.

Professor Israeli chaired the national committee to update the Israeli national standard basket of health services and many more national and international committees.

Professor Israeli received his medical degree and his master in public health from the Hadassah - Hebrew University Medical School. He completed residencies in Internal Medicine and in Health-Care Management at Hadassah University Hospital and has certification in both specialties. He received his Master's Degree from the Sloan School of Management at MIT, Boston.

His scientific activities are related to applied, methodological and theoretical research in the fields of health policy, health care management, and the epidemiological, economic, social and cultural basis for decision-making.

His publications deal with the translation of academic knowledge and inputs from the field into policy setting and decision-making processes.

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## Dr. Ashish K. Jha

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Ashish K. Jha, MD, MPH is a physician, health policy researcher, and advocate for global healthcare reform. Dr. Jha serves as the Director of the Harvard Global Health Institute, K.T. Li Professor of International Health & Health Policy at the Harvard T.H. Chan School of Public Health, Professor of Medicine at Harvard Medical School, and a practicing Internal Medicine physician at the VA Boston Healthcare System.



Dr. Jha received his M.D. from Harvard Medical School and trained in Internal Medicine at the University of California, San Francisco where he also served as Chief Medical Resident. He completed his General Medicine fellowship from Brigham and Women's Hospital and Harvard Medical School and received his M.P.H. from Harvard T.H. Chan School of Public Health.

Dr. Jha's major research interests lie in improving the quality and costs of healthcare with a specific focus on the impact of policy efforts. His work has focused on a broad set of issues including transparency and public reporting of provider performance, financial incentives, health information technology, and leadership, and the roles they play in fixing healthcare delivery systems.

The Harvard Global Health Institute, in combination with Dr. Jha's research team and the Global Health Delivery Project, reside at 42 Church Street in the heart of Harvard Square.

A prolific writer, Dr. Jha has published over two hundred various papers in notable journals. Furthermore, his personal blog entitled "An Ounce of Evidence", which focuses on bringing statistical data research to the conversation of health quality improvement, has garnered a significant following across the web.

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## Mr. Charles N. Kahn

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Charles N. (“Chip”) Kahn III is President and Chief Executive Officer of the Federation of American Hospitals (FAH), the national public policy organization for investor-owned hospitals, a position that he has held since June 2001.



He is recognized nationally as one of the country’s most insightful and articulate experts on health policy, Medicare payment, health care financing, and health coverage.

Mr. Kahn serves as co-chairman of the Coordinating Committee of the National Quality Forum’s (NQF) Measure Applications Partnership (MAP), a multi-stakeholder private-public partnership for developing and implementing a national strategy for health care quality measurement. He also is a former member of the NQF’s Governing Board. Previously, Mr. Kahn served as a principal of the former Hospital Quality Alliance (HQA), a private-public partnership that he helped to initiate. He was a Commissioner of the American Health Information Community, a former federal policy advisory panel responsible for advising then-HHS Secretary Michael Leavitt about the diffusion of health information technology and was recently appointed a member of the HHS Agency for Healthcare Research and Quality National Advisory Council.

Before coming to the FAH, Mr. Kahn was one of the nation’s top public policy leaders for the health insurance industry.

Mr. Kahn had a long and distinguished career as a professional staff person in The United States Senate and House of Representatives, specializing in health policy issues.

Mr. Kahn taught health policy at The Johns Hopkins University, The George Washington University, and Tulane University and writes about health care financing and quality measurement policy.

Mr. Kahn holds a Masters of Public Health (M.P.H.) degree from Tulane University’s School of Public Health and Tropical Medicine. Mr. Kahn received a Bachelor of Arts degree from The Johns Hopkins University.

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## Mr. Nir Kaidar

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Senior Deputy Director General and Head of the Administration for Strategy, Economic Planning, Research and Regulation, Ministry of Labor, Social Affairs and Social Services.



In 2019, Nir started his position at the Ministry of Labor, Welfare and Social Services, where he is responsible for all aspects of quality and supervision of the social services in Israel.

Between the years 2014–2019, Nir served as Senior Deputy DG and Head of the Strategic and Economic Planning Administration at the Ministry of Health. He was responsible for the development and promotion of the Ministry's strategic plans, economic planning of the health system, promotion of national reforms and more. Nir filled additional positions in the Health Ministry, including director of the area of Health Economics and senior coordinator of Health Economics, both in the Economics and Health Insurance division.

Nir has an MA in Public Policy, in the program for exceptional students at the Hebrew University, and a Master of Social Sciences and Humanitarian Affairs in a joint program of the Hebrew University and La Sapienza in Rome.

Nir has a BA in the combined program in Philosophy, Economics and Political Science, also from the Hebrew University.

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## Prof. Isaac Kohane

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Isaac (Zak) Kohane, MD, PhD is the inaugural Chair of the Department of Biomedical Informatics and the Marion V. Nelson Professor of Biomedical Informatics at Harvard Medical School. He served as co-author of the Institute of Medicine Report on Precision Medicine that has been the template for national efforts. He develops and applies computational techniques to address disease at multiple scales: from whole healthcare systems as “living laboratories” to the functional genomics of neurodevelopment with a focus on autism.



Over the last 30 years, Zak’s research agenda has been driven by the vision of what biomedical researchers could do to find new cures, provide new diagnoses and deliver the best care available if data could be converted more rapidly to knowledge and knowledge to practice. In so doing, Dr. Kohane has designed and led multiple internationally adopted efforts to “instrument” the healthcare enterprise for discovery and to enable innovative decision-making tools to be applied to the point of care. At the same time, the new insights afforded by ‘omic-scale molecular analyses have inspired him and his collaborators to work on re-characterizing and reclassifying diseases such as autism, rheumatoid arthritis and cancers. In many of these studies, the developmental trajectories of thousands of genes have been a powerful tool in unraveling complex diseases.

In 1987, Dr. Kohane earned his MD/PhD from Boston University and then completed his post-doctoral work at Boston Children’s Hospital, where he has since worked as a pediatric endocrinologist. He joined the faculty at Harvard Medical School in 1992, serving as Director of Countway Library from 2005–2015 and as Co-Director of the Center for Biomedical Informatics during the same period, before it became the Department of Biomedical Informatics in July 2015. Dr. Kohane has published several hundred papers in the medical literature and authored a widely-used book on Microarrays for an Integrative Genomics. He is a member of the Institute of Medicine and the American Society for Clinical Investigation.



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## Prof. Daniel Kraft

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Prof. Daniel Kraft is a Stanford and Harvard trained physician-scientist, inventor, entrepreneur, and innovator. With over 25 years of experience in clinical practice, biomedical research and healthcare innovation, Kraft has served as Faculty Chair for Medicine at Singularity University since its inception in 2008, and is the Founder and Chair of Exponential Medicine, a program that explores convergent, rapidly developing technologies and their potential in biomedicine and healthcare.



Following undergraduate degrees from Brown University and medical school at Stanford, Daniel was Board Certified in both Internal Medicine & Pediatrics after completing a Harvard residency at the Massachusetts General Hospital & Boston Children's Hospital, and fellowships in hematology, oncology and bone marrow transplantation at Stanford.

He has multiple scientific publications and medical device, immunology and stem cell related patents through faculty positions with Stanford University School of Medicine and as clinical faculty for the pediatric bone marrow transplantation service at University of California San Francisco.

Daniel is a member of the Kaufman Fellows Society (Class 13) and member of the Inaugural (2015) class of the Aspen Institute Health Innovators Fellowship. Daniel's academic research has focused on: stem cell biology and regenerative medicine, stem cell derived immunotherapies for cancer, bioengineering human T-cell differentiation, and humanized animal models. Clinical work focuses on: bone marrow / hematopoietic stem cell transplantation for malignant and non-malignant diseases in adults and children, medical devices to enable stem cell based regenerative medicine, including marrow derived stem cell harvesting, processing and delivery. He also implemented the first text-paging system at Stanford Hospital. He is also the inventor of the MarrowMiner, an FDA approved device for the minimally invasive harvest of bone marrow, and founded RegenMed Systems, a company developing technologies to enable stem cell-based regenerative therapies. He is also the founder of IntelliMedicine, focused on data driven, precision medicine. Daniel is an avid pilot and has served in the Massachusetts and California Air National Guard as an officer and flight surgeon with F-15 & F-16 Fighter Squadrons. He has conducted research on aerospace medicine that was published with NASA, with whom he was a finalist for astronaut selection.

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## Dr. Osnat Levtzion-Korach

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49 years old, married to Amit Korach, MD. Mother of 4 boys; Yoav (22), Nadav (20), Yuval (16) and Yonatan (10).



Graduated from Hadassah-university Medical School (1996), board certified in both Pediatrics and Hospital Management from Hadassah Medical Center.

Dr. Levtzion-Korach's expertise is in Patient safety, quality of care and improvement of processes. An area which she furthered developed in her 3 years work at the Center of Excellence for Patient Safety at Brigham and Women's Hospital (BWH), Harvard, Boston. At Brigham she worked on various issues of patient safety. Along with her work at BWH Dr. Levtzion-Korach was a senior consultant at the program of Management and Variability in Healthcare Delivery, Boston University and later at PatientFlow Technology; consulting hospitals around the US on how to optimize the flow of the patients and the usage of resources in the operating room, cath lab and the emergency department.

After her return from the USA in the summer of 2008, she became the Deputy Director of Assaf Harofeh Medical Center, where she served 3.5 years; as the Deputy Director she had numerous responsibilities.

In June 2012, she was appointed to be the Director of Hadassah Mount Scopus Hospital, becoming the first woman leading a Hadassah Hospital. After very successful 5 years, in leading Hadassah Mount Scopus Hospital. She was chosen to be the Director General of Assaf Harofeh Medical Center - being the first woman in Israel to lead a governmental hospital.

Osnat started her position heading Assaf Harofeh in September of 2017.

Her professional interests are: Patient safety, Patient centered care, Appropriateness usage of resources, Improvement of Patient-Flow, Risk management and quality assurance and Healthcare economics.

Osnat studies and publishes on these issues.

Dr. Levtzion-Korach is involved in different patient safety and quality initiatives nationally.

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## Prof. Christian Lovis

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Board certified physician in internal medicine, professor of clinical informatics and director of the academic department of radiology and medical informatics at the University of Geneva and chairman of the division of Medical Information Sciences at the university Hospitals of Geneva.



His research focuses on clinical data interoperability and semantic representation, including a strong lead on computational linguistics and tools to use medical narratives and texts.

Christian is a Fellow of the American Medical informatics association (FACMI) and Medical Informatics certified of the German Medical Informatics Association. He is Editor-in-Chief of JMIR Medical Informatics and of HealthManagement.Org, academic editor of PLOS One, member of the scientific board of the Swiss Personalized Health network initiative and of the international advisory board of the German “Medical Informatics” initiative.

Christian was vice-chair of the HIMSS board of directors, president of the Swiss and of the European Federation of Medical Informatics.

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## Ms. Maxine Mackintosh

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Maxine is a Ph.D. student at the Alan Turing Institute and University College London's Institute of Health Informatics.

Her Ph.D. involves using medical records to uncover early signs of dementia.

She is interested in how we might make better use of routinely collected data to inform our understanding of health and diseases.

Prior to this, she completed a BSc in Biomedical Sciences (UCL) and an MSc in Health Policy, Planning and Financing (LSE & LSHTM).

In addition, Maxine is the co-founder of One HealthTech - a community which champions and supports underrepresented groups, particularly women, to be the future leaders in health innovation.

Her professional work has led her to the Royal Society, Roche, L'Oreal, Department for International Development and NHS England.

She is part of a number of communities and committees including the World Economic Forum's Global Shapers, the British Computer Society (Health Exec) and previously, DeepMind Health's Independent Review Board.



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## Prof. Orly Manor

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Prof. Manor is the Chairman of the Board of the Israel National Institute for Health Policy Research, since 2014, and a Professor of Biostatistics at the Braun School of Public Health and Community Medicine of the Hebrew University–Hadassah Medical Organization in Jerusalem. Prof. Manor is a former Director of the School.

Prof. Manor received her first and second degrees in Statistics from the Hebrew University and her PhD in Statistics from Stockholm University.

Prof. Manor led the Israel National Program for Quality Indicators in Community Healthcare (QICH) during the years 2010–2017. Prof. Manor is the founder of the Israel Longitudinal Mortality Studies. Prof. Manor’s research interests include quality of care, health inequalities, the developmental origin of adult disease and methodological issues associated with longitudinal studies. In 2012, Prof. Manor was the recipient of The Hebrew University Rector’s award for outstanding faculty member. Prof. Manor was a visiting professor in numerous institutions including Stockholm University and Geneva University Hospital. See also Prof. Manor’s Lancet Profile <https://www.sciencedirect.com/science/article/pii/S0140673617311972?via%3Dihub>

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## Prof. Martin McKee

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Martin McKee is Medical Director and Professor of European Public Health at LSHTM, London School of Hygiene & Tropical Medicine and Research Director at the European Observatory on Health Systems and Policies.



He qualified in medicine in Northern Ireland and subsequently trained in public health in London.

His research focuses on the health effects of major social, political, and economic change, from the collapse of the USSR to Brexit. He has published over 1,100 papers in peer-reviewed journals and he is author or editor of 46 books. He is in the top 1% by citations worldwide in social sciences.

He is a member of the International Advisory Committee of the Israel National Institute for Health Policy Research and, in 2015, was the Albert Neuberger lecturer at the Hebrew University, Jerusalem.

His contributions to health policy in Europe have been recognized by election to the UK Academy of Medical Sciences, US National Academy of Medicine, and Academia Europaea and has been awarded honorary doctorates from Greece, Hungary, the Netherlands, Sweden, and the United Kingdom.

In 2003 he was awarded the Andrija Stampar medal by the Association of Schools of Public Health in European Region (ASPHER) and in 2005 he was made a Commander of the Order of the British Empire (CBE) for services to health care in Europe.

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## Prof. Shlomo Mor-Yosef

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Prof. Shlomo Mor-Yosef is the Director General of Population and Immigration Authority since 2017.

Prof. Mor-Yosef was the Director General of the Bituach Leumi, National Insurance Institute of Israel between the years 2012–2016.

Prof. Mor-Yosef was the Chairman of the Board of the Israel National Institute for Health Policy Research between the years 2008–2014.

In 2011, Prof. Mor-Yosef completed his tenure as Director General of the Hadassah Medical Organization (HMO) in Jerusalem. His eleven years as Director General were the crowning glory of his 38 years at Hadassah, from his first year of medical school until 2011, with just a few brief exceptions.

Prof. Mor-Yosef graduated from the Hebrew University–Hadassah Medical School in 1980, completing his obstetrics and gynecology specialization at Hadassah. He served as a senior physician in the Department of Obstetrics and Gynecology at Hadassah with special focus on cervical cancer. From 1988–89 Prof. Mor-Yosef completed a subspecialty in Gynecological Oncology at Queen Elizabeth Hospital, Gateshead, England.

In 1990, Prof. Mor-Yosef assumed the position of Deputy Director of the Hadassah Ein Kerem Hospital, following which he studied at the Harvard University JFK School of Government where he received his Master's Degree in Public Administration. In 1994, he assumed the post of Deputy Director General of HMO and then served as Director of Hadassah Ein Kerem. Prior to assuming his post as Director General of HMO, Prof. Mor-Yosef served as Director General of the Soroka Medical Center of the Negev.

Prof. Mor-Yosef has authored more than 100 scientific publications and has served on the faculty of several universities and boards of various organizations and companies. From 2001–2012, Prof. Mor-Yosef served as Chairman of Hadasit, HMO's Technology Transfer Company. Among his present responsibilities, Prof. Mor-Yosef serves as Chairman of the Public Committee for Fertility and Birth appointed by the Director General of the Ministry of Health to recommend legislation in the field of fertility and birth in Israel; and Member of the Master Plan for Transportation Committee of the Association for Planning, Development & Urban Preservation – Jerusalem.



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## Dr. David B. Nash

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David B. Nash is the Founding Dean and the Dr. Raymond C. and Doris N. Grandon Professor of Health Policy at the Jefferson College of Population Health (JCPH). His 10-year tenure as Dean completes nearly 30 years on the University faculty. JCPH is dedicated to developing healthcare leaders for the future. A board-certified internist, Dr. Nash is internationally recognized for his work in public accountability for outcomes, physician leadership development, and quality-of-care improvement.

Repeatedly named to Modern Healthcare's list of Most Powerful Persons in Healthcare, his national activities cover a wide scope.

Dr. Nash is a principal faculty member for quality of care programming for the American Association for Physician Leadership (AAPL) in Tampa, FL. He serves on the NQF Task Force on Improving Population Health and the John M. Eisenberg Award Committee for The Joint Commission. He also is a founding member of the AAMC-IQ Steering Committee, the group charged with infusing the tenets of quality and safety into medical education.

Dr. Nash was recently appointed to the Executive Research Advisory Council (ERAC) of the Pharmaceutical Quality Alliance (PQA) in Washington, DC.

Dr. Nash has governance responsibilities for organizations in the public and private sectors. He has chaired the Technical Advisory Group (TAG) of the Pennsylvania Health Care Cost Containment Council (HC4) for more than 20 years and he is widely recognized as a pioneer in the public reporting of outcomes.

Dr. Nash has been a hospital trustee for 20 years. He served on the Board of Trustees of Catholic Healthcare Partners (now Mercy Partners), in Cincinnati, OH (1998–2008), where he was the inaugural chair of the board committee on Quality and Safety.

He now serves on the board of the Geisinger Commonwealth School of Medicine (GCSOM). In 2018 he joined the board of the National Investment Center for Senior Housing and Care (NIC) – a national not-for-profit to enable housing choices for elders. In 2019, he joined the AMGA Foundation Board in Arlington, VA.



Dr. Nash has received many awards in recognition of his achievements. He received the top recognition award from the Academy of Managed Care Pharmacy (1995), the Philadelphia Business Journal Healthcare Heroes Award (1997), and was named an honorary distinguished fellow of the American College of Physician Executives (now AAPL) in 1998. In 2006 he received the Elliot Stone Award for leadership in public accountability for health data from NAHDO. Wharton honored Dr. Nash in 2009 with the Wharton Healthcare Alumni Achievement Award and in 2012 with the Joseph Wharton Social Impact Award. Also in 2012, he received the Philadelphia Business Journal award for innovation in medical education.

Dr. Nash's work is well known through his many publications, public appearances, and an online column on MedPage Today. He has authored more than 100 peer-reviewed articles and edited 23 books.

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## Prof. Peter J. Neumann

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Director of the Center for the Evaluation of Value and Risk in Health (CEVR) at the Institute for Clinical Research and Health Policy Studies at Tufts Medical Center, and Professor of Medicine at Tufts University School of Medicine.

He is the founder and director of the Cost-Effectiveness Registry, a comprehensive database of cost-effectiveness analyses in health care.

Prof. Neumann has written widely on the role of clinical and economic evidence in pharmaceutical decision making and on regulatory and reimbursement issues in health care.

He served as co-chair of the 2nd Panel on Cost-Effectiveness in Health and Medicine. He is the author or co-author of over 250 papers in the medical literature, the author of *Using Cost-Effectiveness Analysis to Improve Health Care* (Oxford University Press, 2005) and co-editor of *Cost-Effectiveness in Health and Medicine, 2nd Edition* (Oxford University Press, 2016).

Prof. Neumann has served as President of the International Society for Pharmacoeconomics and Outcomes Research (ISPOR). He is a member of the editorial advisory board of *Health Affairs* and the health policy advisory boards for the Congressional Budget Office.

He has also held several policy positions in Washington, including Special Assistant to the Administrator at the Health Care Financing Administration.

He received his doctorate in health policy and management from Harvard University.

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## Prof. Kira Radinsky

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Prof. Radinsky serves as a visiting professor at the Technion, Israel's leading science and technology institute, where she focuses on the application of predictive data mining in medicine.

In the past, she co-founded SalesPredict, acquired by eBay in 2016, that was the leader in the field of predictive marketing building solutions leveraging large-scale data mining to predict sales conversions.

One of the up-and-coming voices in the data science community, she is pioneering the field of medical data mining.

Prof. Radinsky gained international recognition for her work at Microsoft Research, where she developed predictive algorithms that recognized the early warning signs of globally impactful events, including political riots and disease epidemics.

In 2013, she was named to the MIT Technology Review's 35 Young Innovators Under 35, in 2015 as Forbes 30 under 30 rising stars in enterprise technology, and in 2016 selected as "woman of the year" by Globes.

She is a frequent presenter at global tech events, including TEDx, Wired, Strata Data Science, Techcrunch, academic conferences, and she publishes in the Harvard Business Review.

Radinsky serves as a board member in Israel Security Authorities, Maccabi Research Institute and technology board of HSBC bank.

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## Prof. Stephen Schoenbaum

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Stephen C. Schoenbaum, MD, MPH, is Special Advisor to the President of the Josiah Macy Jr. Foundation, a grant-maker that fosters innovations in health professions education. He has extensive experience as a clinician, epidemiologist, and manager.



From 2000-2010, he was Executive Vice President for Programs at The Commonwealth Fund and Executive Director of its Commission on a High Performance Health System.

Prior to that, he was the medical director and then president of Harvard Pilgrim Health Care of New England, a mixed model HMO delivery system in Providence, RI.

He chairs the International Academic Review Committee at the Joyce and Irving Goldman Medical School in Be'er Sheva; and in 2014 he chaired an external committee that reviewed the medical schools in Israel.

He is an honorary fellow of the Royal College of Physicians.

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## Prof. Varda Shalev

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Director, Kahn-Sagol-Maccabi Research and Innovation Institute, Israel



Prof. Varda Shalev, MD MPH, is the head of the Kahn-Sagol-Maccabi Research and Innovation Institute, and a faculty member at the Tel-Aviv University School of Public Health (TAU SPH). Side by side to here senior level roles, Prof. Shalev is an active primary care physician in Maccabi Healthcare Services (MHS) sick fund.

With an MD degree from Ben-Gurion University Medical School, she completed her residency in family medicine and earned an MPA in Health Public Administration at Clark University. After a two-year fellowship in medical informatics at the Johns Hopkins University Hospital, Prof. Shalev established the Medical Informatics Department at Maccabi and was responsible for planning and developing its computerized systems encompassing data from two million members and 9000 care provides. She has pioneered the development of multiple disease registries to support chronic disease management. Prior to her current position, Prof. Shalev has served as the director of Primary Care Division at MHS and implemented several structural reforms in the provision of care.

Prof. Shalev's research interests are epidemiology, medical informatics and predictive analytics. She is a member of the European Health Telematics Association and the American Medical Informatics Association. Prof. Shalev teaches regularly at the TAU SPH graduate school in the areas of big-data and medical informatics. She has authored or co-authored over 200 publications in peer-reviewed journals.

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## Prof. Amir Shmueli

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Amir Shmueli received his MA and Ph.D in economics from the Hebrew University of Jerusalem, where he currently serves as a Full Professor of Health Economics.



His research has focused on risk adjustment, equity, solidarity and health inequality, technology assessment in medicine and economic aspects of complementary and alternative medicine.

Amir has been intensively involved in Israeli health policy decisions, and has a long experience with global research networks. He was a member of the Stanford Center for Health Policy's global projects TECH and GHP, and was one of the founders of the Risk Adjustment Network (RAN) (<http://www.riskadjustment.net>) in 2000.

He has published over 100 papers in peer-reviewed journals, and has had appointments as a visiting scholar at Yale University, University of Technology Sydney, Dauphine University Paris, IRDES Paris, and Fordham University, NYC.

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## Prof. Uri Shalit

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Uri Shalit is a senior lecturer (assistant professor) at the Technion - Israel Institute of Technology, Faculty of Industrial Engineering and Management, in the areas of statistics and information systems.



Uri's research is focused on two subjects:

The first is applying machine learning to the field of healthcare, especially in terms of providing physicians with decision support tools based on big health data.

The second is the intersection of machine learning and causal inference, with a focus on learning individual-level effects.

Previously, Uri was a postdoctoral researcher in Prof. David Sontag's Clinical Machine Learning Lab in NYU and then MIT. He completed his PhD studies at the Center for Neural Computation at The Hebrew University of Jerusalem, under the guidance of Prof. Gal Chechik and Prof. Daphna Weinshall. From 2011 to 2014 he was a recipient of Google's European Fellowship in Machine Learning.

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## Prof. Noam Shomron

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Professor Noam Shomron is passionate about using basic science to advance better healthcare.



Prof. Shomron heads the Genomic Intelligence Research Laboratory at the Faculty of Medicine at Tel Aviv University, after training at MIT.

He leads a multidisciplinary team of scientists: biologists, physicians, computer scientists and bioinformaticians. The team develops computational methods for parsing molecular and big-data in the bio-medical field using Artificial Intelligence, successfully publishing more than 150 scientific papers and applying for more than 30 patents.

Shomron's aim is to deepen our understanding of diseases in order to translate information into clinical reality.

Shomron is also the Editor of 'Deep Sequencing Data Analysis' book (Springer); Director of 'Rare-Genomics' Israel (NPO); Academic Director of 'ScienceAbroad' (NPO); and, Co-founder and Chief Scientific Officer (CSO) of Variantyx which provides clinical interpretation of whole genome sequences.



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## Dr. Lisa Simpson

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Dr. Simpson has been the President and Chief Executive Officer of AcademyHealth since 2011. A nationally recognized health policy researcher and pediatrician, she is a passionate advocate for the translation of research into policy and practice. Her research, and over 100 articles and commentaries in peer-reviewed journals, focuses on the role of evidence and data to improve health and healthcare, particularly for children and vulnerable populations.

Before joining AcademyHealth, Dr. Simpson spent eight years as a professor of pediatrics, first as an Endowed Chair in Child Health Policy at the University of South Florida and then as the Director of the Child Policy Research Center at Cincinnati Children's Hospital Medical Center and the University of Cincinnati. She served as the Deputy Director of the Agency for Healthcare Research and Quality from 1996 to 2002.

Dr. Simpson serves on the advisory boards of the Robert Wood Johnson Health Policy Scholars Program, the Israel National Institute for Health Policy Research, and the Cambridge Biomedical Research Centre as well as the Boards of Directors of the Institute for Accountable Care and the National Health Council. She also serves on the Editorial boards for the Journal of Comparative Effectiveness Research and Healthcare: The Journal of Delivery Science and Innovation.

In October 2013, Dr. Simpson was elected to the National Academy of Medicine (formerly the Institute of Medicine).

Dr. Simpson earned her undergraduate and medical degrees at Trinity College (Dublin, Ireland), a master's in public health at the University of Hawaii, and completed a post-doctoral fellowship in health services research and health policy at the University of California, San Francisco.

She was awarded an honorary Doctor of Science degree by the Georgetown University School of Nursing and Health Studies in 2013.

Dr. Simpson's areas of expertise include translating research into policy; quality and safety of health care; health and health care disparities; childhood obesity; and child health services.

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## Dr. Harpreet Sood

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Harpreet is currently a NHS primary care doctor in London, Co-Founder of the NHS Digital Academy and Visiting Senior Fellow at London School of Economics.



Harpreet was formerly the Associate Chief Clinical Information Officer (CCIO) at NHS England. As Associate CCIO, Harpreet was involved in implementing the NHS England technology and digital health strategy, including leading and co-launching the NHS Digital Academy, one of the key initiatives from the strategy. Additionally, Harpreet was involved with the Topol Review, looking at the impact of technology on the workforce and developing a code of conduct for data and digital health innovations including artificial intelligence in the NHS. During his tenure as Senior Fellow to CEO of NHS England, Harpreet was involved in innovation policy and helped set up the NHS Diabetes Prevention Programme currently being rolled out to 26 million across England.

Prior to NHS England, Harpreet worked at Brigham and Women's Hospital in Boston where he was involved with setting up the innovation hub and understanding the impact of health information technology on healthcare. He also co-founded a digital health start-up in paediatric asthma adherence.

Harpreet trained as a clinical doctor at King's College London and Imperial College Business School and completed a Masters in Public Health (MPH) at Harvard University. Harpreet sits on the Board for Digital Health, London and is a Founding Fellow of the Faculty of Clinical Informatics.

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## Dr. Vivian Tseng

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Vivian Tseng is the Senior Vice President, Programs at the William T. Grant Foundation. She leads the Foundation's grantmaking programs and its initiatives to connect research, policy, and practice to improve child and youth outcomes. In 2009, she launched the Foundation's initiative on the use of research evidence in policy and practice. That program has generated over 50 funded studies and informed the grantmaking programs of private and public funders across the country. She has been instrumental in the growing field of research-practice partnerships, including supporting the creation of field-defining resources and the National Network of Education Research-Practice Partnerships.

Tseng has longstanding interests in racial equity in higher education and philanthropy. Under her leadership, the Foundation has strengthened its internal diversity, equity, and inclusion work, increased its grantmaking and capacity support to underrepresented researchers, and developed a program to support stronger mentoring relationships for graduate students of color.

She regularly writes and speaks to international and domestic audiences on evidence-informed policy and practice. Her studies of racial, cultural, and immigration influences on child development have been published in *Child Development* and her research on improving social settings and promoting social change have appeared in the *American Journal of Community Psychology*.

She received her Ph.D. from NYU and her B.A. from UCLA. She serves on the Boards of the Forum for Youth Investment, Asian Americans and Pacific Islanders in Philanthropy, and Grantmakers Concerned with Immigrants and Refugees.

She was previously on the faculty in Psychology and Asian American studies at CSUN.

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## Dr. Ahuva Weiss-Meilik

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Head of the Data Science and Quality Division, Tel Aviv Sourasky Medical Center, Israel



In that capacity, Dr. Ahuva Weiss-Meilik leads the hospital's data science innovation and research strategy as well as innovative data science projects.

Previously, she served as the national coordinator of the Middle East Quality in Health Care Program coordinated by Harvard University and also served as the head of the clinical and economic performance unit at Sheba Medical Center.

She holds a Ph.D. degree from the Technion in Haifa and attended multiple advanced programs at Harvard University, Dartmouth Hitchcock College, and Intermountain Healthcare (LDS).

Recently she attended the first cohort of the exclusive 8400 program for medical industry leadership.

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## Mr. Harold F. Wolf, III

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President and CEO, HIMSS

Harold “Hal” Wolf III is the president and CEO of the Healthcare Information and Management Systems Society (HIMSS), a mission-driven non-profit global advisor and thought leader supporting the transformation of health through information and technology. With a collective membership of 100,000 around the world, HIMSS serves the global health information and technology communities with focused operations across North America, Europe, United Kingdom, the Middle East and Asia Pacific.

Wolf is respected internationally as a healthcare and informatics leader, with areas of expertise in mhealth, product development, integrated care models, marketing, distribution, information technology and large-scale innovation implementation.

Prior to his role with HIMSS, Wolf served as the Senior Vice President and Chief Operating Officer of Kaiser Permanente’s, The Permanente Federation, representing more than 16,000 physicians. He has also held leadership positions at MTV Networks, Time Warner, The Chartis Group, and served as a Senior Advisor at McKinsey & Co.



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## Dr. Marta Gaia Zanchi

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Marta Gaia Zanchi holds M.S. and Ph.D. in electrical engineering from Politecnico di Milano (Italy) and Stanford University (California), where she has always applied her expertise to create technologies that improve health care. During her 12 years at Stanford University, first as a doctoral student then as a faculty member and founding director of digital health at the Stanford Byers Center for Biodesign, her efforts turned from designing software and hardware devices to walking the full process of health technology innovation.



Trained in management and in regulatory affairs, including at the Food & Drug Administration, she found in Biodesign her toolkit and philosophy and built on it. Stanford afforded her the opportunity to help advance innovation, education, and technology translation in health care not just within academia but also outside, as founding chief executive officer of one startup, advisor and consultant to numerous, equity partner for deep- tech venture capital fund Data Collective (DCVC) in Silicon Valley, and most recently, founding managing partner of health-tech micro fund Nina Capital in Europe.

At Nina Capital, she supports ambitious European founders building companies at the intersection of healthcare and information technology, with a vision for the future of medicine in which data derived through computing, IoT and sensor technologies deliver meaningful insight for improving health.

In any and all her endeavors, she is an advocate for responsible and collaborative health technology innovation grounded on the understanding of true needs

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## Dr. Eyal Zimlichman

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Dr. Eyal Zimlichman is an internal medicine physician, a health care executive and a researcher focused on assessing and improving health care quality and value, patient engagement and patient safety.



Dr. Zimlichman is currently Deputy Director General and Chief Medical Officer at Sheba Medical Center, Israel's largest hospital. Under this role, Dr. Zimlichman is in charge of clinical affairs, quality, patient safety and risk management. Dr. Zimlichman is also head of clinical innovation at Sheba, leading innovation efforts both internally and through establishment of partnerships with industry and leading academic medical centers worldwide. Prior to this Dr. Zimlichman has held the position of Lead Researcher at Partners Health Care Clinical Affairs Department in Boston where he was involved in the efforts to bring about a strategic care redesign initiative. In that capacity, Dr. Zimlichman has established for Partners Healthcare a program for collecting and reporting patient reported outcomes across the continuum of care, a program that had won international appraisal. Dr. Zimlichman holds an appointment at Brigham and Women's Hospital and Harvard Medical School affiliated Center for Patient Safety Research and Practice, where he is conducting research on implementing technology to improve health care quality and patient safety. Dr. Zimlichman served as an advisor to the Office of the National Coordinator for Health Care Information Technology in the U.S. Department of Health and Human Services.

In 2013 Dr. Zimlichman was appointed as an International Expert at the International Society of Quality in Healthcare (ISQua).

Dr. Zimlichman is a graduate of the Harvard School of Public Health Executive Health Care Management Master of Science program and has earned his MD at the Technion Israel Institute of Technology in Haifa, Israel.





# ABSTRACTS

## Parallel Sessions





## POPULATION HEALTH CARE FOR CHILDREN WITH ONGOING CONDITIONS

Ingrid Wolfe<sup>1</sup>, Claire Lemer<sup>2</sup>, Julia Forman<sup>3</sup>, James Newham<sup>3</sup>, Raghu Lingam<sup>4</sup>

*1 King's College London; Evelina London Children's Healthcare, UK*

*2 Evelina London Children's Healthcare, UK*

*3 King's College London, UK*

*4 University of New South Wales, Australia*

**Background:** Children and young people (CYP) with ongoing physical health conditions such as asthma are affected by mental health and social conditions. The current healthcare model designed for acute episodic illness delivers variable and poor outcomes, and demand is rising unsustainably.

We present a population approach to healthcare delivering high quality preventive and responsive biopsychosocial care as part of clinical-academic health systems strengthening initiative, using data to inform a population registry for improving direct patient care and system intelligence for improving services.

**Study Question:** Can data-driven population health management improve health outcomes and equity among children with ongoing conditions?

**Methods:** An opportunistic cluster randomised control trial, measuring health, healthcare quality, and healthcare use between intervention and control, and before-after implementation. Population approach to case finding and improving equity of access to care will be assessed by comparing coverage and uptake rates with prevalence of health and population socio-economic conditions. Estimates of ED attendances prevented by comparing attendances in the quarter before and after receiving CYPHP care, using routine hospital administrative data.

**Results:** The first wave of active case finding reached 90% eligible population; 11% participated in early intervention. Demographic and socio-economic characteristics of participants suggest this approach enhances equity of access to care; a high proportion of CYP from ethnic minority families and living in deprived conditions. Early results suggest improved healthcare quality and reductions in ED use among patients with asthma, epilepsy, or constipation. We estimate 288 fewer ED contacts per asthma 100 patients, per year, 120 for epilepsy, and 60 for constipation.

**Conclusions:** A population approach to biopsychosocial care can improve early intervention and care among CYP with ongoing conditions.

**Health Policy Implications:** Population health approaches to care can improve health, healthcare quality, and health service sustainability. Clinical academic partnerships and learning health systems are a successful means of strengthening health systems and improving health.

## REPURPOSING MEDICATIONS BY USING MACCABI HEALTH SERVICE ELECTRONIC DATABASE

Gideon Koren

*MK&M Research & Innovation Institute, IL*

**Background:** Repurposing of existing drugs for new indications can save years of research and tremendous resources.

**Study Question:** Can we test a new repurposing model and create an algorithm by utilizing machine learning of big data to identify the potential role of concomitant drugs taken by hypertensive and diabetic Type 2 patients.

**Methods:** We applied machine learning techniques to identify concomitant drugs not taken for hypertension or diabetes which may contribute to lowering blood pressure or improving glucose control.

Success in controlling blood pressure was achieving blood pressure below 140/90 within 90 days of therapy, and success in diabetes control was defined as achieving HgA1c levels <6.5 between 90 to 365 days following diagnosis and initiating treatment.

**Results:** Among numerous concomitant drugs taken by hypertensive patients, statins and protein pump inhibitors (PPI) significantly improved blood pressure. For Type 2 diabetic patients, alpha 1 blocking drugs were the only group of medications to significantly improve the success rate of glucose control. These effects of statins, PPI and alpha 1 blockers shown by us have been recently documented in animal models and small human studies, validating this new innovative method.

**Conclusions:** Machine learning of big data is a novel method to identify effective repurposing of medications already on the market for new indications. Our model has been validated by contrasting these discoveries with recent animal and human studies.

**Health Policy Implications:** In the case of alpha 1 blockers, because this class of medications is widely used in men with benign prostate hyperplasia at age groups with increased rates of type 2 diabetes, this finding is of potential clinical and health policy significance.

## INDIA'S NATIONAL FAMILY HEALTH SURVEY (2015-16) BIG DATA AWAITS ADVANCED ANALYTICS AND ARTIFICIAL INTELLIGENCE APPLICATIONS TOWARDS STRENGTHENING PUBLIC HEALTH OUTREACH AND OUTCOMES

Kandarp Talati<sup>1</sup>, Geetika Madan-Patel<sup>2</sup>, Priya Swaminarayan<sup>2</sup>

*1 Foundation for Diffusion of Innovations, India*

*2 Parul University, Limda, Vadodara, India*

**Background:** India undertook National Family Health Survey (NFHS-4; 2015-16) almost after a decade. For the first time data collection was done at district-level with sample size of 601,509 households. Data is freely available on Demographic and Health Survey (DHS) website and Government of India (GoI) has also published factsheets (district/state/ national-level), national and state reports highlighting key findings from NFHS-4 data. Currently NFHS-5(2018-19) is underway and still, there is dearth of credible research output from NFHS-4.

**Study Question:** What opportunities does Artificial Intelligence (AI) provide with NFHS-4 and similar open-access big data for transforming public health landscape in resource-constrained settings?

**Methods:** Authors with qualifications in public health, community medicine and computer science reviewed recent literature and discussed potential opportunities for AI in NFHS-4 based on their individual experience and domain expertise.

**Results:** NFHS-4 has sensational media coverage with 6,000+ articles. On contrary, PubMed has <20 research papers exploring NFHS-4 dataset. Availability of online open-access AI-powered analytics portal could empower key players to identify critical public health challenges, ranging from malnutrition to malignancies, in their population catchment from NFHS-4/DHS data. The portal could help identify key social and other determinants of health and predict future trends based on available data and suggest targeted interventions which may be specific to region/locality under consideration. The portal could be programmed as an expert system to suggest context-specific interventions and guide uniform data collection for tracking intervention fidelity, its evaluation and real-time decision support.

**Conclusions:** AI-powered analytics support to mine NFHS/DHS data could empower academic scholars and local institutions to pursue need-based research and/or public health service delivery.

**Health Policy Implications:** Advances in data analysis can be leveraged with AI applications for evidence-based decision making and problem-solving by government, non-government and private health service providers. Public leadership in such portal may facilitate data collection, aggregation and validation from different sources and guide future strategies for NFHS/DHS based on emerging trends.

## AN AI-BASED MULTI-CRITERION APPROACH TO ENHANCE THE EFFECTIVENESS OF VACCINATION STRATEGIES

Sharon Hovav<sup>1</sup>, Amir Elalouf<sup>2</sup>, Eugene Levner<sup>3</sup>, Dmitry Tsadikovich<sup>2</sup>

*1 Clalit Health Services, IL*

*2 Bar-Ilan University, IL*

*3 Holon Institute of Technology, IL*

**Background:** Seasonal influenza has become a serious public health concern, against which vaccination is one of the most effective ways to protect people. Specifically, usage of vaccination can significantly reduce the transmission rate of infection from the infected to susceptible individuals, curtailing the disease spread. However, the effect of vaccination on containing influenza spread critically depends on the immunization programme adopted. In the present work, we analyze big data related to three immunization strategies most popular today in developed countries: mass, random and targeted vaccination.

**Study Question:** We aim to find the optimal combination of the above vaccination strategies, with an emphasis on decreasing the programme cost, enhancing the vaccination efficiency, and improving the corresponding societal benefits.

**Methods:** We develop artificial intelligence (AI) based multiple criteria model to address the problem, analyze the model, and derive the required structural properties of the optimal solution. Our approach is a combination of the artificial approach based TOPSIS methodology and the mathematical programming algorithm.

**Results:** We found that an integrated strategy embracing the early-stage indiscriminate mass vaccination with the late-stage targeted vaccination outperforms other strategies both in cost and efficacy.

**Conclusions:** From both the healthcare and operations management perspectives, the proposed model can be used as an effective decision-making tool for determining the optimal vaccination strategy in different healthcare organizations around the world. This tool allows the decision-maker to define the principal strategy or the optimal combination of the strategies over the vaccination period.

**Health Policy Implications:** Improving vaccination distribution policy.

## BURDEN OF MORTALITY DUE TO AMBIENT FINE PARTICULATE AIR POLLUTION (PM<sub>2.5</sub>) IN ISRAEL

Alina Vodonos<sup>1</sup>, Itai Kloog<sup>2</sup>, Joel Schwartz<sup>1</sup>

*1 Harvard T.H. Chan, US*

*2 Ben-Gurion University of the Negev, IL*

**Background:** Exposure to fine particulate matter (<2.5 mm in aerodynamic diameter, PM<sub>2.5</sub>) is a major source of reduced lifespan worldwide. Despite recent reduction of air pollution levels in Israel, adverse health effects of PM<sub>2.5</sub> remain a regulatory and public health concern as recent studies have shown effects at lower concentrations. Many health impact assessments produce national or international estimates of the health burden.

**Study Question:** In this study, we present the estimates of the effect of PM<sub>2.5</sub> on mortality highlighting differential effects by local districts in Israel.

**Methods:** Health impact assessments for 2005, 2010 and 2015 were performed using a validated hybrid satellite-based spatiotemporal model for PM<sub>2.5</sub> combined with population data and district level mortality rates. Relative risks were derived from a previously published meta-analysis of association between long-term exposure to PM<sub>2.5</sub> and mortality. Four scenarios were considered; a decrease of the air pollutant levels by 10% and 20%, a decrease to the World Health Organization (WHO) air quality guidelines, and a decrease to the background level found in the absence of emissions from transportation.

**Results:** The mean of PM<sub>2.5</sub> in 2005, 2010 and 2015 was  $18.8 \pm 7.2$ ,  $21.99 \pm 16.7$  and  $20.48 \pm 23.8$   $\mu\text{g}/\text{m}^3$ , respectively. All location exceeded the WHO air quality guidelines of 10  $\mu\text{g}/\text{m}^3$ . In 2015, the absence of emissions from transportation would postpone 1,868 deaths. Complying with the WHO guidelines would postpone up to 4,452 deaths. The burden was unequally distributed, with the majority of premature deaths occurring in Haifa, Tel Aviv, and Hamerkaz districts.

**Conclusions:** High background levels together with anthropogenic pollution result in Israeli residents being exposed to a high concentration of PM<sub>2.5</sub>. Our study provides evidence of major health benefits expected from reducing the anthropogenic source of pollution by shifting to a low emission vehicles alternative.

**Health Policy Implications:** The estimates are expected to be useful to policymakers and others to craft more effective policies to mitigate the adverse impact of air pollution on the public's health.

## BARRIERS TO TREATMENT IN ISRAELI ARAB MINORITY ADOLESCENTS WITH MENTAL HEALTH PROBLEMS: RESULTS FROM THE GALILEE STUDY

Raida Daeem<sup>1</sup>, Ivonne Mansbach-Kleinfeld<sup>2</sup>, Ilana Farbstein<sup>1</sup>, Alan Apter<sup>2</sup>

*1 Ziv Medical Center, IL*

*2 Schneider Medical Center for Children in Israel, IL*

**Background:** The Galilee Study is the first study to assess mental health service needs among Israeli Muslim and Druze adolescents and their mothers.

**Study Question:** What are the structural and cultural barriers to help-seeking among the mothers considering seeking help for their children.

**Methods:** All 9th-grade students living in 5 towns representative of Muslim and Druze localities in northern Israel, were eligible for the study and 1639 (69.3%) obtained parental agreement and participated. The emotional or behavioral problem was assessed in the classroom using the Strengths and Difficulties Questionnaire. A total of 704 adolescent-mother dyads participated in the follow-up, and were interviewed at home, using the Development and Well Being Assessment inventory, the Composite Barriers to Help-Seeking Questionnaire, the General Health Questionnaire -12 and socio-demographic questions.

**Results:** More mothers of adolescents with a mental disorder than those without a mental disorder consulted a professional or school source (39.7% vs. 20.5%;  $\chi^2=45.636$ ;  $p<0.001$ ). The most important barriers to help-seeking were those related to "Accessibility", followed by barriers related to the belief that "Treatment is detrimental" and to the possibility of "Reprisal by authorities". Barriers related to "Stigma" and "Distrust of professionals" had the lowest mean scores.

**Conclusions:** Structural barriers related to lack of access, were considered the main obstacle to help-seeking in this Israeli Arab minority population. Cultural barriers such as stigma were considered of secondary importance. The findings of the Galilee Study undermine the preconceptions and prejudice about service use among Arab minority in Israel and provide guidance on planning services for the minority Muslim and Druze populations in the coming decade.

**Health Policy Implications:** Structural barriers could be reduced by increasing the number of accessible public mental health clinics in the minority localities, a responsibility of the Ministry of Health and the HMOs. Information campaigns and psychoeducation for parents would help reduce other barriers to mental health treatment.



## THE APPROPRIATE USE OF ANTIPSYCHOTICS: SUPPORTING QUALITY IMPROVEMENT IN SUPPORTIVE LIVING

Deborah Katz, Mollie Cole

*Alberta Health Services, Canada*

**Background:** This project aimed to address the appropriate use of antipsychotics in Supportive Living. Side effects of antipsychotics include agitation, confusion, falls, insomnia, sedation, increased risks of infection, strokes and cardiac events. Families, physicians and staff work together to investigate and trial alternate approaches to reduce agitation.

The Alberta Health Services Seniors Health Strategic Clinical Network initiative to reduce the use of Antipsychotics in Long Term Care Facilities continues to achieve success. The existence and publication by the Canadian Institute for Health Information (CIHI) of the interRAI Resident Assessment Instrument (RAI-MDS 2.0) Quality Indicator (QI) – Percent of Residents on Antipsychotics without a Diagnosis of Psychosis provides a metric that can be accessed and reported quarterly. By acquiring and integrating data from Emergency, Inpatients, Physician Claims, Pharmacy Information Network and the Resident Assessment Instrument–Home Care (RAI-HC), a similar metric can be developed to monitor and report on the use of Antipsychotics in Supportive Living environments.

**Study Question:** Can existing data be leveraged to create a metric to support improvements in inter-professional practice and care for residents and families by spreading the Appropriate use of Antipsychotics initiatives from Long Term Care Facilities to Supportive Living environments in Alberta?

**Methods:** Data sources include Home Care, RAI-HC, National Ambulatory Care Reporting System, Inpatient Discharge Abstract Database, Physician Claims and the Pharmacy Information Network. Data analytic, visualization and liberation tools include Oracle, SQL Developer, Excel and Tableau.

**Results:** Referencing the RAI-MDS 2.0 QI, similar core elements have been acquired and a comparable antipsychotic measure for community living clients has been generated.

**Conclusions:** This work allows for measuring, monitoring and reporting on the use of Antipsychotics for individuals residing in Supportive Living environments in Alberta.

**Health Policy Implications:** These antipsychotic utilization measures are designed to support improvements in inter-professional practice and the quality of care delivered to residents and their families.

## BUILDING BIG DATA FROM EXPERIENCE: A NEW MODEL FOR PREMS COLLECTION AND UTILISATION

*Ilaria Corazza, Kendall Jamieson Gilmore, Manila Bonciani, Sabina De Rosis*

*Sant'Anna School of Advanced Studies, Pisa, Italy*

**Background:** Patient-reported experience measures (PREMs) can help the design and management of healthcare services, and inform policymaking. However, the experience is typically measured using standard closed-ended questions, collected only periodically and unsystematically. This dearth of data is particularly problematic in pediatric settings due to exacerbated information and power asymmetries.

**Study Question:** How can healthcare providers make use of new technologies and analytical techniques to enable the systematic and continuous collection and utilisation of pediatric PREMs?

**Methods:** This study describes the cases of Meyer Hospital (Florence) and Children's Clinical University Hospital (Riga) that, from December 2018, adopted a digital PREMs survey. The questionnaire was developed by hospital managers and physicians, collaborating with researchers from the MeS Laboratory – Sant'Anna School of Advanced Studies (Pisa). It consists of open-ended and closed-ended questions, some of which are adopted from the pediatric Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). It can be answered directly by adolescent patients or by caregivers and includes a section specifically addressed to children. The questionnaire is administered digitally upon discharge to all enrolled patients. A web platform collects, analyses and illustrates data in aggregate and anonymous form to hospital staff in real time.

**Results:** This study sets out the development of a new pediatric PREMs questionnaire, plus a digital and automatic survey administration and data reporting system.

**Conclusions:** This model has several features which may be of interest to clinicians and administrators and can be replicated elsewhere: notably, inclusion of narrative sections, enabling greater richness of information; differential access for different staff groups and researchers through an online platform, enabling prompt use of data and possibilities for action; dual implementation in two sites in different settings, enabling comparison and shared learning.

**Health Policy Implications:** This approach to PREMs can provide professionals at all levels in healthcare systems with a novel source of insight to support quality improvements.

## BARRIERS TO COMPLETING COLONOSCOPY AFTER A POSITIVE FECAL OCCULT BLOOD TEST

Liora Valinsky<sup>1</sup>, Revital Azulay<sup>1</sup>, Einat Elran<sup>2</sup>, Fabienne Hershkowitz<sup>1</sup>,  
Natan Lederman<sup>1</sup>, Revital Kariv<sup>2</sup>, Anthony Heymann<sup>1</sup>

*1 Meuhedet Healthcare Services, IL*

*2 Maccabi Healthcare Services, IL*

**Background:** Colorectal cancer leads to significant morbidity and mortality. Early detection and treatment are essential. Screening using fecal occult blood tests (FOBT) has increased significantly, but adherence to colonoscopy follow-up is suboptimal worldwide. Recently published papers have emphasized the increased risk of abstaining from colonoscopy after a positive FOBT.

**Study Question:** What are the barriers to colonoscopy following a positive FOBT at the level of the patient, physician, organization, and policymakers.

**Methods:** This mixed methods study was conducted at two health care organizations in Israel. The study included retrospective analyses of 45,281 50-74-year-old members with positive FIT's from 2010-2014, and a survey of 772 patients with positive FIT during 2015, with and without follow-up. The qualitative part of the study included focus groups with primary physicians and gastroenterologists and in-depth interviews with opinion leaders in healthcare.

**Results:** Patient lack of comprehension regarding the test was the strongest predictor of non-adherence to follow-up. Older age, Arab ethnicity, and lower SES (socio-economic status) significantly reduced adherence. We found no correlation with gender, marital status, patient activation, waiting for time or distance from gastroenterology clinics. Primary care physicians underestimate non-adherence rates. They feel responsible, but lack the time and skills to ensure adherence. Gastroenterologists do not consider FIT an effective tool for CRC detection. Lack of agreement between screening recommendations and gastroenterologist opinion and lack of awareness among healthcare authority figures negatively impact the screening program.

**Conclusions:** Interventions to improve follow-up after a positive FOBT should be targeted at all levels within the health care system. Individually tailored patient interventions that are educationally and culturally appropriate prior to testing completion is essential. Strategies to support primary care physicians in the test and follow-up process, as well as improving communication between physicians, and finally, increasing awareness among healthcare leaders will all improve outcomes.

**Health Policy Implications:** We have clearly defined avenues to improve colorectal cancer screening outcomes at all levels of the system.

## PARTIAL SMOKING BAN BREAKS THE PROMISE OF SMOKE-FREE ENVIRONMENT IN KAZAKHSTAN

Jamilya Sadykova<sup>1</sup>, Ardak Baizhaxynova<sup>2</sup>

*1 National Coalition "Smoke free Kazakhstan", Kazakhstan*

*2 Nazarbayev University, Kazakhstan*

**Background:** The fundamental human rights and principles of Article 8 of the WHO Framework Convention on Tobacco Control (FCTC) requires 100% smoke-free public places. Kazakhstan ratified the FCTC in 2006 but only has a partial smoke free policy; current law allows designated smoking rooms (DSR) in public dining establishments, while other public places must be 100% smoke free.

**Study Question:** Assess the effectiveness of specially designated places for smokers, in protecting people from second-hand smoking exposure, in the public dining venues of Kazakhstan by means of air quality monitoring.

**Methods:** A cross-sectional study of indoor air quality was conducted from September to October 2017 in the largest city of Kazakhstan. A total of 29 public dining establishments with different smoking policy were monitored in the evenings. The real-time measurement of PM<sub>2.5</sub> particulate matters was conducted by TSI SidePak AM510 Personal Aerosol Monitor and was ranked using the WHO target air quality guideline.

**Results:** The highest mean PM<sub>2.5</sub> level was detected inside the DSRs (648 µg/m<sup>3</sup>), followed by venues with similar results where smoking was allowed throughout the venue (180,3 µg/m<sup>3</sup>) and inside the smoking hall (182 µg/m<sup>3</sup>). The third rank belongs to non-smoking areas venues which allows smoking only in DSRs (73.1 µg/m<sup>3</sup>). The lowest mean PM<sub>2.5</sub> level was observed in 100% smoke-free venues (26 µg/m<sup>3</sup>).

**Conclusions:** PM<sub>2.5</sub> concentrations at DSRs which comprise hazardous level severely undermines the smoke-free environment national agenda. Unhealthy levels of PM<sub>2.5</sub> concentrations at smoking areas confirm that a partial smoking ban violates the fundamental human right to be protected from second-hand smoke.

**Health Policy Implications:** Air quality monitoring data confirms that anything less than 100% smoke-free policies is hazardous to people and must be amended to eliminate DSRs and other exemptions from public places, as mandated by the Framework Convention on Tobacco Control.

## USE THE DATA TO MAKE THE CHOICE: SELECTING THE BEST SMOKING CESSATION SERVICE FOR PEOPLE WITH SERIOUS MENTAL ILLNESS (SMI)

Orit Stein Reisner<sup>1</sup>, Jenny Dortal<sup>1</sup>, Yehuda Neumark<sup>2</sup>, Leon Grunhaus<sup>3</sup>,  
Ronit Nezry<sup>1</sup>, Tamar Alcalay<sup>1</sup>

*1 Maccabi Healthcare Services, IL*

*2 The Hebrew University of Jerusalem, IL*

*3 Mind Clinic, US*

**Background:** Between 50–80% of people with SMI are smokers, whilst smoking prevalence in the general community is 23%. The SMI population is more likely to be heavy smokers (23% vs 9%). However, their motivation to quit smoking is no lower than the general population. Maccabi Healthcare provides two services for smoking cessation: groups and a telephone Quitline. This study compared registration, participation, use of smoking cessation medications, and successful cessation rates between the two service types for SMI and non SMI members to determine if either service offered specific advantages over the other.

**Study Question:** Is there a difference in registration, participation, treatment completion, smoking cessation medication use and/or cessation rates between SMI and non-SMI populations and does the choice of smoking cessation service modify these differences?

**Methods:** Data was extracted from the Maccabi database for the years 2013–2017 for all 18+ ever-smokers: SMI status, other health and demographic variables, registration, participation, treatment completion, smoking cessation medication and smoking cessation outcome for both services.

**Results:** SMI ever smokers were 1.8 times more likely to register for smoking cessation services than non SMI ever smokers. However, non SMI smokers were more likely to commence treatment (OR:1.2), complete treatment (OR: 1.4) and quit than SMI ever smokers (OR:1.9). Ever smokers presenting to the Quitline were more likely to commence treatment, complete treatment and quit, irrespective of SMI status.

**Conclusions:** SMI smokers are more likely to seek smoking cessation services but less likely to successfully quit. Smoking cessation rates are higher for those presenting to the Quitline.

**Health Policy Implications:** Quitline services are not available in all HMO's in Israel today. These services should be expanded, given their added benefit to the general population and their use encouraged for the SMI population.

## A CASE STUDY EXAMINING THE COST MEASUREMENTS IN PRODUCTION AND DELIVERY OF A BLENDED MASSIVE OPEN ONLINE COURSE (MOOC) ON THE USE OF DATA SCIENCE IN HEALTHCARE USING REAL WORLD EVIDENCE

Edward Meinert

*University of Oxford, UK*

**Background:** There is a significant demand for trained data scientists to provide insight and analysis of health-related data. A MOOC allows a flexible means of course provision for learners, as they can undertake the learning at a time and location which is to their convenience in addition to having the possibility to collaborate with a broad number of learners face to face. Understanding the costs to deliver these courses could enable further investment in the development of these courses to replace costly and limited one-time use course implementations.

**Study Question:** How are the total costs for the production and delivery of a blended massive open online course calculated?

**Methods:** This study uses a mixed-methods study design, using a case study design structured for study observation of financial decision making and cost analysis (centred on variance analysis) used to analyse financial data.

**Results:** The course had a positive variance to the initial budget of 16%. Stakeholder costs for subject matter expert lecturers were slightly overestimated but close to budget. Equipment and materials had a significant positive variance of 37%; the reason for this is that not all the planned equipment for the course development was necessary because there was efficiency derived in the course production and streamlining of data science modules that were thought to have required custom application development. Personnel had a negative variance of 13%; this was related to additional effort needed in video editing. Additionally, the course was completed ahead of schedule and in less time than was anticipated.

**Conclusions:** Although this programme was a significant undertaking in resources and scope in combining both a digital programme and face to face residential course, the project was successful in achieving its cost schedule through optimising its project management, through strong relationships of its principals and leveraging successful smaller scale learning implementations developed in previous years.

**Health Policy Implications:** In order to execute an online learning project within the allocated cost parameters requires a combination of skills that enable the people, process and technology to deliver the requirements of the initiative and within a predicated framework. Although this programme was a significant undertaking in resources and scope in combining both a digital programme and

face to face residential course, the project was successful in achieving its planned cost schedule through optimising its project management, leveraging strong relationships of its principals and building on successful smaller scale learning implementations developed in previous years. Such iterative and incremental course planning could get similar results in the development of similar eLearning programmes.

## USING QUALITY DATA TO STRENGTHEN ROUTINE IMMUNIZATION IN NIGERIA; EXPERIENCE WITH ROUTINE IMMUNIZATION (RI) LOTS QUALITY ASSURANCE SAMPLING (LQAS)

Rilwan Raji

*World Health Organization, Nigeria*

**Background:** Studies emphasize the importance of quality data for effective planning, monitoring, and evaluation. The 2015 National Immunization Coverage Survey (NICS) in Nigeria revealed data quality issues across all 36 states, (worse in 18 states) of the Country with National Penta3 Coverage at 33% as against Administrative (Admin) Coverage of 98%, hence the importance of RI LQAS to identify reasons for disparities.

**Study Question:** Does the RI data from health facilities (HFs), aggregated at districts (LGAs) reflect true performance? What reasons explain disparities? What are the primary sources of information that guide vaccination amongst caregivers?

**Methods:** 18 priority States were selected. Using a probability proportionate to population size, all LGAs in a State, 6 HFs and 6 settlements were selected. Within each settlement, 10 households (HH) were selected from which 1 child 0–11 months per HH was selected for assessment by reviewing the immunization card and/or mother's recall. Reasons for partially/not immunized for age and sources of information about vaccination were ascertained.

Using cumulative binomial probabilities, a district (Lot) was said to have passed (accepted at 80% coverage or more) if at least 8 of 60 children sampled were fully immunized for age.

**Results:** A total of 2,292 sites, 22,920 households, 22,920 children 0–11 months sampled in 382 districts. Only 3% of the districts passed, with 56% of the States having < 80% coverage. At the individual level, only 1 of 3 children in the Country was fully immunized for age.

The main reasons for none/incomplete immunization was weak demand for immunization with Health Workers (HWs) being the major source of information about vaccination in the Country.

**Conclusions:** The RI LQAS confirmed findings of the NICS that admin data did not reflect RI performance in Nigeria. Subsequently, a State of Emergency on RI with RI Coordinating Centers set up across States with RI LQAS conducted quarterly to review performance.

**Health Policy Implications:** Instituting frequent low budget surveys as RI LQAS is effective in ensuring reliable data for planning to improve vaccination of children and enshrine accountability amongst erring HWs that falsify data.



## FIRST YEAR OF THE FIRST POPULATION-BASED BIOBANK IN ISRAEL

Daniella Beller

*Maccabi Institute for Research and Innovation, IL*

**Background:** Maccabi Healthcare Services (MHS) has set for itself the target of creating the first population-based biobank in Israel, thus providing an ideal platform for Precision Medicine research. MHS is the second largest healthcare provider in Israel. MHS serves 2.3 million members which constitutes a representative quarter of the Israeli population. Electronic health records have been implemented in MHS for over a quarter of a century. With less than 2% annual member turnover, MHS records have a longitudinal history of many patients throughout their entire lives. In 2017 the Tipa Biobank (Tipa) was launched, a nationwide biobanking program to link samples and EHR data for broad research use.

**Study Question:** We describe the initial phases of implementation of a large-scale population-based biobank initiative within the setting of a public healthcare fund.

**Methods:** Patients are approached by trained concentrators and offered to participate. Samples are collected in a standardized manner and transported daily using the existing nationwide infrastructure of MHS.

**Results:** As of March 2019, over 70,000 MHS patients consented to participate in Tipa and over 100,000 vials have been stored. Of the patients approached, over 50% consent to participate. Tipa participants are slightly older (mean age of 49.7) and are more likely to be female (60%). 23% of participants are diagnosed with hypertension and 18% of them suffer from diabetes or pre-diabetes.

**Conclusions:** With virtually no funding MHS succeeded in creating the first population-based biobank in Israel. Tipa is a resource that enables a new model for translational research that is faster, more flexible, and more cost effective than traditional clinical research approaches. The model is scalable, and will increase in value as resources grow.

**Health Policy Implications:** Findings from using this resource will impact the development of personalized medicine tools and which will not only impact Tipa participants but will change the way patients are treated.

## INNOVATIVE ADOPTION OF TECHNOLOGY FOR IMPROVING POPULATION BASED SCREENING OF COMMON NON COMMUNICABLE DISEASES IN INDIA

Aman Kumar Singh<sup>1</sup>, Rajeev Kumar<sup>2</sup>, Manas Pratim Roy<sup>2</sup>, HSD Srinivas<sup>3</sup>,  
Sita Ram Budaraju<sup>3</sup>

*1 Tata Trusts; Ministry of Health and Family Welfare, India*

*2 Ministry of Health and Family Welfare, Government of India, India*

*3 Tata Trusts, India*

**Background:** India is witnessing a rapid health transition with a rising burden of Non-Communicable Diseases (NCDs) which account for around 5.8 million or 61% of all deaths annually.

The Government of India has launched the world's largest government-funded health Programme "Ayushman Bharat" to strengthen comprehensive primary health care, reduce out of pocket expenditure and conduct Population-Based Screening (PBS) for Diabetes, Hypertension & Common Cancers (oral, breast and cervical) for population aged >30 years; targeting 500 million population annually.

**Study Question:** Does adoption of Technology hasten and standardize prevention, control and management of Non-Communicable Diseases?

**Methods:** A NCD application software has been developed and deployed by Tata Trusts and Dell (as development partner) for the Government of India to facilitate PBS of common NCDs. It automates intensive screening, digitalizes health records, standardize recording and reporting system and helps in NCD management through decision support system (DSS), streamline upward and downward referrals across health facilities, tracking follow up and preparation of work plan for the health personnel.

**Results:** Tata Trusts is conducting an intensive capacity building of front-line workers (FLWs) for technology adoption. Till date, 11,450 personnel have been trained who have enrolled 45.6 million persons in NCD application of which 29.2 million persons have been screened for common NCDs from September 2018-March 2019.

**Conclusions:** With strong political will, regular capacity building and supportive supervision it is possible to scale up adoption of technology by FLWs enabling screening of large populations for common NCDs within a short span of time.

**Health Policy Implications:** The Government of India has adopted the use of NCD application as one of the basic digital tools for record keeping and NCD management.

## BIG DATA AS A CATALYST FOR POLICY RESEARCH, PHARMACO-EPIDEMIOLOGY AND CLUSTER RANDOMIZED CLINICAL TRIALS

Vincent Mor

*Brown University, US*

**Background:** Interventions requiring a restructuring of health care systems are rarely replicated and difficult to extend beyond select early adopting health care organizations. However, since most program innovations require adoption by functioning health care systems, the classic NIH research phase models ignore this crucial implementation and dissemination phase which also needs to be rigorously tested.

**Study Question:** What are the necessary conditions under which a health systems intervention can be successfully implemented in the real world of functioning health care systems?

**Methods:** We examined multiple pragmatic, cluster randomized clinical trials implemented in functioning health care systems in order to identify the characteristics of interventions that are associated with successful replication and implementation of the intervention. A total of 5 different types of interventions were examined with successively more complicated interventions.

**Results:** Interventions that merely substitute one treatment for another are readily implemented with very successful adherence to the intended design. As interventions require changes in assignments, allocation of resources and shifts in expectations of supervisors and staff, the degree of adherence to the research model of the intervention breaks down considerably. The more the breakdown in intervention adherence, the greater the effect of the intervention must be in order for it to demonstrate the intended effect on patients' outcomes.

**Conclusions:** Understanding the potential that innovations in health care practice can achieve the intended effects requires careful consideration of the level of organizational disruption that each entail since health care organizations have considerable entropy which can reduce the likelihood that the desired outcomes are achieved.

**Health Policy Implications:** Before interventions, shown to be effective in leading organizations, are widely promulgated across the country, it is essential that researchers and policymakers understand how the necessary organizational changes in daily practice can be achieved in the average health care organization.

## TOWARDS A NATIONAL SYSTEM FOR MEASURING AND PUBLIC REPORTING OF WAITING TIME FOR COMMUNITY-BASED SPECIALIST CARE

Rachel Wilf Miron<sup>1</sup>, Ilya Novikov<sup>2</sup>, Arnona Ziv<sup>2</sup>, Avishai Mandelbaum<sup>3</sup>,  
Ya'acov Ritov<sup>4</sup>, Zach Tagar<sup>1</sup>, Osnat Luxenburg<sup>1</sup>

*1 Ministry of Health, IL*

*2 The Gertner Institute for Epidemiology and Health Policy Research, IL*

*3 Technion, Haifa, IL*

*4 University of Michigan, USA Information Systems, US*

**Background:** Extended waiting time for a physician's appointment may incur health, financial and social consequences. The Israeli Ministries of Health and Finance initiated a National Program for Reducing Waiting Times (WT). However, attempts to develop national indices for WT have encountered challenges, mainly due to differing measurement approaches and infrastructures among the Israeli healthcare providers.

**Study Question:** Develop a unified national methodology to measure WT for community-based specialist care and to create the appropriate format to present it to the public.

**Methods:** Existing infrastructures of health maintenance organizations (HMO) were analyzed, in search of a "common denominator" methodology. Measures were applied to the five most common medical specialties. An interactive application, based on geographic information systems, was developed for public reporting of WT.

**Results:** We developed an algorithm to calculate WT that HMOs offer their members, by geographic regions, in two formats: "any physician" and "specific physician". Supply estimation was based on 2 million available appointments, collected during October and December 2018. A clinic's activity served as an estimator of demand for its physician.

The interactive application presents various statistical measures for districts and towns, by medical specialty. WT distribution differed among specialties. WT in central Israel did not always present shorter WT when compared with geographic peripheries.

**Conclusions:** The first stage of developing the national system for measuring WT was completed through cooperation with stakeholders and will serve as a platform for continuous dialogue. Future stages entail the development of an information infrastructure to enable measurements of actual WT, accompanied by a comprehensive survey towards understanding patients' journeys when making appointments.

**Health Policy Implications:** Despite diverse challenges, national reporting of WT will be accessible to the public in April 2019, encouraging transparency and evidence-based discourse among decision-makers. Identification of barriers will serve to allocate resources, improve WT and strengthen public health services.

## HOME SWEET HOME

Yael Applbaum, Ziona Haklai, Ethel-Sherry Gordon

*Ministry of Health, IL*

**Background:** One of the Israeli health system's sorest points is the overcrowding of general medicine departments.

A society that is living longer with more chronic illnesses and a shortage of chronic care beds, have caused the acute care medicine departments to bear a great part of this burden.

The occupancy rates in medicine departments are 97–107% with seasonal changes. Seeing patients lying in a bed in the hallway of a medical ward is commonplace.

Many suggestions have been raised to alleviate the problem. One recommendation was to develop a stronger system of home hospitalization.

**Study Question:** If indeed home hospitalization could shorten the stay of some patients, how much of the burden would decrease?

**Methods:** We chose three diseases that are amenable to continue treatment at home after the initial evaluation and inpatient treatment: congestive heart failure, pneumonia and urinary tract infections. We measured the number of discharges and the average length of stay of patients with these diseases listed as the primary diagnosis and estimated how many beds we could save if we could decrease the length of stay for patients with these three diseases. All the data were collected from the national hospitalization database in the Israel Health Ministry.

**Results:** There were 32,000 discharges for these three diseases in 2016, with the average length of stay between 5–5.7 days. Assuming we had an alternative setup such as home care that would allow us to decrease the average length of stay by two days, we estimated that we would save 60000 bed days, reducing the occupancy by 5%, or, alternatively, reduce the number of beds by 165.

**Conclusions & Health Policy Implications:** Although this is an exercise based on very crude but large data, in this very conservative model, we show that establishing an intensive home-based care system that would allow reducing the length of stay could help decrease the burden of hospitalization in the general medicine wards.

## HEALTH SERVICE INTEGRATED CONSTRUCTION IN AGRICULTURAL & PASTORAL VILLAGES AND TOWNSHIPS OF QINGHAI, CHINA

Yongnian Liu, Rong Wang, Mingyu Huang, Xiang Gao

*Medical College, Qinghai University, China*

**Background:** Qinghai Province is located on the Tibet Plateau, covering a large area (722,300 km<sup>2</sup>), but with a small population (5.73 million). People living in the remote have poor access to health services.

**Study Question:** To describe the current existing integrated management of rural health services, and to analyze the determinants of the quality of rural health service, thus improving the health service capacity in Qinghai, particularly among the rural minority villages and townships.

**Methods:** We have selected the pilot areas through stratified sampling from the aspects of health services utilization and satisfaction, performance and changes in the health sector, and conducted surveys on rural health services and health authorities in the pilot areas and surveys on agricultural and pastoral households residents, and qualitative interviews with medical staff and medical managers to understand the implementation and problems on integration management and improvement of rural health service.

**Results:** With the achievements of the project, the village doctors have obtained the identities equal to that of social welfare jobs, e.g. pension and medical insurance. We have put forward multi-compensation system on village doctor post subsidies, zero added profit drug subsidy, water, electricity and heating subsidies running costs, network operating subsidies. Besides, we have established systems on conducting business guidance in medical institutions of villages, townships and counties, technical support, personnel training and training system.

**Conclusions:** The central pharmacy has been established for village clinics to be engaged in unified order, drug distribution and supervision on drug utilization. The minority clinics have been established, which are the indispensable in rural health service.

**Health Policy Implications:** The achievements on the resources being integrated, the management being accessed and service quality and capacity being promoted could be realized to build an appropriate model for rural health service in Qinghai.

## PRO (PATIENT REPORTED OUTCOMES) IMPLEMENTATION AT SHEBA MEDICAL CENTER

Alex Galper, Ora Shamai-Rosler, Varda Stanger, Eyal Zimlichman

*Sheba Academic Medical Center, IL*

**Background:** Patient-reported outcomes measure patients' views of their health-related quality of life as received directly from the patient. With the increasing interest and usage of PRO's in the world, Sheba Medical Center is the pioneer in the field in Israel, since 2015, looking at the potential value in PRO implementation in routine practice as a quality improvement and decision support tool together with the opportunity to drive changes in healthcare delivery.

**Study Question:** Feasibility of PRO collection and reporting platform at Sheba Academic Medical Center.

**Methods:** A comprehensive process, initiated by department leading clinician and involving multidisciplinary staff, results in a tool set build up and department implementation. The tool set used to gather the PRO data from patients in various methods, on specific periods, processed and presented in an easy to read format in the EMR.

**Results:** Program continues growth from three to over fifty areas in various implementation stages doubled the number of questionnaires collected and patients enrolled between 2018 (5,784 questionnaires, 3,475 patients) and 2017 (2,542, 1,815) and more than tripled in relation to 2016 (1,729, 479). The increased use of the patient portal had a significant impact and involved 11% of all complete tool sets and 30% of the follow-up questionnaires.

**Conclusions:** Program expansion shows success in increasing number of patients and fields enrolled. In order to scale up to include large target populations, a better use of electronic mass data collection methods is required.

**Health Policy Implications:** Basic usage of a patient generated report in a clinical practice during patient-physician encounter provides insights on the ongoing patient journey that can help focus all parties on the patient status, goals and progress.

Combining patient centered care with data driven care and other EMR existing data can be used to create and measure outcome benchmarking as well as construct patient predictive tools to make informative treatment decisions and to perform as a clinical decision support tool for both patients and clinicians.



## PLANNING FOR SPECIALISTS: CAN WE PREDICT THE NUMBER OF NEW SPECIALISTS?

Myriam Aburbeh, Haim Karger, Ziona Haklai

*Ministry of Health, IL*

**Background:** In recent years the proportion of specialist physicians in Israel has increased. Planning the medical workforce must consider cost and time of training new specialists.

**Study Question:** Can we predict the number of future specialists following their initial physician license by specialty?

**Methods:** Data was obtained from the licensed physician and residents' databases. A cohort of physicians licensed in 2005–2008 was followed up to find time interval till the beginning of the first specialization, and till its completion, allowing a 10-year follow up. For those who did not complete the first specialization, we checked whether another specialization was begun.

**Results:** Of 2,351 physicians who received their license in 2005–2008, 1,964 began the first specialization, on average 13 months after receiving their license, with a median time of 5–6 months.

Following up these physicians shows that 27% did not finish their specialist training within 10 years from starting. Of those, 28% of internal medicine interns did not finish, 25% in psychiatry, 56% in general surgery, 49% in anesthetics, 18% in family medicine and gynecology and obstetrics and 8% in pediatrics.

From those who did finish their first specialty, 81% of internal medicine interns received their specialist license within 6 years, 84% in family medicine and pediatrics, and 74% in psychiatry. 78% of those in general surgery finished in 8 years, and 91% in gynecology and obstetrics.

In most specialties, median time till finishing was longer for male than female physicians.

A third of those who did not finish their first specialization began and finished a different one; 45% of those who didn't complete family medicine and pediatrics, 38% - gynecology and obstetrics and 52% - general surgery.

**Conclusions:** A follow up of medical specializations from initial license to completion allows mapping their supply and demand.

**Health Policy Implications:** Planning the medical workforce for changing population needs should utilize medical resident data.

## MEASURING THE QUALITY OF A THERAPEUTIC MEETING USING OBJECTIVE-STRUCTURED CLINICAL SIMULATION (OSCS) - THE CASE OF DIABETES EDUCATORS

Orly Tamir<sup>1</sup>, Tatiana Kolobov<sup>1</sup>, Vardit Kalamaro<sup>1</sup>, Karen Hershkop<sup>2</sup>

*1 The Gertner Institute for Epidemiology and Health Policy Research, IL*

*2 Shaarei Tzedek Medical Center, IL*

**Background:** Under a national endeavor to establish the role of Diabetes Educators (DE) in the healthcare system, during 2015–2018 over 200 healthcare professionals were trained under the auspice of the Ministry-of-Health to serve as educators. The training comprised of theoretical knowledge and hands-on practice, with an internationally-unique accreditation exam of OSCS carried out by standardized patients in clinic-like settings. Up until now, evaluation of the simulated therapeutic meetings was conducted by trained evaluators, but in a subjective manner. In order to assess the suitability of the training to the DE role and establish the accreditation system, there is a need for a reliable and valid quantitative evaluation.

**Study Question:** 1. To examine the use of OSCS to modulate a real-life therapeutic-meeting. 2. To develop and validate an instrument for quantitative evaluation of the OSCS.

**Methods:** All DE were asked to provide feedback through a self-report questionnaire on the suitability of the OSCS modality. In addition, an evaluation tool for the accreditation exam was constructed on the basis of well-established relevant scales and consultation with experts. The validity and reliability of the instrument were tested by several independent rounds of evaluations, having corrections to the inventory after each round. Cost components of OSCS per participant were collected.

**Results:** Over 90% of the participants expressed satisfaction from the compatibility of OSCS with their everyday work and recommended to continue with this method. The main parts of the final version of the instrument include: general impression, the structure of the meeting, obligatory communication skills, deeper level skills and summary score. The validity and reliability scores of the OSCE evaluation were high. The cost per participant was calculated to be USD 150.

**Conclusions:** OSCS is a suitable methodology for testing the quality of a therapeutic meeting in a clinical setting. The suggested instrument was proved to allow credible evaluation.

**Health Policy Implications:** Implement the evaluation tool for accreditation tool as well as for the routine assessment of DE in practice.

## THE ISRAELI NATIONAL COMMITTEE FOR SEX SELECTION BY PRE-IMPLANTATION GENETIC DIAGNOSIS (PGD) FOR NON-MEDICAL REASONS: A UNIQUE HEALTH POLICY

Liat Lerner-Geva<sup>1</sup>, Nirit Pessach<sup>2</sup>, Saralee Glasser<sup>1</sup>, Varda Soskolne<sup>3</sup>, Gil Siegal<sup>4</sup>

*1 Gertner Institute for Epidemiology and Health Policy Research, IL*

*2 Ministry of Health, IL*

*3 Bar-Ilan University, IL*

*4 Ono Academic College, IL*

**Background:** Pre-implantation genetic diagnosis (PGD) for sex selection raises complex dilemmas, and remains controversial. The Israel Ministry of Health (MoH) unique policy prohibits PGD, but exceptions are allowed upon approval by the National Committee for Sex Selection by PGD for Non-Medical Reasons (the "Committee"), according to specific criteria.

**Study Question:** Applicants' characteristics and reasons for the request, and the Committee's activity and decisions were analyzed.

**Methods:** All 784 Committee files (2005–2016) were abstracted, and 184 interviews were conducted with applicants.

**Results:** Of the applicants, 69.8% were Jewish and 30.2% Arab. Most requests were for a male (70.7%): 100% of Arabs' and 59% of Jews'. Decisions were arrived for 394 applications, with 125 (31.7%) approved. Nearly half of the couples (46.6%) had another child following application to the Committee. Of those, 82% whose request was approved had a child of the desired sex, compared to 63.8% of the others. Interviewees noted administrative requirements and the emotional impact as the hardest aspects of their applying for PGD.

**Conclusions:** The primary reason for the request was the parents' intense emotional desire, although often more than one reason was given. Nearly one-third of the applications were approved, an increase since the onset of the Committee's activity.

**Health Policy Implications:** Innovative reproductive technologies require an understanding of the public's needs and desires while taking into account the long-term implications of national health policy. This approach can contribute to the debate conducted in many countries on these controversial issues. Our study addresses the consequences for individuals, couples and families involved in the experience of applying to the Committee, and the Committee's procedures. This research can provide a basis for decision-making regarding PGD for non-medical reasons, and a template for confronting future questions arising from such technological advances.

## A WEB-BASED DISCUSSION FOR DIFFICULT-TO-SOLVE CASES: A PROMISING EXPERIENCE IN A LARGE PHYSICIAN NETWORK

Shmuel Prints<sup>1</sup>, Tsernishov N.A.<sup>2</sup>

*1 Neglected Diseases Collaboration, IL*

*2 Doctor na rabote (DnR), Russia*

**Background:** A diagnosing of rare diseases takes an unusually long time. During that period, the patient gets 2-3 misdiagnoses. Educational web presentations of patients with rare diseases show that among the participants, at least one has the right answer. An off-line discussion about a patient with an unusual clinical picture may be a promising opportunity for a physician experiencing diagnosing difficulties.

**Study Question:** We studied the number of diagnostic assumptions and the speed of their receipt in the web-based consultation regarding patients who standard diagnostic procedures did not allow to establish a diagnosis.

**Methods:** The social network “Doctor na rabote” (DnR) brings together more than half a million Russian-speaking physicians. Almost every day, its members turn to their colleagues with questions about diagnostic difficulties. We conducted an observational study of difficult-to-solve cases, presented on DnR in the period 1.09.18 - 28.02.19. In order to analyze the practice of a web Concilium regarding patients with possible rare diseases, we chose cases in which at least 20 doctors participated. We investigated the time between publication and the receipt of the last diagnostic assumption, the number of independent diagnostic assumptions and the total number of participants in the discussion.

**Results:** During the study period, there were 25 discussions that met the inclusion criteria. Two cases of them were presented twice. The average number of participants who made significant comments was 27.32 (20-41). The count of independent diagnostic assumptions per case varied from 6 to 22 and averaged 12.6. The time between publication and receipt of the last of the diagnostic version did not exceed two weeks.

**Conclusions:** An off-line Concilium regarding difficult-to-diagnose cases yields a significant number of diagnostic assumptions in a very short time.

**Health Policy Implications:** An adding to off-line web Concilium a tool for choosing between assumptions can significantly speed up the diagnosis of such patients in everyday medical practice.

## PERSONAL AND SOCIAL PATTERNS PREDICT INFLUENZA VACCINATION DECISION

Dan Yamin<sup>1</sup>, Adir Shaham<sup>1</sup>, Gabriel Chodick<sup>2</sup>, Varda Shalev<sup>2</sup>

*1 Tel Aviv University, IL*

*2 Tel Aviv University; Maccabi Healthcare Services, IL*

**Background:** Seasonal influenza vaccination coverage remains suboptimal in most developed countries, despite longstanding recommendations of public health organizations. The individual's decision regarding vaccination is located at the core of non-adherence.

**Study Question:** Can we predict whether a patient will become vaccinated against influenza in the next season?

**Methods:** A retrospective longitudinal cohort study, utilizing data from the electronic medical records of 250,000 members of Maccabi Healthcare Services. The data was collected from 1,600 clinics, 32 hospitals and 700 pharmacies, between the years 2007 and 2017.

We developed machine-learning models to predict the future vaccination decision of a patient. Models' performance was based on the area under the ROC curve.

**Results:** The vaccination decision of an individual can be explained in two dimensions - personal and social. The personal dimension is strongly shaped by a "default" behavior, such as vaccination timing in previous seasons and general health consumption, but can also be affected by temporal factors such as respiratory illness in the prior year.

In the social dimension, a patient is more likely to become vaccinated in a given season if at least one member of his family also became vaccinated in the same season (RR:11.09; 95% CI:10.92 to 11.25). Furthermore, vaccination uptake was highly associated with the individual's home geographic area (P value<.0001), and with the individual's socioeconomic score. An XGBoost-based predictive model achieved a ROC AUC score of 0.91 with accuracy and recall rates of 90% on the test set. Prediction relied mainly on the patient's individual and household vaccination status in the past, age, number of encounters with the healthcare system, number of prescribed medications, and indicators of chronic illnesses. A model which relies solely on the vaccination timing in the previous season yielded 0.81 ROC-AUC scores.

**Conclusions:** The decision of an individual to become vaccinated is highly predictable.

**Health Policy Implications:** Our study sets a major step toward personalized influenza vaccination campaigns.

## AUTOMATIC EVALUATION OF ROUTINE COMPUTED TOMOGRAPHY SCANS FOR PREDICTION OF OSTEOPOROTIC FRACTURES

Noa Dagan<sup>1</sup>, Eldad Elnekave<sup>2</sup>, Noam Barda<sup>1</sup>, Eitan Bachmat<sup>3</sup>, Ran Balicer<sup>1</sup>

*1 Clalit Research Institute, IL*

*2 Zebra Medical Vision LTD., IL*

*3 Ben-Gurion University of the Negev, IL*

**Background:** Osteoporotic (OP) fractures cause major morbidity and mortality. The clinical importance of fracture risk prediction models such as FRAX is well established, but these models require many inputs and are underutilized in practice.

**Study Question:** How does the predictive ability of OP-fracture risk scores, derived automatically from routine CTs using an artificial-intelligence based algorithm, compared to that of FRAX?

**Methods:** Members of Clalit Health Services aged 50–90, who underwent routine chest or abdomen CTs prior to July 2012, were included.

An algorithm scored each CT for bone mineral density and the presence of vertebral compression fractures. Three models predicting five-year fracture risk were assessed as of July 2012: FRAX, CT (using algorithm markers together with CT metadata of age and sex), and combined FRAX-CT. The two outcomes were major OP and hip fracture incidence over 5-years (2012–2017).

Model discrimination was evaluated using the area under the ROC curve (AUC). Missing FRAX inputs were multiply imputed. Significance was evaluated using 500 bootstrap samples.

**Results:** A total of 48,227 individuals were analyzed. Of these, 5,106 (10.6%) and 1,901 (3.9%) suffered major OP and hip fractures during follow-up, respectively. The AUCs of the FRAX, CT and combined models were 69.1%, 71.0% and 72.3%, respectively for major OP fractures, and 75.1%, 76.0% and 77.2% for hip fractures, respectively. All AUC results were significantly different except those between the FRAX and CT models for hip fractures.

**Conclusions:** Fully automatic screening for OP fracture risk using routinely acquired CT scans achieves discrimination which is at least as good as the well-established FRAX model. If data for all required inputs is available, combining the CT scores with FRAX further improves predictive ability.

**Health Policy Implications:** OP fracture prediction scores can be added automatically to CT reports, to help identify people at risk for fractures who are currently missed.

## PATIENT NAVIGATION IN A VIRTUAL WORLD: USING ENGLISH SPEAKING IMMIGRANTS AS A MODEL FOR TELEHEALTH ADVOCACY

Aviva Yoselis, Gabriel Pransky

*The Shira Pransky Project, IL*

**Background:** Although there are no exact figures, there are approximately 300,000 Native English speakers living in Israel, and 5,000 more making Aliyah every year. Despite the demand of the Knesset to make healthcare accessible, both culturally and linguistically, to immigrants, English speaking services have been slow to come. This is due, in part, to the belief that all healthcare providers can converse in English (they cannot), and that English speakers making Aliyah navigate the healthcare system effectively (they do not). These discrepancies cause (1) decreased access to needed healthcare services, (2) increased levels of frustration, disempowerment and depression (3) decreased quality of life among English speaking immigrants dealing with healthcare issues. In addition, this immigrant population needs to overcome the cultural stigma of entitlement and the true lack of social capital that healthcare navigation operates through Israel.

**Study Question:** Can effective navigation and advocacy services be delivered to a varied and dispersed immigrant population, virtually, and have similar, if not better, outcomes than standard in-person services offered by the Ministry of Welfare, National Insurance Institute and the Ministry of Health?

**Methods:** An online system was developed that delivers health navigation and advocacy services based solely on online and ongoing telephone service, in conjunction with the information database of “Kol Zchut”, All Rights Organization.

**Results:** Over a two-year period, over 2,000 English speakers have been served by this online system, and over 100,000 individuals have received accurate healthcare information in English through the collaboration between The Shira Pransky Project and the All Rights site. More importantly, over 400 immigrants in the periphery of the country, who have much less access to English speaking services have received services.

**Conclusions:** An organized informational and online-based system, with trained staff can deliver effective informational and advocacy services. A culturally diverse population spread out over a large geographic area can receive effective intervention services that can mitigate crises, increase access to benefits and suitable care.

**Health Policy Implications:** A system that generates empathy even if the platform is Telehealth (i.e. not in person), can be personal without being in person. Using trained staff and a specific rubric of service delivery and intake, services can be delivered effectively, efficiently and with minimal costs.

## MACCABI RED - UBERIZATION OF MINOR TRAUMA AND SEMI URGENT MEDICAL CARE IN PRIMARY CARE SETTING

Ilan Yehoshua, Limor Boker Faran, Neomi Siegal, Miri Reuveni Mizrachi

*Maccabi Healthcare Services, IL*

**Background:** Minor trauma and semi-urgent conditions are a burden on the health system. In a year, in Maccabi alone, there are more than 50,000 cases. Many patients that seek urgent medical care are treated in the emergency department. The Maccabi health service has the medical personnel which is capable of delivering the same, if not better treatment, in the outpatient setting. This treatment is faster and cheaper. In order to facilitate the needs of the individual patient, we need a system that will connect the patients to the Doctors enrolled to program within the relevant area efficiently. It is very similar to the Uber system. We call this medical service innovation 'Maccabi red'. For example - a 3 years old child with a laceration who needs suturing; the 'Maccabi red' system can efficiently find the Doctor that can perform the suture. Thanks to this system the child and his family do not need to go to a busy emergency room thus reducing the burden of disease and health costs.

**Study Question:** (1) How efficient is this system in the management of minor trauma and semi-urgent conditions? (2) How does the project influence the satisfaction of Doctors and patients? (3) What are the changes in cost and health burden?

**Methods:** Since 12/2017, a pilot of 219 Doctors from different specialties and selected regions around the state was trained and enrolled. Each condition is referred to the system and directed accordingly to the suitable Doctor close by. Ongoing evaluation of the above questions is being performed.

**Results:** (1) Until February 2019, 2,065 referrals were made to the Maccabi Red. 78% were suitable for the definitions of the program. (2) Patients and Doctors' satisfaction were very high in qualitative questioners. (3) Financial benefit - still not enough data.

**Conclusions:** This is a useful process that needs ongoing adjustments to become a model for better utilization of medical resources.

**Health Policy Implications:** Maccabi Red could serve as a good example of how can 'Uberization' of the medical system succeed.



## CLINICAL TRIALS IN ADVANCED THERAPIES - ISRAEL IS ON THE MAP

Shlomo Yaacobi, Miriam Cohen-Kandly, Catherine Ela, Eli Marom

*Ministry of Health, IL*

**Background:** Advanced therapies are breakthrough technologies in the medical world designed to treat unmet medical needs including cancer, neurodegenerative and hereditary diseases.

Nationally there is great medically and financially importance, in the development and implementation of innovative treatments.

**Study Question:** Does the Ministry of Health's policy enables developments in advanced therapies in Israel?

**Methods:** Due to the progress and complexity of these innovative experimental treatments, the MoH nominated specific committees to address necessary aspects, such as clinical safety data, scientific integrity, product quality and ethical value. In 1999, a central committee for clinical trials utilizing cells and tissues medicinal products was established, and in 2007 a committee for gene therapy clinical trials was established. In 2012, committee activity became regulated according to annual schemes.

In 2015, the Ministry of Health created a computerized database of all clinical trials. The database includes trial documents, product classification, MoH processing time, applications status, safety and annual reports, etc.

The Department of Clinical Trials conveys MoH policy throughout conferences and working groups and one on one meetings with sponsors and institutional review boards.

**Results:** Summarizing the data from 2015-2018, we can identify an increase in the number of innovative experiments (6 in 2015 to 22 in 2018) in all phases.

The processing time is usually between 150 to 200 days. Over the years 2015-2017 MoH approved over 70% of applications.

MoH also approved compassionate use of these treatments for patients that could not be included in a trail.

**Conclusions:** The Ministry of Health's policy enables and promotes developments in advanced therapies in Israel.

**Health Policy Implications:** In order to further promote these innovative trials, the MoH acts to improve the approval process, minimize evaluation time, enable transparency, whilst at the same time guarantee the safety of the participant in the trial.

## CLINICAL OUTCOMES, QOL AND COSTS ANALYSES OF TELEMEDICINE APPLICATION IN LOWER EXTREMITIES ULCERS TREATMENT

Alexander Gamus, Varda Shalev, Gabriel Chodick

*Maccabi Healthcare Services, IL*

**Background:** The estimated annual prevalence of the foot and leg ulcers in Israel, where the prevalence of diabetes mellitus (DM) is estimated at 8.4 %, up to 15% of DM patients may develop diabetic foot ulcers. Providing medical services to Lower Extremities Ulcers (LEU) patients in geographically remote regions is a growing concern in healthcare systems. Telemedicine (TM) has been suggested to be a potential solution to this problem.

**Study Question:** The study aimed at assessing the clinical effectiveness, cost-effectiveness, and quality of life (QoL) of TM application.

**Methods:** The research was conducted at Maccabi Healthcare Services, a 2.2 million-member sick fund in Israel, and performed during Jan 1st, 2013 - Jun 31st, 2017 period. Both TM and face-to-face modalities were implemented using identical treatment settings with the same nurse at each location. The same specialist supervised patients in each modality.

**Results:** A total of 650 cases (nTM=277, nFTF=373) with 5,203 visits. Comparable ( $P=0.475$ ) proportions of healed ulcers (52% in TM vs. 55% in FTF) were detected. Survival analyses found a non-significant advantage of TM (0.887; 0.650-1.212) compared to FTF. A total of 83 TM and 94 FTF patients' questionnaires included in the QoL trial. The mean quality-of-life in TM was  $0.546(\pm 0.249)$  compared to an FTF cohort with  $0.507(\pm 0.238)$ ,  $p=0.291$ . The cost-per-patient in TM, compared to FTF, was 7% higher; however, with similar quantities of TM and FTF patients, the cost in TM becomes lower. The alternative of FTF-only treatment demonstrated higher direct cost-per-patient by 30%.

**Conclusions:** Synchronous video-conferencing based TM may be a feasible and efficient method of LEU management.

**Health Policy Implications:** The Costs and Benefits study brings new evidence of cost per patient to a LEU treatment domain with little previous research.

## FETAL TELE-MONITOR SYSTEM - CENTRAL ANALYSIS, QUALITY CONTROL AND ARCHIVING - PRELIMINARY ACCOUNT OF THE FIRST YEAR

Dror Raif<sup>1</sup>, Ofer Tadmor<sup>2</sup>, Yaakov Segal<sup>2</sup>, Miri Mizrahi-Reuveni<sup>2</sup>, Rachel Fish<sup>2</sup>, Angela Ironi<sup>2</sup>, Nachman Ash<sup>2</sup>

*1 Hadassah-Hebrew University of Jerusalem, IL*

*2 Maccabi Healthcare Services, IL*

**Background:** Maccabi Healthcare Services provides healthcare services nationwide. One of those services is a prenatal evaluation of fetal well-being through a non stress test (NST). Maccabi's healthcare professionals perform 60,000 NST monitors per year in 142 care centers.

**Study Question:** What are the technical probability and the medical and economic benefit of fetal tele-monitor analysis and archiving via the Internet?

**Methods:** In 2017, the tele-monitor system dealt with 27,695 fetal monitors. Those consisted out of 2,697 monitors centrally analyzed by six doctors via a secure network, and 18,799 centrally archived post local analysis. The medical benefit of the project was studied and determined according to medical intervention and outcome of cases centrally analyzed.

**Results:** We found that 0.8% of real-time analyzed tele-monitors were diagnosed with fetal distress, and out of those, 78% were rushed to the hospital by ambulance and received a significant medical intervention, possibly altering the course of the pregnancy. Furthermore, 31.6% of archived monitors were inspected post archiving. Out of those, 0.42% were deemed incompatible to original analysis, and 37% of them received significant medical care.

**Conclusions:** The tele-monitor system was proven to improve the medical care of Macabbi outside large cities. The project proved that a limited staff can provide care in real time, with no geographic limitations. Moreover, the system contributed directly to the improvement of the medical care of some patients and enabled the inspection and monitoring of the quality of medical care of other patients.

**Health Policy Implications:** Secure internet networks are becoming increasingly widespread, allowing more services to be made available to more patients through tele-medicine. In light of the severe shortage of medical professionals and growing gaps in medical care between major metropolitan areas and more outlying areas, tele-medicine and care should be the next step in public healthcare.

## DOES STAFFING LEVELS OF HEALTH-CARE WORKERS IMPACT RETENTION IN HIV CARE AND TREATMENT? A RETROSPECTIVE COHORT ANALYSIS OF DATA FROM RIFT-VALLEY IN KENYA

Raphael Onyango

*Kenya Medical Research Institute-Family AIDS Care and Education Services, Kenya*

**Background:** Human resources for health is key to achieving the UNAIDS 90-90-90 targets by 2020. Retention in care is a step towards achieving viral load suppression among clients in HIV/AIDS care and treatment. The “Care&Treatment” program is implemented in 137 Ministry of Health facilities in the Rift Valley Province of Kenya.

**Study Question:** What is the impact of healthcare worker numbers on retention in care among People Living with HIV (PLHIV)?

**Methods:** We performed retrospective analysis on routinely collected program data on staff and retention between October-December, 2018. These were staff numbers, adherence counselors, case managers/mentor mothers, nurses, and registered clinical officer (RCO). We calculated retention as a percentage of adults and children known to be on treatment 12 months after initiation of antiretroviral therapy and used Poisson Regression for count data controlling for facility-level clustering and using the total number of staffs at the facility level as an offset variable to assess the association between staff numbers and retention.

**Results:** There were 63/548(11.5%) -adherence counsellors, 296/548(54%) -case-managers, 97/548(17.7)-nurses, and 92/548(16.8%) registered clinical officers in 137 facilities. We observed statistically significant association between availability of overall staff numbers and retention, availability of 1-5 staff was IRR [0.35 95%CI (0.33-0.37)], 6-10 staff IRR [0.14 95%CI (0.13-0.15)], and availability of above 10 staff numbers, IRR [0.055, 95% CI (0.052-0.060)]. Availability of adherence counsellor was protective [IRR 0.46 95%CI (0.44-48)]; 2-4 adherence counsellors [IRR 0.25 95%CI (0.23-0.27)]. availability of between 1-2 mentor-mother(s)/case-manager(s) was protective [IRR 0.40 95%CI (0.37-43)]; 3-4 mentor-mothers/case-managers [IRR 0.19 95%CI(0.18-20)]; above 5 mentor-mothers/case-managers [IRR 0.09 95% CI(0.08-0.10)]. availability of nurses was protective [IRR 0.56 95%CI (0.54-59)]. Availability of 1 RCO was protective [IRR 0.44 95%CI (0.42-46)]; between 2-4 RCOs [IRR 0.27 95%CI (0.25-0.29)].

**Conclusions:** Availability of healthcare workers improves retention and increased numbers improve retention in care among PLHIV.

**Health Policy Implications:** Understanding the distribution and allocation of healthcare workers will help the government to allocate scarce healthcare workers to achieve optimal health outcomes.

## FEASIBILITY, SAFETY, AND EFFECTIVENESS OF A NOVEL MOBILE APPLICATION IN CARDIAC REHABILITATION

Robert Klempfner<sup>1</sup>, Amira Nachshon<sup>1</sup>, Irene Nabutovsky<sup>2</sup>, Liza Grosman<sup>3</sup>,  
Offer Amir<sup>3</sup>, Riki Tesler<sup>4</sup>, Yair Shapiro<sup>4</sup>

*1 Sheba Medical Center, IL*

*2 Ariel University; Sheba Medical Center, IL*

*3 Baruch Padeh Medical Center, Poriya, IL*

*4 Ariel University, IL*

**Background:** Cardiac rehabilitation (CR) is underutilized globally despite evidence of clinical benefit. Major obstacles for wider adoption, include distance, travel-time and interference with the daily routine. Tele-rehabilitation can potentially address some of these limitations, enabling patients to exercise in their home environment or community.

**Study Question:** The aim of this study was to evaluate the clinical and physiological outcomes as well as adherence to tele-cardiac rehabilitation (tele-CR) in patients with low cardiovascular risk.

**Methods:** A total of 22 patients with established coronary artery disease participated in a 6-month tele-CR program. Datos Health, a novel digital health application and care-team dashboard were used for remote monitoring, communication and management of the patients. The primary objective of the study was to assess exercise capacity, determined by exercise stress test, using a treadmill before and following the 6-month intervention.

**Results:** Following the 6-month tele-CR intervention, there was a significant improvement in exercise capacity, assessed by estimated Metabolic Equivalents (METs) with an increase from  $10.6 \pm 0.5$  to  $12.3 \pm 0.5$  ( $P=0.002$ ). High-density lipoproteins (HDL) levels significantly improved, whereas low-density lipoproteins (LDL), triglyceride (TG) glycosylated hemoglobin (HbA1c), systolic (SBP) and diastolic (DBP) blood pressure levels were not significantly changed. Exercise adherence was consistent among patients, with more than 63% of patents participated in a moderate intensity exercise program for 150 minutes per week.

**Conclusions:** Patients who participated in tele-CR adhere well to the exercise program and attained clinically significant functional improvement. Tele-CR program is a viable option for populations that cannot, or elect not to participate in center-based CR programs.

**Health Policy Implications:** Tele-CR is a viable option for attaining good adherence and functional improvement. Healthcare providers should strive to integrate alternative models of rehabilitation, such as Telehealth interventions tailored to individual's risk factor profiles as well as community- or home-based programs to ensure there are choices available for patients that best fit their needs, risk factor profile, and preferences.

## NEW MODEL OF 'INTERNET + HEALTHCARE': CASE STUDY OF ONLINE HEALTH SERVICES IN CHINA

Fowie Ng

*Hong Kong College of Community Health Practitioners, Hong Kong*

**Background:** China has one of the largest numbers of hospitals in the world. Access to good quality health care remains a problem in both urban cities as well as in the rural areas. Patients are rushing to outpatient clinics in well-known hospitals to register (guahao in Chinese) and have to wait to see the experts and specialists. The recent reform of the health services in China has facilitated the emerging giant online health services providers to fill in the gap in the form of 'Internet + Healthcare'.

**Study Question:** (1) What are the current government policies and regulations in China towards the practice of 'Internet + Healthcare'? (2) What are the current types of services and the model of this 'Internet + Healthcare'? (3) Evaluate the current two major listed 'Internet + Healthcare' providers in the China market.

**Methods:** (1) Content analysis of the government policies and regulations regarding the development of 'Internet + Healthcare'. (2) Case Study of the two major listed 'Internet + Healthcare' providers in China market in terms of their market, model and their outcomes.

**Results:** (1) A disruptive model of the health care market in China has been currently dominated by internet or financial giants. (2) Market share is constantly growing in this field. (3) Investment Funding and Initial Public Offering are the major sources of funding for sustaining and developing the services. (4) Changes in the behaviors of local citizens in seeking health advice and consultations.

**Conclusions:** While the current scale of 'Internet + Healthcare' provision in China is stilling developing, it is envisaged that there is a strong growing demand of adopting this new model to seek health services from the citizens in China. While these providers may not acquire their financial profits yet, this new model of economy has attracted much attention from the investors' point of interest.

**Health Policy Implications:** (1) Can this model of 'Internet + Healthcare' be applied to other countries? (2) How to regulate and assure the quality of services or advices? (3) Urgent need for government to evaluate the effectiveness of the 'Internet + Healthcare.' (4) Update and refine the current policy regarding 'Internet + Healthcare'.

## FEASIBILITY OF TELEHEALTH IN HONDURAS

Sandra Gomez Ventura<sup>1</sup>, Reyna M. Durón<sup>1</sup>, Dina Alvarez<sup>2</sup>, Andrea Summer<sup>3</sup>,  
Dean Sutphin<sup>4</sup>, Juan Pablo Bulnes<sup>1</sup>, Gabriela Mondragon<sup>1</sup>

*1 Universidad Tecnológica Centroamericana, UNITEC, Tegucigalpa, Honduras*

*2 Hospital María de Especialidades Pediátricas, Tegucigalpa, Honduras*

*3 Medical University of South Carolina, Charleston, US*

*4 Edward Via College of Osteopathic Medicine, US*

**Background:** Telehealth is an innovative tool for teleconsultation and Tele-education. Our project unifies local and international efforts to establish the feasibility of this tool in Honduras. We pursue the benefit of patients and health personnel (especially medical students) in remote areas where the internet is available.

**Study Question:** Is Telehealth feasible in Honduras?

**Methods:** Our Interventional Pilot Project includes eight Telehealth stations in four Departments of the country: Two stations at Universidad Tecnológica Centroamericana's (UNITEC) Campus, one at the public children's hospital in the capital, one at a regional hospital (Danlí), and five at non-governmental clinics in Tegucigalpa, Copán and Olancho. The project follows international standards to protect privacy and confidentiality, as the standards by the American Telemedicine Association. We use three systems: Zoom for teleconferencing with Edward Via College of Osteopathic Medicine (VCOM), Vidyo for teleconferencing and teleconsults with Medical University of South Carolina (MUSC), and Alivio for teleconsult with the electronic record.

**Results:** Since 2017, UNITEC's students connect with MUSC for conferences and case discussions, in 2019 they happen every week. Since 2018 they connect with VCOM to discuss cases related to public health strategies. Teleconsultations are developed per calendar. Physicians at the rural areas consult with specialists in pediatrics, physical therapy, neurology and internal medicine. Satisfaction rates are high due to financial savings and improved diagnosis and treatment plans, but there are complains related to internet connectivity and availability of more specialists for consultations.

**Conclusions:** This project has shown the feasibility of Telehealth in Honduras and could be a model to expand in the country to improve access to health care and continued medical education.

**Health Policy Implications:** This project includes education, diagnosis, electronic record and soon Tele-Diagnosis for radiology. For this reason, it is considered by the Honduran Government as a pilot that could provide inputs for the preparation of national Telehealth legislation.

## DIGITAL PATIENT PORTALS AND HEALTH OUTCOMES, SYSTEM EFFICIENCY AND PATIENT ATTITUDES: A SYSTEMATIC REVIEW

Leonardo Villani, Andrea Barbara, Elettra Carini, Andrea Gentili, Angelo Maria Pezzullo, Walter Ricciardi

*Università Cattolica del Sacro Cuore, Italy*

**Background:** Systems based on Electronic Health Records (EHRs) have the potential to improve patient care, self-management and activation. Among these systems, patient portals are becoming increasingly popular worldwide even though their impact on individual health and health systems efficiency is still unclear.

**Study Question:** The aim of the study was to analyze the impact of digital interactions between health systems or providers and citizens through patient portals or other EHRs-based systems on health outcomes, treatment adherence, health system efficiency, and patient characteristics, attitudes and satisfaction.

**Methods:** MEDLINE and Web of Science databases were queried from 1 January 2013 to 8 January 2019. Hypothesis-testing or quantitative studies of patient portals or other EHR-based digital applications that addressed patient outcomes, satisfaction, adherence, efficiency, utilization, attitudes, and patient characteristics, as well as qualitative studies of barriers or facilitators, were included.

**Results:** Forty-six articles were included: 2 randomized controlled trials, 19 observational hypothesis-testing studies, 14 quantitative descriptive studies and 11 qualitative studies. There is mixed evidence about the effect of portals on health outcomes, although most studies report positive results. Satisfaction is generally good, especially when the patients are involved in portal framing. The effect of portals on utilization and efficiency of health systems is still unclear. Patients' age, gender, education level, computer literacy, and number of comorbid conditions may influence use.

**Conclusions:** Evidence suggests that patient portals improve health outcomes and patient satisfaction. Patient attitudes are generally positive. Portals represent a technology whose benefits for health systems utilization are still unclear.

**Health Policy Implications:** This review informs digital health managers, health policymakers and citizens worldwide about the effects of well-designed patient portals on health and provision of care. Health systems and providers need to put more effort to overcome social, economic and literacy barriers in adoption and use of patient portals.



## IS UBER'IZATION OF RELATIONS POSSIBLE? EXAMINING THE PROS AND CONS OF TELECARE MODELS USING POVERTY-AWARE THEORIES

Shlomit Avni

*Ministry of Health, IL*

**Background:** Digital-care (DC) models have been criticized and simultaneously praised as contributing to the expansion/reduction of health disparities. Poverty is a multidimensional social problem prominent in all developed countries and an important determinant of health. Are DC models a threat or an opportunity to people living in poverty?

**Study Question:** To examine the pros and cons of DC models in mitigating the effects of poverty on health and their contribution to people living in poverty's needs.

**Methods:** A qualitative analysis of 3 approaches focused on the delivery of care to people in poverty ("Pro-poor Health Systems"; "Social Exclusion" and "Poverty-Aware social-work - PASW) was undertaken. 16 principles were grouped into 3 groups (interpersonal-downstream factors; practical-midstream factors; and social-upstream factors). Both groups and principles underwent examination in order to characterize the challenges and opportunities they insinuate to DC models.

**Results:** DC models can help mitigate numerous practical-midstream barriers including: economic barriers to care as well as hidden expenses such as expenses on transportation; help expand health care organizations' ability to expand outreach to people in poverty; and provide better accessibility to knowledge and entitlements. Contrariwise, DC models are challenging mainly for interpersonal-downstream factors such as emotional needs, trust and close relations and "symbolic" capital, important factors identified as crucial in PASW approaches. Social-upstream factors such as Social exclusion are also challenging for DC models since they potentially strengthen individualistic patient-oriented approaches rather than socially-oriented ones.

**Conclusions:** Consideration of barriers to care for different social groups, stemming from the use of DC models, should expand to include not only the "usual suspects" such as health literacy and technologic accessibility but also to other interpersonal, ethical, social, cultural and political factors.

**Health Policy Implications:** Systematic examination of DC models for care is needed, especially regarding excluded social groups.

## MATURE VERSUS REGISTRATION STUDIES OF IMMUNO-ONCOLOGY AGENTS: DOES VALUE IMPROVE WITH TIME?

Omer Ben-Aharon<sup>1</sup>, Racheli Magnezi<sup>1</sup>, Moshe Leshno<sup>2</sup>, Daniel Goldstein<sup>2</sup>

*1 Bar-Ilan University, IL*

*2 Tel Aviv University, IL*

**Background:** A unique feature of immune-oncology agents is the potential for durable survival for a subset of patients, however, this benefit can usually not be seen on the early published data used for regulatory approval. Value Frameworks developed by ASCO and ESMO assess the clinical benefit demonstrated in registration trials. We hypothesize that the proven clinical benefit may change with time, as more mature data is available.

**Study Question:** Objectives: To evaluate the impact of mature data of immunology agents on ASCO and ESMO scores and to examine the concordance of these frameworks using more mature data.

**Methods:** We reviewed all FDA approvals for immuno-oncology agents between 2011-2017, calculated the ASCO Net Health Benefit (NHB) and ESMO Magnitude of Clinical Benefit Scale (MCBS). We checked which agents fulfill the criteria of being rewarded for durable survival. We assessed the concordance between models using Pearson and Spearman correlation tests. We compared the initial results of studies used for registration to mature follow-up data from the same studies.

**Results:** The FDA approved 27 solid tumor indications for immuno-oncology agents between 2011-2017. The correlation between ASCO NHB and ESMO MCBS was high (0.87-0.93). Mature follow-up data were available for 13 of these indications. In 8 of the mature studies, we found improvement in the grade of ASCO and/or ESMO value frameworks. In 2 cases we found a downgrade in the scale.

**Conclusions:** Despite the different approaches, the high concordance between ASCO-NHB and ESMO-MCBS indicates that both models reward treatments as beneficial for the same immuno-oncology agents. Mature data with longer follow-up reaffirmed most of the findings found in the evaluation at the registration studies stage.

**Health Policy Implications:** ASCO and ESMO value frameworks might be used as supporting tools for reimbursement decisions concerning oncology innovate treatments. Analysis of mature data should be considered for the re-examination of decisions made in previous years.

## QUANTIFYING A MINIMUM SOCIAL VALUE OF PUBLIC HEALTH CARE: A GENERAL EQUILIBRIUM MODEL APPLIED TO ISRAEL

Erez Yerushalmi<sup>1</sup>, Sani Ziv<sup>2</sup>

*1 Birmingham City Business School, UK*

*2 Academic College of Tel Aviv-Yaffo, IL*

**Background:** Countries with universal health care have experienced a rising demand for health care services, without a corresponding rise in public supply. This has led to a debate on whether to increase private health care services – especially in hospitals and second-tier healthcare. Proponents for increasing private health care highlight gains in efficiency and innovation, while opponents emphasize its risk to social welfare. However, the monetary value of these gains and losses is seldom quantified.

**Study Question:** What is the minimum social value of public health care that corresponds to indifference between gains in economic efficiency, with losses to social welfare?

**Methods:** We develop a general equilibrium model that distinguishes between public-private healthcare services and public-private financing. Our approach resembles contingent valuation methods that introduce a hypothetical market. However, it is different because we use numerical simulation techniques to compare a regulated with a simulated deregulated health-labor market. Furthermore, the social value is modeled as a byproduct of health care services. The model is then calibrated to our unique health-focused Social Accounting Matrix of Israel, and simulates the introduction of a hypothetical health-labor market – given that it is heavily regulated in the baseline (i.e., the true situation in Israel today).

**Results:** For mid-point parameters, we estimate the minimum social value at around 18% of public healthcare financing. We furthermore simulate a deregulated health care scenario that internalizes the imputed value of social value and search for the optimal weight of public and private health care provision.

**Conclusions:** When assessing the best type of health care, policymakers should weigh the economic gains of deregulation with the lost social value.

**Health Policy Implications:** We show that well-being may even decrease in cases of over-privatization of health care.

## CHOOSING VIDEO INSTEAD OF IN-CLINIC CONSULTATIONS IN PRIMARY CARE: DISCRETE CHOICE EXPERIMENT AMONG KEY STAKEHOLDERS: PATIENTS, PRIMARY CARE PRACTITIONERS AND POLICY MAKERS

Irit Chudner<sup>1</sup>, Drach-Zahavi Anat<sup>2</sup>, Karkabi Khaled<sup>3</sup>

*1 Technion, IL*

*2 University of Haifa, IL*

*3 Technion, Clalit Health Services, IL*

**Background:** Despite being beneficial for Primary care settings, the adoption of Video-Consultations (VC) instead of traditional in-clinic consultations (I-CCs) is complex and slow.

**Study Question:** Understanding VC vs. ICC choice related preferences of the three key stakeholder groups in primary care: Patients, Primary Care Physicians (PCPs) and Policy Makers (PMs), is crucial for achieving better implementation.

**Methods:** Discrete Choice Experiment (DCE) surveys with 12 choice tasks of two labeled alternatives (VC or I-CC) with four VC vs. ICC attributes most relevant to each stakeholder group was filled by 508 Patients, 264 PCPs and 138 PMs. Choice' attributes were, for both patients and PMs were: (1) Time to next available appointment; (2) Time in-line before consultation; (3) Relationship to PCP; and (4) Quality of consultation. For PCPs these were: (1) Time in-line before consultation; (2) Patient's self-management ability; (3) Consultation purpose; (4) Quality of consultation. Random effects logit model analysis was used to estimate stakeholders' preferences for attributes.

**Results:** All experiment attributes were significantly important in choosing VC vs. ICC for patients and PCPs groups. Three out of four attributes were significantly important for PMs. Gaps and similarities were identified between stakeholders in attribute rank orders, trade-offs and probabilities of VC take up. PMs VC uptake was 86%, patients' preferences suggested that 68% of ICC can be switched to VC and PCPs uptake rates were 30% in cases, where consultation purpose is to diagnose and giving treatment and 48% of consultations, where consultation purpose is a follow-up.

**Conclusions:** Our findings show key stakeholders' preferences for VC integration. Those preferences should be considered when VC systems are about to be used in primary care to optimize the implementation process.

**Health Policy Implications:** Although there is a stronger preference for I-CC among PCPs and patients, alternative combinations of attribute levels can be used to compensate and reconfigure a more preferred VC service.

## THE POSITIVE INFLUENCE OF APPMEDIC VOLUNTEER'S INTERVENTION IN THE EMERGENCY DEPARTMENT ON PATIENT AND FAMILY SATISFACTION

Yuval Levy<sup>1</sup>, Moshe Sharist<sup>2</sup>, Doron Garfinkel<sup>1</sup>

*1 Sheba Medical Center, IL*

*2 Yitzhak Shamir Medical Center, IL*

**Background:** Overcrowded Emergency Departments (EDs) represents a leading national health problem. The rapidly increasing imbalance between populations seeking help and the available professional teams leads to decreased quality of care (QoC), patient/team's frustration, anxiety, even violence. Facing financial distress, obvious solutions of enlarging the professional teams seem impractical. Therefore, health authorities constantly search for different, cheaper solutions.

**Study Question:** To evaluate whether adding volunteers to ED's professional staff relieves anxiety/frustration and improves patients/family satisfaction.

**Methods:** AppMedic volunteers (practiced medical clowns) were assigned randomly to morning/evening shifts at the Wolfson Medical Center adult ED and accompanied patients/families throughout their stay there (study group). The control group was comparable to patients/families who were treated regularly with no interaction with volunteers. Both groups were interviewed by research assistants (RNs), and filled-in two similar questionnaires, upon admission (expectations) and upon discharge, rating QoC. The questions referred specifically to efficacy, attitudes, and QoC provided by both doctors and nurses and the overall satisfaction of the stay at the ER.

**Results:** Between November 2017–March 2018, 387 patients/families met our inclusion criteria, 112 refused to cooperate. Eventually, 275 participants filled questionnaires: 144 were accompanied by AppMedic volunteers (intervention, study group); the remainder 131 comprised the control group. The groups were comparable in demographic and clinical parameters, and in their responses to the first "expectation" questionnaire. However, for all "discharge" questionnaire parameters evaluated, QoC ratings were significantly higher in the volunteer intervention study group.

**Conclusions:** This study proves that adding trained "non-health professionals" volunteers to ED teams, may decrease patient/family anxiety/frustration and improve overall satisfaction. Interestingly, AppMedic volunteers intervention was associated with significantly increased patients/family satisfaction of doctors/nurses performance, although the latter operated "as usual".

**Health Policy Implications:** The results may encourage health authorities to further promote this important route of incorporating knowledgeable volunteer into our starving health system.

## MINIMIZING ABUSE OF EMERGENCY CALL CENTER SERVICES: IS TECHNOLOGY THE RIGHT SOLUTION?

Maya Siman-Tov<sup>1</sup>, Oren Blushtein<sup>1</sup>, Racheli Magnezi<sup>2</sup>

*1 Magen David Adom, IL*

*2 Bar-Ilan University, IL*

**Background:** Unnecessary calls to emergency centers consume valuable time and resources that could be dedicated to patients in genuine need for treatment and transport. Literature regarding rates of malicious or prank calls to the emergency medical system is minimal. Legislation and guidelines regarding harassment calls are lacking or unenforced.

**Study Question:** To estimate and characterize intentional false emergency calls to emergency call centers in Israel and to assess the effectiveness of call-tracking technology implemented at Israel's national emergency medical service (Magen David Adom - MDA) to deter the problem.

**Methods:** A retrospective interventional study was conducted of all emergency calls received by MDA nationwide, from 2012 through 2016. The daily average number of false and missed calls were calculated. The multivariate analysis compared the average number of these calls based on emergency call center location before and after the technology was implemented in during 2015.

**Results:** In 2016, after implementing specialized call-tracking technology, the number of missed calls decreased to zero and the number of false calls decreased significantly. The average number of false and missed calls was consistently higher in dispatch centers located closer to Israel's borders. Higher numbers of false calls were correlated to missed calls ( $r=.425$ ,  $p<.001$ ).

**Conclusions:** In Israel, most false emergency calls originate from areas outside the country and thus, require specialized reactive and proactive technological solutions rather than laws, enforcement or education. Reducing and even eliminating phone harassment, along with fewer missed calls improved the effectiveness of emergency services for the general population.

**Health Policy Implications:** Healthcare professionals and stakeholders are concerned that misuse of emergency call centers stress service provision and may jeopardize patient care. The solution presented here can be implemented by various rescue organizations to reduce inappropriate use. Special technology can reduce and almost eliminate harassment calls without additional staff.

## HPV-DNA-PRIMARY SCREENING IN ISRAEL IS MORE EFFICIENT THAN CYTOLOGICAL SCREENING (PAP TEST)

Eduardo Schejter, Einav Shainadman, Talia Feinberg, Judith Sandbank, Noa Triki, Dalia Rabinobich, Jacob Segal

*Maccabi Healthcare Service, IL*

**Background:** The primary-cytological-screening for detecting cervical cancer and precancerous lesions has been proven in reducing morbidity and mortality of cervical cancer. In order to improve the sensitivity of the survey, it has been proposed to use HPV-DNA as primary-screening instead. Maccabi Healthcare Services (MHS) (cover 25% of the Israeli-population) started to use HPV-DNA-primary-screening based on HPV-DNA only test (Cobas-test, Roche) at 1.3.2018, with triage of cytology and genotyping for the referral to colposcopy.

**Study Question:** To compare the rate of indicated referral to colposcopy and the diagnosis of precancerous lesions based on two primary screening methods in the MHS.

**Methods:** Data was collected for each screening-group based on a centralized computerized system. The screening was done for women aged 25-65. The time periods were 1.1.2017-31.12.2017 for cytology-screening (CS) and 1.3.2018-31.12.2018 for the HPV-DNA-screening (HDS). In the CS group, women with abnormal-cytology ( $\geq$ LGSIL) or occasionally with ASCUS (atypical squamous cell of undetermined significance) were referred for colposcopy. During the HDS, women that were found HPV 16+/18+ or positive for other High-Risk HPV with abnormal-cytology were referred for colposcopy.

**Results:** 95,137 women with HDS tests during the study period were compared to 112,000 women screened by CS. In the HDS group, 4,091 women (4.3%) were referred for colposcopy, of which 2.3% were HPV 16+/18+ and 2.0% positive for other HR-HPV with abnormal-cytology. In the CS era 7,392 women (6.6%) were referred for colposcopy of which 4.1% had  $\geq$ LGSIL and the rest (2.5%) had ASCUS. The differences were statistically significant by chi-square analysis (OR=0.64, 95% CI, 0.61-0.66, p-value<0.0001) favoring HDS. In the CS group 1,680 (1.5%) women were diagnosed with CIN II+ (precancerous cervical lesions) vs 1,902(2%) in the HDS (OR=1.34, 95% CI, 1.25-1.43, p-value<0.0001) favoring HDS.

**Conclusions:** HDS decreases significantly the rate of indicated referral for colposcopy, when compared to CS and increase significantly the diagnosis of CIN II+ at the first screening round.

**Health Policy Implications:** HPV DNA screening in Israel is more efficient and preferred than the conventional cytological screening.

## IS FRONTAL TRIAGE AN EFFECTIVE ALTERNATIVE TO PHYSICIAN REFERRAL-BASED TRIAGE? A PROSPECTIVE COHORT STUDY

Susanna Mordechay<sup>1</sup>, Chaya Glickman<sup>1</sup>, Hagit Baranes<sup>1</sup>, Leonid Kalickman<sup>2</sup>

*1 Meuhedet Health Services, IL*

*2 Ben-Gurion University of the Negev, IL*

**Background:** In Israel, physiotherapy-led triage is conducted in patients with musculoskeletal problems (MSKP) referred to physiotherapy clinics (PTC). Patients are classified as "urgent" or "non-urgent" according to the medical information appearing in the doctor's referral.

Currently, "urgent" patients are assessed for initial examination and treatment within 48 hours at Meuhedet PTCs. "Non-urgent" patients are assessed according to availability, at an average of 5 weeks.

Prolonged waiting may cause some patients to use unnecessary medical services and enter the chronic phase of their disease, and therefore impaired functioning. Research shows that triage methods that enable early physiotherapy intervention, reduce waiting times and usage of medical services and show better clinical results.

**Study Question:** To evaluate whether a Frontal Triage Method (FTM) is an effective alternative to the current physician referral-based triage method.

**Methods:** A trial was conducted in a large PTC. The computer program for triage appointments was adapted and a new triage protocol introduced. All patients were assessed by a physiotherapist within 48 hours and received an initial intervention. Patients were classified as Urgent, Moderately-Urgent, Non-Urgent and continued treatment according to urgency. The following data was collated; waiting time, the number of treatments, clinical results for lower/ upper limb MSKP and patient satisfaction. The study period was 11 months and included patients "Before FTM" and "During FTM Intervention."

**Results:** 2,122 patients were included; 771 before FTM, 1,070 during FTM and 281 were not triaged. Waiting times decreased from  $19.98 \pm 16.59$  to  $1.89 \pm 1.34$  days ( $p < 0.001$ ), the number of treatments decreased from  $4.97 \pm 3.57$  to  $4.37 \pm 3.49$  ( $p < 0.001$ ), (clinical results for lower limb improved ( $p = 0.037$ ), and overall patient satisfaction was maintained.

**Conclusions:** FTM promotes reduced waiting, decreased usage of medical services and is cost effective. FTM effectiveness should be tested in the future in a cluster-wedge trial.

**Health Policy Implications:** Health policy decision-makers should consider implementing a physiotherapy-led triage system and encourage a change in current referral to PT.



## MANAGING DRUG SHORTAGES - THE ISRAELI EXPERIENCE (2013-2018)

Alla Vishkautzan, Eli Marom, Einat Gorelik

*Ministry of Health, IL*

**Background:** The growing number of drug shortages (DS) is of worldwide concern. This problem presents challenges to healthcare professionals and regulatory authorities and may have a direct impact on public health.

Early notification regarding future shortage is essential in order to minimize the potential risks to patients and the health system.

The database of the pharmaceutical division in the Ministry of Health (MoH) was established in 2013, detailing the cause, duration of DS, and the availability of generic or therapeutic alternatives. Since 2017 more detailed causes of the DS are requested.

As from 2016, the MoH instructed the pharmaceutical industry to hold in any time stock of at least 1 month's supply of all registered drugs in Israel.

**Study Question:** Do the mandatory early notification and the obligation of maintaining at least one month's supply of a drug reduce the number of DS in Israel?

**Methods:** Using the database of the pharmaceutical division, between the years 2013–2018.

**Results:** According to the data collected by the MoH, between 2013 and 2018, 1,580 DS notifications were received. In each of these years there was an increase in the number of DS, along with a decline in permanent drug discontinuations, and in immediate notifications. Among the reasons for temporary DS, delay in the delivery of goods was a primary cause (25%).

**Conclusions:** Despite all the steps taken by the MoH and efforts to reduce the scope of DS and their impact on public health, their numbers continue to rise annually albeit with a decline of immediate notifications of permanent market withdrawals.

**Health Policy Implications:** Drug shortages pose a significant hazard to public health in Israel and worldwide. An open dialog between all stakeholders is required in order to minimize the impact of DS. More measures, including the legislation of deterrent measures, should be considered in order to minimize the frequency of DS.

## NURSING ASSISTANTS - INNOVATIVE INTERVENTION

Ahuva Spitz, Gali Weiss, Tzion Tsohar

*Shaare Zedek Medical Center, IL*

**Background:** The role of the non-nursing, health care assistant developed primarily to lower health care costs by undertaking perceived non-nursing duties under the supervision of registered nurses. While nursing assistants represent a substantial proportion of the health care workforce and often are the first responders in providing direct patient care, the growth of their role has taken place without proper preparation, or systematic education and training especially in communication skills. This has raised serious concerns, especially with regard to the quality of care.

**Study Question:** Examining an innovative intervention utilizing simulation to train health care assistants, providing them with tools to deal with challenging situations they encounter in delivering direct patient care.

**Methods:** During 2018, data was collected through focused groups with nursing assistants in addition to questionnaires that were filled by nurses and nursing assistants. The results demonstrated a need to address communication between the nurses and the assistants. 100 nursing assistants from the medical-surgical wards participated in simulations that were specially tailored for them. Prior to attending the simulation center, social workers met with the nursing assistants in small groups allowing them to speak their emotions through cards and guided imagery. The simulations challenged the nursing assistants with difficult patients or family members. At the end of each session, the actor reflected the nursing assistant how he had felt. Each training day concluded with a discussion presenting communication tools for the nursing assistants.

**Results:** The closing questionnaires demonstrate a high level of satisfaction with the intervention.

**Conclusions:** The next planned step is to follow the nursing assistants utilizing qualitative and quantitative analysis focusing on the quality of care through tasks that they perform.

**Health Policy Implications:** The policy will be to provide twice a year a simulation-based training refresher course in order to fully implement a culture of quality and safety amongst nursing assistants applying communication skills.

## BUDGET-IMPACT OF DRUGS FOR ORPHAN DISEASES (ORPHAN DRUGS) IN THE ISRAELI HEALTH BASKET: A LONGITUDINAL ANALYSIS

Tal Morginstin<sup>1</sup>, Ariel Hammerman<sup>2</sup>, Noa Triki<sup>3</sup>, Baruch Weinreb<sup>4</sup>

*1 Ministry of Health, IL*

*2 Clalit Health Services, IL*

*3 Maccabi Healthcare Services, IL*

*4 Ben-Gurion University of the Negev, IL*

**Background:** Since the adoption of orphan-drug legislation in the US and Europe, the development of orphan drugs has grown rapidly. The rareness of each disease has led manufacturers to request extremely high prices for such drugs, and therefore their reimbursement has become a significant issue for healthcare decision makers. Although their high cost per patient, the Israeli Health Basket updating committee has tended to recommend accepting most orphan drugs, mainly because of 'rule of rescue'; saving identifiable patients with life-threatening illnesses, regardless of treatment costs.

**Study Question:** The aim of this study was to evaluate the total budget-impact of reimbursing orphan drugs in Israel in the last two decades.

**Methods:** Although there is no agreed definition of a rare disease, we chose to focus on treatments for diseases with a prevalence of less than 1: 80,000. Budgets were figured in 2019 values. Data was collected from MoH publications regarding the annual Health Basket updates.

**Results:** The first orphan drug added to the Health Basket was Agalsidase alfa for Fabry Disease, in 2002. During 2002–2018, a total of 316 million NIS, 4.4% of the entire budget allocated for all Health Basket updates, was provided for reimbursing 41 novel orphan medicines.

**Conclusions:** We have found that in Israel, although a permissible attitude, the proportion of the total budget allocated for orphan drugs, seems to be tolerable, mainly due to small patient numbers.

**Health Policy Implications:** The price of orphan drugs is a substantial challenge, especially since it has very little to do with incremental benefit. Fears that growth in the availability of novel orphan therapies will lead to an unsustainable cost escalation are currently not justified. However, it cannot be expected that the Health Basket will accept at any price all effective orphan drugs, since numerous significant and cost-effective treatments will need to be forgone for many other patients.

## ALLOCATION OF RESOURCES AMONG MEDICAL FIELDS IN UPDATING THE ISRAELI 'HEALTH BASKET', IS THERE A 'CANCER PREMIUM'?

Ariel Hammerman<sup>1</sup>, Noa Triki<sup>2</sup>, Tal Morginstin<sup>3</sup>, Baruch Weinreb<sup>4</sup>

*1 Clalit Health Services, IL*

*2 Maccabi Healthcare Services, IL*

*3 Ministry of Health, IL*

*4 Ben-Gurion University of the Negev, IL*

**Background:** The Israeli 'Health Basket' is updated annually according to a government allocated budget. The budget allocated is far from being sufficient to keep up with the ever-growing demands of the healthcare arena, which makes priority setting inevitable. Among health interventions, the cost of cancer treatment has been receiving increased public attention, mainly because of the hardship and short life expectancy associated with the disease and the high cost of the newly developed anti-cancer drugs.

**Study Question:** We attempted to assess how the resources allocated for updating the Health Basket were distributed by the 'Basket Updating Committee', between the different medical fields in the last two decades, and whether oncology treatment might be receiving a 'cancer premium'.

**Methods:** Data was collected from MoH publications regarding the annual Health Basket updates. Budgets were figured in 2019 values.

**Results:** During 1998-2019, resources for new health technologies in the 'Health Basket' were allocated to 32 different clinical fields. The therapeutic areas that received the highest budget allocation were: Oncology (33.45%) (Solid tumours (22.49%) and Hemato-oncology (10.96%)), Gastroenterology (7.13%), Diabetes (6.65%), Cardiology (6.59%), Neurology (6.09%), Rare diseases (5.76%) and Pulmonology (3.27%).

**Conclusions:** We have found that in Israel, a third of all resources allocated for new health technologies, were dedicated to cancer treatment, mostly solid tumours. Other diseases received significantly smaller amounts.

**Health Policy Implications:** The access to new expensive anticancer drugs is of concern to patients, decision-makers and the general public. Many reimbursement agencies, such as NICE in England, are still debating whether to place a higher value on end-of-life cancer care. It seems that at least de-facto, decision-makers in Israel have already accepted that cancer treatment deserves a special premium and that patients in Israel should have access to the effective cancer treatments, taking into account the necessity of declining funding for other diseases.

## THE NEED FOR DIFFERENTIAL TARIFFS IN ISRAEL IN THE ERA OF AGING POPULATION AND EMERGING TECHNOLOGY: CARDIAC SURGERY AS A CASE STUDY

Joseph Mendlovic, Rachel Tauber, Shuli Silberman

*Shaare Zedek Medical Center, IL*

**Background:** Reimbursement for surgical procedures in Israel does not account for diversity in costs of various procedures. With new and more costly technology coupled with higher risk patients needing more complex surgery, these tariffs may not reflect the true financial burden on caregivers.

**Study Question:** Does case mix and complexity of procedures significantly affect cost to justify differential tariffs?

**Objective:** To determine the relative cost of heart surgery as function of predicted risk and complexity of surgery.

**Methods:** Cardiac surgery was taken as a case study. All patients (n=4,409) undergoing cardiac surgery at Shaare Zedek Medical Center between 1993–2016 were stratified according to (1) type of surgery and (2) clinical profile (predicted operative risk according to EuroSCORE). Approximate cost of each group was assessed by the average number of days in ICU and ward multiplied by the respective daily cost as determined by the Ministry of Health, plus the cost of fixed components used in the operating room (manpower and disposables). Cost was evaluated according to these variables. Cost variability was determined using ANOVA.

**Results:** Both increased value of EuroSCORE and type of surgery were directly correlated with cost ( $p < 0.0001$ ): up to 180% increase in cost between low and high risk patients in identical surgery and up to 77% increase with respect to type of surgery. There was up to 330% increase in cost between low risk and low fixed price surgery and high risk patients with high fixed price surgery.

**Conclusions:** Cost of heart surgery is directly influenced by patient profile as well as type of surgery. Modern day technology is more costly yet has become mandatory. Thus reimbursement for heart surgery should be based on differential criteria: clinical risk profile as well as type of surgery.

**Health Policy Implications:** An urgent need for design and implementation of a realistic differential tariff model in the Israeli medical reimbursement system.

## AN INNOVATIVE NON-ECONOMIC INCENTIVE TO INCREASE VACCINE ADHERENCE AMONG HCWS: COST-CONSEQUENCE ANALYSIS AND EVALUATION OF SUSTAINABILITY

Marcello Di Pumpo<sup>1</sup>, Andrea Tamburrano<sup>1</sup>, Andrea Barbara<sup>1</sup>, Francesca Romana Rolli<sup>1</sup>, Americo Cicchetti<sup>1</sup>, Walter Ricciardi<sup>2</sup>, Patrizia Laurenti<sup>2</sup>

*1 Università Cattolica del Sacro Cuore, Italy*

*2 Università Cattolica del Sacro Cuore; Fondazione Policlinico Universitario A. Gemelli IRCCS, Italy*

**Background:** Flu vaccination is effective in preventing seasonal influenza, decreases staff absenteeism by reducing costs resulting from loss of productivity and protects fragile patients from experiencing seasonal flu-related complications. The seasonal flu vaccination coverage among healthcare workers (HCWs) in Italy and in other European countries is too low (approximately 10% during the 2017–2018 influenza season).

**Study Question:** The aim of this retrospective observational study was to test the economic sustainability of an innovative incentive measure consisting in granting one paid hour off-work to all HCWs willing to get vaccinated in our hospital.

**Methods:** We performed a cost-consequence analysis (by using the friction cost method) estimating the per-capita HCWs loss of productivity caused by absenteeism. We calculated the overall HCWs salary per hour to identify the cost of our incentive measure. Finally, we estimated the maximum sustainable amount of paid time off-work grantable without causing financial loss for the hospital, also considering the economic advantage for company to provide flu vaccination to hospital workers.

**Results:** We found a loss of productivity due to absenteeism equal to 237.65€ for each vaccinated worker and 413.78€ for each unvaccinated worker. The difference in per-capita loss of productivity was 176.13€. Considering the incentive measure (an average salary is equal to 36.89€/h) the simulation identified the maximum sustainable paid time off-work to be 4.77 hours (286.5 min).

**Conclusions:** We conclude that our innovative non-economic incentive measure to increase the vaccine coverage among HCWs is sustainable and incrementable.

**Health Policy Implications:** Seasonal flu vaccination is effective in preventing seasonal influenza and its related complications so any useful incentive measure to increase vaccine coverage should be used, especially among HCWs.

## PHYSICIAN REMUNERATION IN THE AGE OF INNOVATION

Leah Wapner, Malke Borow, Baruch Levi, Dotan Simchovitz

*Israeli Medical Association, IL*

**Background:** The considerable changes that have taken place recently in the field of medicine, such as the introduction of telemedicine and the development of Big Data, have had a profound effect on the organization of health services. Their impact is increasingly felt in the financial sphere, especially in the need to change traditional earning models of health professionals, chief among them physicians.

**Study Question:** The aim of this study is to explore the changing nature of physician remuneration models globally in light of innovative technological developments, and to examine the need and feasibility of their adoption in Israel.

**Methods:** The authors conducted a literature review of innovative physician remuneration models. Data were collected from a variety of sources including academic works, official government publications, and media reports, mainly discussing the health services of economically and technologically developed countries. Search engines and databases used include PubMed, Google and Google-scholar, ProQuest, Web of Science, and the OECD online library.

**Results:** Two main themes arose frequently in the review: First, the literature considered propositions to reimburse physicians for video or audio check-ins, even if they do not result in an office visit, in order to allow physicians to practice without establishing an in-person relationship with each beneficiary. Second, the development of Information technology accelerates the expansion of Pay-for-Performance (P4P) models to the point of connecting physician earnings to patient satisfaction of care.

**Conclusions:** Considerable changes in physician remuneration models have been taking place globally in light of profound technological developments. These should be taken into account in the Israeli context.

**Health Policy Implications:** Future negotiations between stakeholders need to include examination and discussion of innovative mechanisms of remuneration, in order to facilitate successful adoption and implementation of technological innovations in medicine. The impact of such mechanisms on the relationship between the patient and the care provider should also be considered.

## THE 2013-14 EXPANSION OF ACTIVITY-BASED HOSPITAL PAYMENT IN ISRAEL: AN EVALUATION OF THE EFFECTS ON INPATIENT ACTIVITY OF 15 PROCEDURES

Ruth Waitzberg<sup>1</sup>, Wilm Quentin<sup>2</sup>, Rina Maoz Breuer<sup>3</sup>, Vadim Perman<sup>4</sup>, Reinhard Busse<sup>5</sup>, Dan Greenberg<sup>6</sup>

*1 Myers-JDC-Brookdale Institute, IL; Ben-Gurion University of the Negev, IL*

*2 Technical University of Berlin, Germany*

*3 Technical University of Berlin, Germany*

*4 Myers-JDC-Brookdale Institute, IL*

*5 Ministry of Health, IL*

*6 Technical University of Berlin, Germany*

*6 Ben-Gurion University of the Negev, IL*

**Background:** In 2013–14, Israel stepped up the replacement of traditional per-diem payments by Procedure-Related Group (PRG) based hospital payments, a local version of Diagnosis-Related Groups (DRGs). PRGs were created for selected procedures in urology, general surgery, gynecology and ophthalmology.

**Study Question:** How did this change affect inpatient activities, measured by the number of discharges, average length of stay (ALoS), and the case-severity Charlson Comorbidity Index (CCI)?

**Methods:** We investigated the impacts of the PRG-payment reform on 15 procedures. Observations covered groups of inpatients, by age and gender, who underwent these procedures in 2005–2016 at all non-profit hospitals. We examined the effect of the payment change on the number of discharges, ALoS and CCI using a multivariable analysis of Ordinary Least Squares controlling for patients, hospital characteristics, and year fixed-effects.

**Results:** Data on 89,533 patients were examined. During the study period, the ALoS decreased except for one procedure, the number of inpatients increased for most procedures, and case severity remained stable. The multivariable analysis suggests that the transition to PRG-payments contributed to changes in ALoS or case severity for only 3 out of 15 procedures examined. The PRG-reform contributed to changes of 10%–45% in the number of patients, but there was no clear trend: it increased in 9, and decreased in 5. The changes did not follow a clear pattern according to procedures' price changes after the reform.

**Conclusions:** Factors that may have hampered the effects of the PRG-reform are conflicting incentives created by other co-existing hospital-payment components, such as revenue caps and retrospective subsidies, and the lack of resources to increase productivity.

**Health Policy Implications:** Provider payment reforms should carefully coordinate the entire payment system, otherwise the incentives may be blurred and the reforms may miss their goals.



## HOME HOSPITAL VS. INSTITUTIONAL TREATMENT FOR SUB-ACUTE CARE PATIENTS - AN INNOVATIVE SETTING IMPACTING HEALTH ECONOMICS

Angela Irony, Haled Abu-Hussain, Natali Stein, Nachman Ash

*Maccabi Healthcare Services, IL*

**Background:** The increase in life expectancy is accompanied by higher financial and operational loads throughout the health system. One of the possible solutions for easing up these loads is home hospitalization. Maccabi Healthcare Services initiated home hospital setting/alternative for subacute patients. This research focuses on comparing home hospital and “conventional” hospital care parameters for the sub-acute patient.

**Study Question:** Does home hospital have an economic impact on the health practice compared to institutional treatment?

**Methods:** A prospective cohort study comparing parameters in home hospitalization versus institutional hospitalization. Data was extracted from HMO information systems.

The population includes patients characterized as sub-acute with the following diseases/treatments: Infectious diseases (e.g. p, UTI, skin infection), chronic diseases (e.g. CHF, COPD) and Metabolism Disorders.

**Results:** Since December 2017, 275 patients were recruited to the home hospital setting involving the cooperation of 3 hospitals.

Home hospital patient's data were compared to cumulative total HMO data of 27,215 internal ward hospitalizations (over 3 years).

Total home hospitalization days were 1,089. The average length of treatment is 4.0 (1.9) days in home hospitalizations versus 4.3 (5.4) in institutional hospitalizations. Rehospitalizations within 7 days is 5.9% days in both settings and 30 days rehospitalization is 13.8% in home hospitalization vs. 16.3% in institutional hospitalizations.

Total cost of home hospitalization setting is less than 50% of the comparable alternative of institutional cost. Economic saving is therefore highly significant.

**Conclusions:** Home hospital seem like a comparable alternative to institutional hospitalization with a clear economic benefit.

**Health Policy Implications:** Home hospital care seems a substitute alternative for subacute inpatient care which is conceptually innovative and cost saving. This alternative may be an important option for handling aging population side effects in Israel.

## THE MINISTRY OF HEALTH FINANCIAL INCENTIVE PROGRAM TO IMPROVE DIAGNOSIS AND TREATMENT OF INFECTIOUS DISEASES IN NURSING HOMES

Ayelet Berg-Warman<sup>1</sup>, Shmuel Be'er<sup>1</sup>, Aharon Cohen<sup>2</sup>, Pinhas Berkman<sup>2</sup>,  
Yohanan Samuel<sup>2</sup>, Ira Glzman<sup>2</sup>

*1 Myers-JDC Brookdale Institute, IL*

*2 Ministry of Health, IL*

**Background:** Approximately 2% of Israeli elderly live in Long-Term-Care institutions. When there is an acute worsening of the medical condition of residents of nursing homes (NH), they need medical services that are not usually available in the institution and are referred to a general hospital (GH). Improving the diagnosis of infectious diseases and treating them with antibiotics can reduce the scale of referrals to GHs. The Ministry of Health has therefore begun to authorize NHS to administer IV antibiotics. In 2017, it implemented a pilot to provide financial incentives to the NHS, aimed at reducing the number of residents being referred to GHs.

**Study Question:** To evaluate whether the pilot achieved its goals.

**Methods:** Comparison over time of parameters associated with quality-of-care in NHS participating in the pilot, and comparison between NHS participating and not participating in the program.

The study analyzed administrative data on admissions to GHs and patient deaths, as well as information from interviews conducted with staff.

### **Results:**

Between 2016 and 2017, the scale of referrals to GHs declined (approximately 2,700 hospital days per year). The relatively largest decline was in NHS that participated in the pilot.

- ◆ There was a reduction of approximately 4,800 hospital days in the nursing wards and the average hospital stays declined. In contrast, there was an increase of approximately 2,000 hospital days in the mentally frail wards.
- ◆ In the institutions participating in the pilot, there was a considerable decline in in-house mortality rate.

**Conclusions:** The pilot contributed to structuring processes of diagnosis and treatment of patients with infectious diseases, thereby reducing the number of referrals to GHs and in-house mortality. This means financial saving while improving several aspects of diagnosis and treatment.

**Health Policy Implications:** It is important to understand the reasons for the increase in the hospitalization rate of mentally frail patients.

## AN OPTIMAL CHARGING SCHEME FOR HUMAN EMBRYOS' STORAGE SERVICE: A SOURCE FOR A SECONDARY MARKET

Avi Herbon, Yael Lahav, Uriel Spiegel

*Zefat College, Bar-Ilan University, IL*

**Background:** A growing bank of frozen human embryos is a negative outcome of cryostorage of human embryos as a part of in vitro fertilization treatments. The existence of remaining unused embryos puts the service provider (the hospital) in a fragile situation, especially when the issue of discarding is raised or when unexpected failures associated with preserving the inventory occurs. Moreover, absence of intrinsic incentives to donate embryos to the secondary market, as well as the increased operational costs with time, for keeping the storage service viable, add these unique service additional barriers.

**Study Question:** We develop an optimization model which determines a charging scheme for the couples using the storage service and a payment scheme to couples who agree to give their remaining unused embryos to be a source for the secondary market. Couples who do not agree are charged with an additional discarding payment.

**Methods:** This model is analytically developed and the optimal solution is obtained through optimal solution algorithms. A numerical example and sensitivity analysis of the key parameters is conducted.

**Results:** A comparison of the suggested model with other pricing strategies, including the one which offers the service for free, is presented, while the superiority of the suggested model in increasing service provider's profit and in decreasing unused remaining inventory is demonstrated.

**Conclusions:** This mechanism motivates donations to secondary market and reduces the remaining unused inventory.

**Health Policy Implications:** Optimal pricing scheme in all of our experiments included no more than two-part tariff (associated with the primary market). This, of course, eases the pricing scheme, as well as makes it more convincing in being accepted by the market.

## THE IMPACT OF CHILD INJURY ON THE ISRAELI ECONOMY

Orly Silbinger, Naor Porat, Sharon Levi, Esti Golan, Natalie Nir

*Beterem - Safe Kids Israel, IL*

**Background:** Unintentional injuries of children and youth, from birth to age 17, constitute a heavy economic and health burden on Israeli society. Each year on average 116 children die, over 20,000 are hospitalized and over 200,000 visit emergency rooms due to unintentional injury. There are also long-term economic effects of injury and disability on the child, caregivers and community.

**Study Question:** Evaluate the impact of unintentional child injury on the Israeli economy and the distribution of the burden across different injury types and population groups.

**Methods:** Data on child fatalities, hospitalizations and emergency room visits were collected from national databases for 2008–2016. Data on disabilities was extracted from the Global Burden of Disease database.

Calculations include:

- ◆ Direct costs and indirect costs of injury, based on the Human Cost approach.
- ◆ Loss of productivity in economic terms related to mortalities and disabilities.
- ◆ Analysis by age group, gender, and injury mechanism.

**Results:** The total cost of injury was at least 5.74 billion NIS and 7.46 billion NIS according to the "more stringent" Human Cost approach. Thus, the burden of injury to the GNP for 2016 is 0.5%–0.6%, which includes loss of productivity due to deaths, costs of emergency visits and hospitalization, and loss of quality of life and productivity due to disabilities. Further detailed findings will be presented.

**Conclusions:** Child injury is a serious burden on the Israeli economy. Limitations in this study related to lack of or access to data, such as emergency care visits.

**Health Policy Implications:** This initial analysis is the first and necessary stage of cost-benefit analysis by which effective and focused intervention programs can be selected, priorities and resources allocated effectively, thereby reducing the burden of unintentional injury to children in Israel.

## LONG TERM IMPACT FROM INNOVATIONS IN NATIONAL HEALTH SYSTEMS: THE CASES OF BRAZIL AND ISRAEL

Fabio Gomes

*Brazilian Chamber of Deputies, Brazil*

**Background:** Brazil and Israel are very distinct countries, but both are young multiparty democracies, which adopted universal health systems (UHS) in the late twentieth century.

**Study Question:** The study presents a comparison between the institutions that constitute the UHS of Israel and Brazil, considering the socio-economic context and the health results obtained by the two countries.

**Methods:** The study discusses the characteristics of each health system and compares the evolution of health indicators (on mortality, morbidity, risk factors, health actions, health resources, and health expenditures), from the late 1990's up to 2018. The data were obtained from the World Bank and the Organization for Economic Co-operation and Development.

**Results:** The tables with health indicators of both countries are available on: [https://github.com/DataBrazil/Health\\_Brazil\\_Israel/blob/master/Health%20Indicators%20Br\\_Is\\_2018.pdf](https://github.com/DataBrazil/Health_Brazil_Israel/blob/master/Health%20Indicators%20Br_Is_2018.pdf). Generally, the context by the time the health reforms began was already much more favorable for Israel and, currently, the level of advances are still superior to the one of Brazil. However, Brazil has achieved significant results (such as controlling malnutrition and reducing infant mortality) and, in some cases, more favorable data than Israel, such as smoking control and care for people with HIV/AIDS.

**Conclusions:** It is perceived that the Israeli system, which is concerned about achieving greater equity, could benefit from the observation of the successful experiences of the Brazilian system, to avoid the erosion of universality. The Brazilian system, in turn, could benefit from the reflection on strengths observed in the Israeli system, mainly the efficient planning and management of health services.

**Health Policy Implications:** The results of such studies can be used to support proposals for improvements of UHS, even in countries of varying degrees of economic development.

## A NATIONWIDE POLICY PROJECT TO PROMOTE CONSUMPTION OF HEALTHY NUTRITION IN ISRAEL

**Ronit Endevelt, Siegal Sadetzki, Itamar Grotto, Udi Kaliner**

*Ministry of Health, IL*

**Background:** The increase in the world's population is expected to lead to a radical increase in food production. Extensive production of food raises a challenge of huge innovation processes. The downside of this production is the ultra-processed food that replaces healthy natural products. This may be associated with microbiota changes, may cause obesity and chronic diseases such as Cancer and Diabetes. To ensure the supply of healthy food, there is a need for a nationwide guidelines regulation and means of enforcement on a national level. Nutritionists are the leading professionals to promote this process, with the collaboration of other sectors such as physicians and food technologists, mediate the regulations to the public.

**Study Question:** How to create national nutrition guidelines that contribute to health, while maintaining sustainability, and equality. How to design methods for implementation and dissemination of the new guidelines.

**Methods:** 1. Establishment of evidence-based nutritional guidelines of a scientific committee. 2. Agreement on regulatory steps to improve the food environment through a committee lead by the Ministry of Health with the participation of stakeholders from many Ministries, the industry, scientists, physicians and nutritionists. 3. Creation of regulations covering various topics that assist to implement the nutritional guidelines in all areas.

**Results:** The Ministry of Health set a few agreements and regulations with the stakeholders: 1. The industry agreed on front of pack labeling and reformulation of packaged foods. 2. The Ministry of agriculture with the ministry of health is formulating the strategic plan of food in Israel. 3. An equality healthy food basket is built with the collaboration of the Ministry of Economics. 4. The Ministry of Education set regulations over healthy food at the lunch program and Kiosks and nutrition education following the Ministry of Health guidelines.

**Conclusions:** The Israeli nutritional guidelines are being published and implemented in all many areas to improve the food environment and eating behavior for better health.

**Health Policy Implications:** The study aims are in health policy and show the way to create national nutrition guidelines that contribute to health while maintaining sustainability, equality, and how to design methods for implementation and dissemination of the new guidelines.

## WHERE TO GO IN AN EMERGENCY? DETERMINANTS OF CHOICE OF OUT OF HOURS SERVICES IN MEUHEDET HEALTH SERVICES

Eyal Ariely, Liora Valinsky, Itai Kadim, David Dvir, Roei Bitcher, Anat Toledano, Nuriel Burak

*Meuhedet Health Services, IL*

**Background:** Out of hours services for medical emergencies are based on three options: emergency departments (ER) in hospitals, in-house emergency clinics (IHC), and emergency clinics run by external providers (EPC). The distribution of the clinics varies across the country. For both clinical and financial reasons it is preferable that members requiring out of hours care attend clinics rather than ER's unless it is strictly necessary.

**Study Question:** What are the demographic, geographic and service-related predictors of the out of hours services used?

**Methods:** We examined all visits to emergency departments (without hospitalization) and clinics during 2018 from Meuhedet data. We analyzed which patient and system related variables, such as age, gender, cultural group, distance from home, district, physician specialization and season were associated with visits to the ER, in-house and external provider emergency clinics.

**Results:** There was no difference in choice of the facility between summer and winter. Ultra-Orthodox members were more likely to attend IHC's than Secular Jews and Arabs (2.2, 1.1 and 0.65) relative to their population proportion. Secular Jews and Arabs were more likely to attend ER's (1.53, 1.73 and 0.93 respectively). Using Multivariate logistic regression, we found that after adjusting for all variables, older age was associated with more ER attendance (OR 1.012 per year,  $p < 0.000$ ), as well as being a member of the Arab population (OR 1.89, 95% CI 1.85-1.93), and having a primary physician who is not a family or internal medicine specialist. In this model, distance from an IHC or EPC was inversely related with attending an ER. Males were slightly more likely to attend ER and women were more likely to attend IHC' and EPC's.

**Conclusions:** Although we did not take into account reasons for out of hours visits, it appears that choice of a facility is associated with distance, the expertise of primary physician and culture.

**Health Policy Implications:** In order to reduce unnecessary ER visits, it is essential to understand and address the determinants of customer use and preference.

## USE OF MACHINE LEARNING MODELS FOR "SUPERVISED CLASSIFICATION" OF LEGISLATIVE PROPOSALS RELATED TO HEALTH IN THE BRAZILIAN NATIONAL CONGRESS

Fabio Gomes

*Brazilian Chamber of Deputies, Brazil*

**Background:** The Brazilian National Congress (BNC) has been outstanding in approving relevant laws related to health policies. However, the monitoring of legislative proposals is hampered by their large numbers. Previous research has identified more than 20,000 proposals submitted between 1999 and 2006 (about 5,000 related to health). Machine Learning can facilitate the task of identifying and classifying the thousands of health-related legislative proposals.

**Study Question:** What is the sensitivity and specificity of machine learning models to predict the classification of health-related legislative proposals in the BNC?

**Methods:** The methodology consists of classifying the health-related legislative proposals that are active in one of the Legislative Houses of the BNC, the Chamber of Deputies (CD); using a typology which has five thematic groups that covers about 60 categories. Between 70 and 80% of those propositions will be used for machine learning, while the rest will be used for the sensitivity and specificity tests of the supervised models, like K-Nearest Neighbors (K-NN), Support Vector Machine (SVM), SVM Kernel, Naive Bayes, Decision Tree and Random Forest.

**Results:** The project has completed its most time-consuming phase: the classification of health related propositions by human classifiers. The data set has 3,592 health related ordinary bills. The most frequent themes were: prevention (35.2%), rights and responsibilities (28.5%), health care (18%) and management and resources (18%). The tests results will be available for presentation in September, 2019.

**Health Policy Implications:** The use of machine learning models has the potential to speed the classification of health-related bills, which can be useful in organizing and monitoring the health agenda in Congress, favoring transparency in the public debate and deliberation on health policies.



## FORGOTTEN ON THE SIDE OF THE INFORMATION HIGHWAY: COGNITIVE BARRIERS TO ELDERS ENGAGEMENT WITH DIGITAL TECHNOLOGY

Shirly Bar-Lev, Daniela Aisenberg, Adi Luria

*Ruppin Academic Center, IL*

**Background:** E-governance refers to the intensive use of electronic tools and applications for the provision of governmental services. As the use of information and communication technologies intensifies, face-to-face encounters with public service workers (also known as street-level bureaucracy) are replaced by websites and applications. As the relationship between government agencies and the citizen's changes, older adults often find themselves without the skills to benefit from the many advantages of digitation. While much attention has been given to training as a way of improving elders' digital proficiency, the issue of design has been sidelined within public management research.

**Study Question:** What are the cognitive hurdles that obstruct elders from successfully navigating governmental websites such as the social security website?

**Methods:** We adopted the principles of a 'think aloud' methodology to provide detailed participant observations of men and women, ages 71 to 90 years old, as they performed two online tasks concerning entitlements to various health and social benefits. As the participants navigated the online site, we tracked their moves, timed their responses, and asked them to vocalize their thoughts. We were thus able to test their information processing, as well as attention, and memory functions.

**Results:** Despite the participants varied levels of digital proficiency and cognitive abilities (tested using MMSE and digit span tests) they all reported that the completion of the tasks required considerable efforts. The performance was slightly (yet significantly) improved between task 1 and task 2, but their assessments of self-efficacy significantly dropped from task 1 to 2.

**Conclusions:** Carefully designed websites are warranted to help elders overcome age-related changes in cognitive functioning.

**Health Policy Implications:** Practical recommendations as to how information should be communicated, to improve senior citizens' navigation and performance in governmental websites are discussed.

## USING DIGITAL DIARIES TO RESEARCH PATHWAYS OF HYPERTENSION CARE: EXPERIENCES FROM ENGAGING WITH PEOPLE WITH HYPERTENSION IN THE PHILIPPINES

Jhaki Mendoza<sup>1</sup>, Maureen Seguin<sup>2</sup>, Gideon Lasco<sup>3</sup>, Alicia Renedo<sup>2</sup>, Benjamin Palafox<sup>2</sup>, Martin McKee<sup>2</sup>, Dina Balabanova<sup>2</sup>

*1 University of the Philippines, Manila, Philippines*

*2 London School of Hygiene & Tropical Medicine, UK*

*3 University of the Philippines, Diliman, Philippines*

**Background:** The rise of digital mobile communication has enabled novel research methods that aim to better understand patients' experience of treating non-communicable diseases (NCD). Despite this promise, there are important challenges that impede the wider application of such methods. The Responsive and Equitable Health Systems Partnership on Non-Communicable Diseases (RESPOND) study explores these possibilities through the use of 'digital diaries' via mobile phone text messaging to track the lived experiences of people with hypertension in the Philippines.

**Study Question:** How effective and acceptable is a digital diary approach to collect prospective longitudinal qualitative data on the lived experiences of seeking care for a chronic illness?

**Methods:** Following in-depth interviews, 40 hypertensive adults were enrolled to submit digital diaries via text message over 12 months. The participants were given weekly mobile phone credit and prompted to share experiences, with entries collated via a dedicated web platform that also permits real-time interaction with researchers.

**Results:** Text messaging was an efficient mode of reaching study participants; however, eliciting relevant information over time required more engagement with researchers. Among the possible explanations for this, one is the participants' own lack of interest in hypertension as many did not consider it a priority given the absence of symptoms, and view it rather as an intermittent disease. Others include unfamiliarity with the concept of maintaining a diary or reflecting and recording one's own experiences without the prompting of researchers.

**Conclusions:** Motivating participants to engage with technology-based research methods is a key challenge, and preliminary work to understand participants' preferences is critical. The ability to maintain two-way interaction between participants and researchers is a feature that holds great potential.

**Health Policy Implications:** Given the ubiquity of mobile phones, the study supports the viability of using text messaging not only for research but also for long-term clinical follow-up and improving adherence.

## DEID: DE-IDENTIFICATION OF CLINICAL NARRATIVE DATA

Vasiliki Foufi, Raphaël Chevrier, Jean-Philippe Goldman, Christian Lovis

*University Hospitals of Geneva & University of Geneva, Switzerland*

**Background:** Medical data contains various types of Protected Health Information (PHI). In this context, legislation has been defined to ensure personal data protection. The most significant legal document produced to face the challenge of healthcare data management is the US Health Insurance Portability and Accountability Act (HIPAA) of 1996. This act provides a legal framework and a guidance for using and disclosing health data. Practically, the approach proposed by HIPAA is the de-identification of medical documents by removing certain PHI.

**Study Question:** Nowadays, interoperability of health data in the aim to improve the health of citizens is the core of personalized health research ([www.sphn.ch](http://www.sphn.ch)). A major goal of the Privacy Rule is to assure the protection of health information and preservation of data integrity while allowing the flow of health information needed to provide and promote high quality health care (<https://www.hhs.gov/hipaa/for-professionals/privacy/laws-regulations/index.html>).

**Methods:** A rule-based system for the de-identification of clinical narrative data in French, German and Italian taking into account the specificities of each language is being developed. Following HIPAA, 18 categories of information such as person names, geographic locations, organization, elements of dates, social security numbers, telephone and fax numbers will be removed or replaced.

**Results:** Manual validation of a random dataset of 1,000 French discharge summaries showed a high performance of the system (precision: 0.99, recall: 0.93).

**Conclusions & Health Policy Implications:** The risk of sharing clinical data for patients' privacy is high; therefore, personalized health research is hindered. The DeID project, funded by the Swiss Personalized Health Network (SPHN), is fully compliant with policies about health data sharing for research purposes and will constitute a solution to accelerate and improve research in the medical domain in Switzerland. Finally, the rule-based de-identification system developed in this project is especially robust in environments that might be confronted to legal pressures.

## PHYSICIANS' EXPERIENCES, ATTITUDES AND CHALLENGES IN A PEDIATRIC TELEMEDICINE SERVICE

**Motti Haimi**<sup>1</sup>, **Shuli Brammli-Greenberg**<sup>2</sup>, **Yehezkel Waisman**<sup>3</sup>, **Orna Baron-Epel**<sup>2</sup>

*1 Clalit Health services; University of Haifa; Technion, IL*

*2 University of Haifa, IL*

*3 Schneider Children's Hospital; Tel Aviv University, IL*

**Background:** Telemedicine in general, and telephone triage, in particular, is considered a high-stress clinical activity and may involve stressful situations, and decision making under conditions of uncertainty and urgency.

**Study Question:** We wanted to explore the experiences, attitudes and challenges of the physicians in a Pediatric Telemedicine Service ('Pediatrician Online service of Clalit'), operating in Israel. We also wanted to explore whether the doctors are using non-medical factors when making clinical decisions in this setting.

**Methods:** We used a qualitative methodology in order to obtain rich data that would reflect the participants' subjective experiences. Fifteen physicians who are working now or worked during the last 5 years in the 'Pediatrician Online of Clalit' service were interviewed individually. Data were analyzed thematically.

**Results:** Seven main themes concerning the difficulties and challenges of the physicians during their work at a pediatric telemedicine service were revealed. These include difficulties diagnosing from a distance, treating unfamiliar patients, working alone, urgency and load of calls, difficulties arising from the technological aspects, and moral conflict between the will to give the parents a good service and the desire to make a proper medicine.

Finally, the physicians described measures they use to overcome the difficulties in the telemedicine setting, enabling them to achieve appropriate decisions. Non-medical /contextual factors were also described to have an effect on their decision-making.

**Conclusions:** The physicians working in the telemedicine setting face various difficulties and challenges. Nevertheless, most of them still reported generally positive experiences, and felt they can give appropriate advises concerning the children's condition.

**Health Policy Implications:** Decision makers should be aware of the challenges the clinicians face in this setting, and the special expertise and training required. Ways must be found to achieve solutions that enable the doctors reaching the correct diagnosis and best possible treatment decisions in this setting.

## VARIABLE PERFORMANCE IN THE COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE) EVALUATION TOOL: AREAS FOR IMPROVEMENT

Zoe Co<sup>1</sup>, Lisa Newmark<sup>2</sup>, A Jay Holmgren<sup>1,3</sup>, Diane Seger<sup>1,2</sup>, Melissa Danforth<sup>4</sup>, David C. Classen<sup>5</sup>, David W. Bates<sup>1,2,3</sup>

*1 Brigham and Women's Hospital, Boston, US*

*2 Partners Healthcare, Somerville, US*

*3 Harvard University, US*

*4 The Leapfrog Group, Washington D.C., US*

*5 University of Utah, Salt Lake City, US*

**Background:** Electronic health record (EHR) adoption has become widespread, since the HITECH Act was passed in 2009. Annually, hospitals use the CPOE Evaluation Tool to assess their system's ability to alert prescribers to common and serious prescribing errors, as implemented.

### **Study Questions:**

- ◆ Between 2017 and 2018, how did hospitals perform on the CPOE Evaluation?
- ◆ Is there variability among hospitals who use the same EHR vendor and medication reference database (Med DB)?

**Methods:** The 2017–2018 CPOE Evaluation Tool results were analyzed. The percentage of orders detected in each order category, and the mean score were calculated. The range of scores for hospitals using the same EHR vendor, and medication database were also calculated.

**Results:** In 2017, 1,750 hospitals completed the test with a mean overall score of 58.0%. The mean overall score increased in 2018 to 65.8% (N = 1,863). In 2018, the order categories in need of improvement included: Drug Diagnosis, Drug Age, Drug Monitoring, and Drug Laboratory (33.11%, 33.53%, 38.68%, and 42.06% respectively). Notably, the Drug Diagnosis category had a 90.3% increase from 2017, where only 17.4% of those orders were alerted on.

There was great variability in the scores of hospitals who use the same EHR vendor and medication reference database. The largest range in score was one vendor/med DB combination (N= 436) where scores ranged from 13.9% to 100%.

**Conclusion:** Although the results suggest that hospitals' CPOE systems alert on most common prescriber errors, there is still important room for improvement in drug diagnosis, drug age, drug monitoring, and drug laboratory alerts. These results provide critical feedback to hospitals, who can use their results to improve their EHR system.

**Health Policy Implication:** Given the high variability in performance even among hospitals using the same combination of vendor and medication database, the government should take initiative in ensuring that there is regular assessment of EHR systems at the local hospital level.

## SOCIOECONOMIC POSITION AND CANCER SCREENING AMONG WOMEN IN ISRAEL

Luz Angela Torres López<sup>1</sup>, Yiska Loewenberg Weisband<sup>2</sup>, Orly Manor<sup>2</sup>,  
Ora Paltiel<sup>2</sup>, Yael Wolff Sagy<sup>2</sup>

*1 Cardioinfatil Foundation - Institute of Cardiology, Colombia*

*2 The Hebrew University of Jerusalem, IL*

**Background:** Screening can improve cancer survival rates, however, population participation in cancer screening is not uniform, with reported inequalities by socioeconomic position (SEP).

**Study Question:** We aimed to study the association between socioeconomic position and cancer screening among women in Israel, and to evaluate whether these associations differed by age and over time.

**Methods:** We used data from the National Program for Quality Indicators in Community Healthcare (QICH), based on electronic medical records from Israel's four health maintenance organizations (HMO), aggregated by SEP and year. The study population included all adult female Israeli residents whose ages corresponded to screening guidelines during 2002–2017 (N=1,529,233). A four-category area-based measure of SEP was used (ranging from 1 (lowest) to 4 (highest)), obtained from the Central Bureau of Statistics census data and further updated by Points Business Mapping Ltd. Data included screening for colorectal, cervical and breast cancer.

**Results:** Women in lower SEP were less likely to uptake any screening behavior. Greater inequalities were found for cervical cancer screening (OR (SEP 4 vs 1) 3.47, 99.9% CI 3.40 – 3.51) compared to colorectal cancer screening (OR (SEP 4 vs 1) 1.34, 99.9% CI 1.32 – 1.36) and breast cancer screening (OR (SEP 4 vs 1) 1.30, 99.9% CI 1.28 – 1.32). While overall inequalities for breast and colorectal cancer were modest, inequalities were more apparent among older women. Prevalence of breast cancer screening increased over time with a marked reduction in inequalities.

**Conclusions:** Substantial socioeconomic inequalities remain in screening behaviors among Israeli women for all three cancers we assessed but were most pronounced in cervical cancer screening, for which no program exists.

**Health Policy Implications:** While national screening programs exist for breast and colorectal cancer, including reminders and invitations, no such programs exist for cervical cancer. Initiating such programs may help reduce SEP inequalities. The use of large data sets such as the QICH program allows us to identify the need for policies that target improved access to screening for women in lower SEPs.

## USING INDIVIDUAL-LEVEL GEOGRAPHIC DATA TO UNCOVER SOCIOECONOMIC STATUS-INDEPENDENT SPATIAL CLUSTERS OF MAMMOGRAPHY ADHERENCE IN GENEVA (SWITZERLAND)

José Luis Sandoval, Rebecca Himsl, Jean Michel Gaspoz, Stéphane Joost, Idris Guessous

*Geneva University Hospitals, Switzerland*

**Background:** Individual behaviour and health-related outcomes are influenced by the local physical and social environment. It remains undetermined if the environmental influence is independent of individual socioeconomic status.

**Study Question:** We aimed to determine the spatial distribution of mammography adherence in a Swiss urban population (Geneva, Switzerland) and evaluate how independent it was from socioeconomic status (SES).

**Methods:** We used geo-referenced individual-level data (n = 5,002) from participants in the population-based cross-sectional Bus Santé study. We calculated local indicators of spatial association (LISA) and assessed the spatial dependence of mammography adherence. Reported spatial clusters are unadjusted; adjusted for individual educational attainment and neighborhood income; and demographic variables (Swiss nationality and age). We also evaluated the association between adjusted clusters and the proximity to the nearest screening center.

**Results:** Mammography adherence was not randomly distributed in Geneva. Spatial clusters coincided with known SES distribution. Adjustment for SES indicators reduced spatial clusters to 56.2% of their initial size (n = 1,033). Further reduction in individuals exhibiting spatially-dependent behavior (36.5% of the initial size) was observed after adjustment for age and nationality. Proximity to the nearest screening center was not related to the identified SES-independent spatial hot-spots and cold-spots of mammography adherence.

**Conclusions:** Demographic and SES factors shape the spatial distribution of mammography adherence. However, the persistence of spatial clusters after adjustment for these confounders indicates that additional neighborhood-level determinants are influencing the spatial variation of mammography adherence. Further studies to identify these additional local determinants could lead to targeted public health interventions to improve population health outcomes.

**Health Policy Implications:** Spatial analysis of individual data is a powerful tool to characterise population behavior and identify spatial clusters that are determined by individual behaviors rather than by pre-determined administrative units (e.g. neighborhood and postal code). Taking into account high definition spatial distribution studies has the potential to improve current data-driven health policymaking significantly.

## EXPLORING SOCIOECONOMIC DISPARITIES IN DIABETES QUALITY INDICATORS IN ISRAELI ADULTS

Yael Wolff Sagy, Michal Krieger, Orly Manor, Ronit Calderon Margalit

*The Israel National Program for Quality Indicators in Community Healthcare; The Hebrew University of Jerusalem, IL*

**Background:** Diabetes Mellitus (DM) is associated with micro- and macro-vascular complications, resulting in a high burden of morbidity and mortality. Populations of low socioeconomic position (SEP) in various countries were found to have increased prevalence of the disease, worse glycemic control, and increased complications.

**Study Question:** To explore socioeconomic disparities in diabetes quality indicators among Israeli adults.

**Methods:** The Israel National Program for Quality Indicators in Community Healthcare obtains data from electronic medical records from the four health plans, covering the entire civilian population. In 2017, 497,397 individuals aged >18 years were identified with DM. Diabetes prevalence, quality of care indicators, including process and intermediate outcomes were explored. SEP was determined on a scale of 1 (lowest) to 10 (highest) according to residential addresses, grouped and classified by the Israel Central Bureau of Statistics into geographical areas, and further refined by a commercial company (Points Business Mapping Ltd).

**Results:** The prevalence of DM in Israeli adults in 2017 was 9.7%, showing a strong SEP gradient, with higher prevalence in individuals of lower SEP when stratified by age-groups. No SEP disparities were observed in process indicators with overall rates of hemoglobin A1c (HbA1c) documentation of 90.9%, ophthalmologic examinations of 72.5%, and kidney function examinations of 92.5%. However, strong SEP disparities were observed in the prevalence rates of uncontrolled diabetes, where the overall rate of HbA1c $\geq$ 9% was 10.0%, and a 5.4-times higher rate was seen in diabetics of the lowest SES level (23.5%) compared with the highest SEP level (4.3%). Diabetes control had an overall rate of 69.7% and was 1.7-times higher in diabetics of the highest SEP level compared with the lowest SEP level.

**Conclusions:** These findings suggest that access to care does not explain SEP disparities in diabetes control in Israel.

**Health Policy Implications:** Current social benefits policy, compensating patients with uncontrolled diabetes may contribute to the observed gap.



## CHALLENGES AND THREATS IN AN ERA OF INNOVATION IN HEALTH PROFESSIONS EDUCATION AND COLLABORATIVE PRACTICE

Stephen C. Schoenbaum

*Josiah Macy Jr. Foundation, US*

Health care needs of people in high and middle income countries have been evolving. The populations of these countries have increasing numbers of persons with multiple chronic conditions and/or complex care problems. Though in part this reflects growth in the numbers of elderly, it involves persons of all ages.

For a long time, the majority of health care services has been delivered in ambulatory settings, and in recent years more complex services can be delivered in ambulatory settings. Yet, the education of health professionals, particularly physicians and nurses, has remained largely in inpatient settings.

Not surprisingly, the education of all health professionals, including physicians, nurses, pharmacists, and allied health professionals, needs to change to meet current and future population needs. This is occurring in several countries. It has been advanced by a number of innovations, particularly development of more interactive teaching and competence based education; simulation-based education and training; and interprofessional education. Each of these innovations presents opportunities and also encounters barriers.

This presentation will discuss several of the following:

- ◆ Current levels of competency of graduating medical students and nursing students
- ◆ Methods of assessing competence and stimulating improvement
- ◆ Mastery learning of skills
- ◆ Development of faculty to address adult learning principles
- ◆ Development of faculty for interprofessional education
- ◆ The economics of ambulatory teaching

It will also address the need for more physicians and nurses for an expanding and aging population in Israel and how Israel might best cope with a seemingly inadequate supply of hospital-based clinical facilities for training the needed professionals.

## LIMITING HEALTH SPENDING IN THE US: IMPACT ON INNOVATION

Stuart H. Altman

*Brandeis University, US*

It is often stated that the reason why the U.S. spends more on healthcare than other industrialized countries is that it uses and waste more high cost medical procedures. In contrast, as will be discussed in this session the big difference between the U.S. and these other countries is not greater use of services but the higher prices charged for the services used. Unlike most other countries, the U.S. lacks a cap or a budget for healthcare and the ready availability of funding is one of the prime reasons for the continued growth in spending.

What about the future? With the growing proportion of the U.S. population over aged 65 and insured by the federal Medicare program and more of the population covered by low income Medicaid programs, the healthcare system will increasingly be dependent on government programs for its support. But in the last decade government payment rates have lagged far behind private rates for similar type services. It is now estimated that in many geographic areas private insurance payments average 240 percent higher than Medicare rates with an even greater gap in comparison with Medicaid payments. In essence, it is high private payments which are allowing the U.S. health system to keep spending at historic levels. The question is will this dynamic continue as the share of private patients fall and the need for ever higher private rates grows. If not, what impact will lower spending levels have on innovation in the health sector? Also which level of government is best equipped to deal with this issue? Both of these issues will be discussed in this session.

## DIGITIZING UNITED STATES AIR FORCE MEDICAL STANDARDS TO CREATE A DECISION-SUPPORT TOOL

Colby C. Uptegraft<sup>1,2</sup>, Matthew G. Barnes<sup>2</sup>, Jonathan Bickel<sup>1</sup>, Adam Wright<sup>3</sup>, Jonathan D. Hron<sup>1</sup>

*1 Boston Children's Hospital, Boston, US*

*2 United States Air Force, Wright-Patterson AFB, US*

*3 Brigham and Women's Hospital, Harvard Medical School, Boston, US*

**Background:** Medical readiness is the ability of military members to safely execute their occupational requirements. To assess readiness in the United States Air Force (AF), clinicians crosscheck each member's diagnosis(es) and occupation(s) with eight separate documents, an inefficient and error-prone process. Additionally, these documents are not linked or mapped to any medical ontology. Linking these documents and mapping them to ICD codes within a decision-support tool could reduce the administrative burden on clinicians and improve readiness.

**Study Question:** Can AF medical standards be integrated and mapped to ICD codes to create a highly sensitive decision-support tool?

**Methods:** Each standard within the AF Medical Standards Directory was mapped to zero or more ICD-10-CM codes and one or more AF occupational codes. 'Waiverable' diagnoses, according to the AF Waiver Guide, were flagged in the mapping. These mappings were validated by two authors (CU, MB) and converted into a SQL database. An RShiny web application was then built as the front-end interface. To validate the tool, a cross-sectional study will compare the tool against an independent SME review. SMEs will review a random sample of 200 outpatient encounters and determine if the encounters justified duty, deployment, and/or fitness restrictions.

**Results:** Overall, 646 of 704 (91.8%) medical standards were successfully mapped to ICD codes. Remaining standards were too vague to identify any matching codes. Additionally, an overview of the methodology used to create this decision-support tool and its validation results will be presented. Measures will include sensitivity, specificity, positive predictive value, and negative predictive value for each restriction category.

**Conclusions & Health Policy Implications:** Creating a readiness decision-support tool could decrease administrative time for clinicians, improve occupational dispositions, and ultimately increase medical readiness. Longitudinal tracking of medical diagnoses and standards violations across occupations using this tool would allow for data-driven adjustments to accession, retention, and standards policies of the United States Armed Forces

## INNOVATION AND THE ISRAEL JOURNAL OF HEALTH POLICY RESEARCH (IJHPR)

**Bruce Rosen<sup>1</sup>, Avi Israeli<sup>2</sup>, Stephen Schoenbaum<sup>3</sup>**

*1 Myers-JDC-Brookdale Institute, IL*

*2 Hadassah Medical Center - The Hebrew University, IL*

*3 Josiah Macy Jr. Foundation, US*

The Israel Journal of Health Policy Research (IJHPR) is both an innovative platform and a platform for innovation.

The IJHPR is a peer-reviewed, on-line, open access journal that is sponsored by Israel's National Institute of Health Policy. Within just 2 years of its launch in 2012, the IJHPR was already accepted into the prestigious Web of Science - primarily because of its innovative positioning as a journal which is simultaneously national and international. This innovative positioning has also contributed to annual growth of over 20% in both submissions and publications, and to the IJHPR being ranked among the top half of public health journals just 6 years after its launch date.

The IJHPR has also served as a platform for numerous innovations, including:  
Sharing with the international community information about Israeli innovations in public health, health policy, health care delivery, and more

Enhancing the impact of empirical studies by Israeli scholars via commentaries by leading scholars from abroad - including 18 commentaries from scholars based at Harvard and one commentary by a Nobel laureate in economics.

The development of a new genre of articles for Israel, which is less of a natural fit for more general policy journals: broad policy analyses focused on major challenges facing Israeli health care

The use of dynamic, constantly growing, article collections in such fields as digital health, pharmaceutical policy, and health care equity, to highlight and promote areas of excellence in Israeli health care and Israeli health services research

The ability to share the essence of major Israeli conferences such as this one with a broader audience

While the IJHPR has already contributed significantly to innovation, we feel that it has significant potential to contribute more, and in new ways, in the years ahead. Conference participants are sincerely encouraged to send to the editors ([ijhpr2@gmail.com](mailto:ijhpr2@gmail.com)) innovative ideas for how the IJHPR can contribute even more to health care in Israel and beyond.

## DISRUPTING HEALTH SERVICES RESEARCH IN THE US: NEED, OPPORTUNITIES, AND RISKS

Michael Gluck, Danielle DeCosta, Maria Gonzalez, Rachel Dungan,  
Thomas Blount, Lisa Simpson

*AcademyHealth, US*

**Background:** To improve the relevance and timeliness of health services research (HSR) in the U.S., AcademyHealth and the Robert Wood Johnson Foundation in the US launched the Paradigm Project in 2019 to identify and test innovative and potentially disruptive changes to the research ecosystem using the tools of “design thinking”. As a first step, AcademyHealth conducted key informant interviews with the project’s Steering Council of established and emerging leaders in and beyond the field.

**Study Question:** What are the most important challenges and opportunities for HSR and AcademyHealth’s Paradigm Project?

**Methods:** AcademyHealth staff conducted semi-structured 45-minute key informant interviews with 3 Co-Chairs and 25 Members of the Steering Council charged with providing guidance to the Paradigm Project. We used qualitative research software and an inductively-developed codebook to thematically analyze interview transcripts.

**Results:** Informants most commonly pointed to incentives in university culture, promotion/tenure standards, peer-review, and academic publishing as significant barriers to the relevance of HSR results for the lived experiences of patients, families, and communities and for health care policy and practice. They also view broader societal trends including new sources of data, increased computing capabilities, and growing expectations for transparent institutions and greater social returns to social investments as providing both opportunities and a mandate to change the way HSR is conducted, disseminated, and used.

**Conclusions:** There is an emerging awareness among established and emerging HSR leaders of an urgent need for an HSR enterprise that supports research using new data and methods, better connects researchers to the systems they research, more effectively moves findings into policy and practice, and rewards researchers for these efforts.

**Health Policy Implications:** This is an opportune moment for changes to the HSR ecosystem that can improve the relevance and timeliness of evidence health policy and practice.

## IMPLEMENTATION OF AN INTEGRATED NURSE-LED CARE PROGRAM FOR COMMUNITY-DWELLING OLDER ADULTS IN CANTON BASELSTADT: THE INSPIRE PROJECT

Mieke Deschodt<sup>1</sup>, Eva Blozik<sup>2</sup>, Matthias Briel<sup>1</sup>, Nicole Probst-Hensch<sup>3</sup>,  
Matthias Schwenkglens<sup>1</sup>, Andreas Zeller<sup>1</sup>, Sabina De Geest<sup>1</sup>

*1 University of Basel, Switzerland*

*2 Helsana, Zürich, Switzerland*

*3 Swiss Tropical and Public Health, Switzerland*

**Background:** In 2018 a new legal framework to redesign community care for older people was approved in Canton Baselstadt, Switzerland: 86 municipalities will merge into 7 care regions. Each region needs to implement an integrated care concept for older people including a nurse-led information and assessment center.

**Study Question:** INSPIRE aims to implement an integrated community care program for senior citizens in Canton Baselstadt, and evaluate the success of the implementation (e.g. reach, fidelity) and the impact at patient-, provider- and health systems level (e.g. quality of life, provider satisfaction, hospitalization).

**Methods:** INSPIRE is a hybrid type 1 mixed-methods effectiveness-implementation design combining clinical effectiveness evaluation while collecting information to inform implementation in a large quasi-experimental before-after study. The Baselstadt Older Population Survey (BOPS) will be sent to all 29,000 people aged 75 years and older to map their needs and preferences and will serve as a cantonal baseline measurement.

**Results:** A contextually-appropriate adapted care program based on the results of the systematic literature review and input of the Baselstadt stakeholders has been developed. The INSPIRE care program includes risk stratification of the older population, nurse-led comprehensive geriatric assessment, care coordination of health and social services, and tailored follow-up. This care program is will be implemented and processes and outcomes will be evaluated in two care regions.

**Conclusions:** INSPIRE will inform the implementation of a new care model by involving stakeholders in co-creating a care concept that is based on scientific evidence, is feasible and acceptable and fits the local context.

**Health Policy Implications:** The integrated care model has the potential to be scaled up as stakeholder involvement is present throughout the project and in-depth process evaluations will be conducted. The INSPIRE project can become a blueprint for other Swiss or international regions to find innovative contextually adapted solutions for aging.

## VARIATIONS IN INFANT AND CHILDHOOD VITAMIN D SUPPLEMENTATION PROGRAMS ACROSS EUROPE AND FACTORS INFLUENCING ADHERENCE

Ardita Kongjonaj<sup>1</sup>, Suma Uday<sup>2</sup>, Magda Aguiar<sup>3</sup>, Ted Tulchinsky<sup>4</sup>,  
Wolfgang Högler<sup>3</sup>

*1 Prime Ministers' Office, Albania*

*2 Birmingham Children's Hospital, UK*

*3 University of Birmingham, UK*

*4 The Hebrew University of Jerusalem; Ashkelon College, IL*

**Background:** Nutritional rickets is a growing global public health concern despite existing prevention programs and health policies.

**Study Question:** What are the differences between infant and childhood vitamin D supplementation policies, strategies and practices across Europe and explore factors influencing adherence?

**Methods:** Representatives of the European Society for Paediatric Endocrinology and other European specialists completed a questionnaire relating to country-specific vitamin D supplementation policy and child healthcare programs, socioeconomic factors, policy implementation strategies, and adherence. Kendall's tau-b correlation coefficient was used to assess the effect of individual factors on adherence.

**Results:** Responses were received from 29 of 30 European countries (97%). Ninety-six percent had national policies for infant vitamin D supplementation in place. Supplements are commenced on day 1-5 in 50% (14/28) of countries, on day 7-21 in 46% (13/28); only the UK starts supplements at 6 months. Recommended duration of supplementation varied widely from a minimum of 6 months to lifelong in at-risk populations. Good ( $\geq 80\%$  of infants), moderate (50-79%) and low adherence ( $< 50\%$ ) was reported by 61% (17/28), 28% (8/28) and 11% (3/28) of countries, respectively, with the UK reporting the lowest adherence to supplements (5-20%). Factors significantly associated with good adherence were universal supplementation independent of the mode of feeding ( $p=0.02$ ), financial family support ( $p=0.04$ ); monitoring adherence at recommended child care visits ( $p=0.001$ ) and the total number of factors ( $n=11$ ;  $p<0.001$ ).

**Conclusions:** Good adherence to infant vitamin D supplementation is associated with relatively simple factors such as offering universal supplementation, financial family support and monitoring adherence at recommended child care visits. Implementation strategies matter for delivering efficient prevention policies.

**Health Policy Implications:** There is a call for a more political effort to invest in the implementation of efficient supplementation and fortification programmes to prevent symptomatic vitamin D deficiency, and thereby protect the most vulnerable members of society and minimize inequalities among socioeconomic groups and ethnic minorities.

## MAKING SENSE OF DATA - BUILDING BRIDGES BETWEEN BIOSTATISTICIANS AND POLICYMAKERS

Richard Dale

*Gothenburg City, Sweden*

**Background:** The wellbeing of the population can be affected if policymakers cannot understand that the health of the population is determined by the physical environment, inhabitants' living conditions and available services. A lot of data is collected, and a lot of register-based studies are published in scientific papers; however, seldom this data makes sense to policymakers.

**Study Question:** The aim of this project was to develop a social surveillance instrument suitable for policymakers.

**Methods:** Sociodemographic and health-related data were collected at the city-level, district-level and subdistrict-level. Maps showing services, housing, roads and public places were produced at subdistrict-level. A policymaker-friendly layout was created in 2014 for one of the ten districts of the city of Gothenburg. Since then the instrument has been updated every year.

**Results:** Knowledge regarding the geographical differences in social determinants and health in the population has increased among policymakers in the intervention area. Policymakers in the selected district use the created instrument in their official meetings while discussing, planning and following up political decisions. Other organizations also have used the created instrument in discussions regarding social and health-related interventions and regarding the allocation of services, recreational areas and new residential areas.

**Conclusions:** The gap between biostatisticians and policymakers can be reduced using the adequate channels and languages.

**Health Policy Implications:** Policymaker-friendly instruments can improve political decisions and improve the health of the population.



## OVERDOSE FROM PRESCRIPTION OPIOIDS IN ADOLESCENCE, 1999-2017

Oren Miron<sup>1</sup>, Kun-Hsing Yu<sup>1</sup>, Rachel Wilf-Miron<sup>2</sup>, Isaac S. Kohane<sup>1</sup>

*1 Harvard Medical School, US*

*2 The Gertner Institute for Epidemiology and Health Policy Research, IL*

**Background:** Opioid prescriptions increased in the U.S. from 1999 to around 2009, which lead to an increase in overdose deaths from prescription opioids. Since then, there has been a decrease in opioid prescription, including in adolescence.

**Study Question:** What is the trend in overdoses from prescription opioids in adolescents, and does it differ from young adults.

**Methods:** We searched the CDC mortality database for ages 10-19 years (adolescents) and 20-29 years (young adults). We extracted ICD-10 counts for overdose from prescription opioids (ICD-10 codes: X40-X44, X60-X64, X85, Y10-Y14; multiple-causes T40.2). We analyzed the trends for each age group from 1999-2017 using Join Point-Regression (NIH-Version 4.7).

**Results:** At ages 10-19 years, the overdose rate from prescription opioids increased from 1999-2008 by an annual percent change (APC) of 15.12% (95% confidence interval, 9.6% to 20.9%). The rate decreased from 2008-2017 by APC of -5.8% (95%-CI, -9.5% to -1.9%). In 2017 the overdose rate per 100,000 at ages 10-19 years was 0.34 (95%-CI, 0.28-0.39).

At ages 20-29 years, the overdose rate from prescription opioids increased from 1999-2010 by an annual percent change (APC) of 15.18% (95%-CI, 13.3% to 17.1%). There was an increase from 2014-2017 by APC of 13.8% (95%-CI, 5.2% to 23.0%). In 2017 the overdose rate per 100,000 at ages 20-29 years was 4.62 (95%-CI, 4.43-4.82).

**Conclusions:** Our analysis shows that age 10-19 years had a decreasing trend from 2008-2017, while age 20-29 years had a non-significant decrease from 2010-2014, followed by a significant increase. The large decrease in adolescent overdoses might stem from the reduction in an opioid prescription from around 2009. The lack of a decrease in young adults may stem from them receiving opioids as adolescents before 2009 and becoming addicted. Another explanation might be adolescent-specific restrictions.

**Health Policy Implications:** Future studies should also examine the effect of specific restrictions on opioid prescribing in adolescence and sequelae in adulthood.

## THE HEALTH OF "ANSWER SEEKERS" - ADDRESSING THE NEEDS OF YOUNG ISRAELIS MOVING FROM THE ULTRA-ORTHODOX TO THE SECULAR COMMUNITY

Ronit Pinchas-Mizrachi<sup>1</sup>, Baruch Velan<sup>2</sup>

*1 Ramat-Gan Academic College, IL*

*2 The Gertner Institute for Epidemiology and Health Policy Research, IL*

**Background:** Many young Israelis leave the Orthodox religious community to join the mainstream non-religious community. These groups often referred to as "Answer-Seekers" are gaining volume in the Israeli society both in number and visibility. The transition process could be very strenuous on the individual and result in undesired effects on wellbeing and health. Moreover, their emerging health needs could be jeopardized by inherent barriers in access to healthcare.

**Study Question:** To examine the health consideration of "Answer-Seekers" in an attempt to define their vulnerabilities and needs, and define measures for improving accessibility.

**Methods:** 12 young adults who have recently made the transition were asked to relate to health problems bothering the community and to accessibility barriers. The semi-structured interviews were analyzed qualitatively.

**Results:** Interviewees indicated that the "Answer-Seekers" population could be affected by mental health problems, including stress and depression, by sexual health problems related to unsafe practices, and by risks related to substance abuse and hazardous behavior. Interviewees suggested that these problems are associated with difficulties encountered prior to and during the post-transition process. Quest for help is often hampered by health illiteracy, stigmatization of mental and sexual vulnerabilities and prejudice.

**Conclusions:** The "Answer-Seekers" population is a newly developing community with specific health needs. Comparison to findings regarding the health of immigrants, and LGBT populations suggest that the process of transition per se could trigger health problems.

**Health Policy Implications:** Health authorities are urged to pay attention to the problems of this emerging group and provide appropriate health measures.

# ABSTRACTS

## e-Poster Exhibition





## ADHERENCE TO GLYCEMIC CONTROL QUALITY INDICATORS IN PATIENTS WITH DIABETES: THE DIABETES QUALITY INDICATORS AND HEALTH OUTCOMES (DQIHO) STUDY

Nura Abdel-Rahman<sup>1</sup>, Orly Manor<sup>1</sup>, Arnon Cohen<sup>2</sup>, Einat Elran<sup>3</sup>, Avivit Golan Cohen<sup>4</sup>, Liora Valinsky<sup>5</sup>, Ronit Calderon-Margalit<sup>1</sup>

*1 The Hebrew University-Hadassah, IL*

*2 Clalit Health Services, IL*

*3 Maccabi Healthcare Services, IL*

*4 Leumit Health Services, IL*

*5 Meuhedet Healthcare Services, IL*

**Background:** Since 2002, The National Program for Quality Indicators in Community Healthcare operates in Israel, with an improvement in diabetes quality indicators.

**Study Question:** To estimate the association of performance of quality indicators related to the measurements and control of HbA1c with all-cause mortality.

**Methods:** A national cohort study including 207,903 diabetic patients, aged 45-80 years, who were followed retrospectively in 2006-2016, using data retrieved from the electronic medical records of all Israeli health plans. Patients with at least four years of follow up were included (90.2%).

Two measures were defined per each patient for the follow-up period:

1. Proportion of HbA1c testing, categorized into: full, partial and low level of performance.
2. Proportion of poor control: number of years the patient had HbA1c >9% divided by the tested years. Proportion was categorized into: never, occasionally and almost always poorly controlled.

Cox models, adjusted for age, gender, smoking status and health plan, were used to estimate the hazards ratio (HR) for mortality.

**Results:** During 1,863,274 person-years of follow-up, 75,493 patients have died. Patients who had either partial or full performance in the HbA1c testing during the follow-up period had 47% and 70% reduced mortality risks (HR: 0.53, 95% CI:0.52-0.55 and 0.30, 95% CI:0.29-0.31, respectively), compared to those with a low level of performance.

In comparison to patients who never had a HbA1c >9%, those who were occasionally and almost always poorly controlled had 1.2- and 1.8-times higher risks of mortality, respectively (HR: 1.17, 95% CI:1.14-1.19, and 1.78, 95% CI:1.72-1.83, respectively).

**Conclusions:** Quality indicators of HbA1c testing and control are strongly associated with mortality of patients with diabetes.

**Health Policy Implications:** Health providers should strive to full adherence to HbA1c testing and control indicators among diabetic patients.

## INCIDENCE OF SURGICAL SITE INFECTION IN PEDIATRIC SURGICAL DEPARTMENTS - A PROSPECTIVE MULTI-CENTER STUDY

Muhammad Abu Thilakh, Raya Madar, Yael Dvori

*Soroka University Medical Center, IL*

**Background:** Surgical site infections (SSIs) are postoperative infections of the surgical incision or organ-space. SSI are defined as an infection occurring within 30 days after an operation, and involve either a discharge of pus (purulent discharge), with or without laboratory confirmation; an organism isolated from an aseptically obtained culture; or signs and symptoms of infection, such as localized swelling, redness, or tenderness. SSIs account for approximately 17% of nosocomial infections among surgical pediatric patients. Only a few studies have evaluated these infections in children.

**Study Question:** The aim of the study was to analyze the demographic and clinical characteristics associated with SSI in the pediatric population.

**Methods:** A multi-center study including children undergoing surgical procedures in 2010–2014 in 6 medical centers across the country. Demographic and clinical data were extracted from the patients' files. Multivariate analysis was used to identify factors associated with SSI.

**Results:** The study included 467 children. 169 (36.2%) underwent clean surgery, 237 (50.7%) clean-contaminated surgery and 52 (11.1%) underwent contaminated procedures. 312 (66.8%) of the study population were female. The mean age was  $98 \pm 71$  months (range; 1, 267 months) and the median length-of-stay was 3 days (1, 5). Twenty-five (5.4%) of the children developed SSIs, of whom 15 (60%) underwent urgent surgery. SSIs rates by wound classification were 8 (33.3%), 9 (37.5%) and 7 (29.2%) in clean, clean-contaminated and contaminated procedures, respectively ( $p=0.02$ ). The adjusted multivariate model demonstrated that contaminated surgery (OR=5.17;  $p=0.01$ ), preoperative bathing (OR=0.29;  $p=0.03$ ) and in-hospital fever (OR=15.00;  $p<0.01$ ) are predictors for SSIs.

**Conclusions:** Wound classification, preoperative bathing and fever are good predictors for SSIs.

**Health Policy Implications:** Policy-makers should consider the possibility of empiric antibiotic treatment for children undergoing surgical intervention, according to wound classification.

## PLANNING FOR SPECIALISTS: CAN WE PREDICT THE NUMBER OF NEW SPECIALISTS?

Myriam Aburbeh, Haim Karger, Ziona Haklai

*Ministry of Health, IL*

**Background:** In recent years the proportion of specialist physicians in Israel has increased. Planning the medical workforce must consider cost and time of training new specialists.

**Study Question:** Can we predict the number of future specialists following their initial physician license by specialty?

**Methods:** Data was obtained from the licensed physician and residents' databases. A cohort of physicians licensed in 2005–2008 was followed up to find time interval till the beginning of the first specialization, and till its completion, allowing a 10-year follow up. For those who did not complete the first specialization, we checked whether another specialization was begun.

**Results:** Of 2,351 physicians who received their license in 2005–2008, 1,964 began the first specialization, on average 13 months after receiving their license, with a median time of 5–6 months.

Following up these physicians shows that 27% did not finish their specialist training within 10 years from starting. Of those, 28% of internal medicine interns did not finish, 25% in psychiatry, 56% in general surgery, 49% in anesthetics, 18% in family medicine and gynecology and obstetrics and 8% in pediatrics.

From those who did finish their first specialty, 81% of internal medicine interns received their specialist license within 6 years, 84% in family medicine and pediatrics, and 74% in psychiatry. 78% of those in general surgery finished in 8 years, and 91% in gynecology and obstetrics.

In most specialties, median time till finishing was longer for male than female physicians.

A third of those who did not finish their first specialization began and finished a different one; 45% of those who didn't complete family medicine and pediatrics, 38% - gynecology and obstetrics and 52% - general surgery.

**Conclusions:** A follow up of medical specializations from initial license to completion allows mapping their supply and demand.

**Health Policy Implications:** Planning the medical workforce for changing population needs should utilize medical resident data.

## HOME SWEET HOME

Yael Applbaum, Ziona Haklai, Ethel-Sherry Gordon

*Ministry of Health, IL*

**Background:** One of the Israeli health system's sorest points is the overcrowding of general medicine departments.

A society that is living longer with more chronic illnesses and a shortage of chronic care beds, have caused the acute care medicine departments to bear a great part of this burden.

The occupancy rates in medicine departments are 97–107% with seasonal changes. Seeing patients lying in a bed in the hallway of a medical ward is commonplace.

Many suggestions have been raised to alleviate the problem. One recommendation was to develop a stronger system of home hospitalization.

**Study Question:** If indeed home hospitalization could shorten the stay of some patients, how much of the burden would decrease?

**Methods:** We chose three diseases that are amenable to continue treatment at home after the initial evaluation and inpatient treatment: congestive heart failure, pneumonia and urinary tract infections. We measured the number of discharges and the average length of stay of patients with these diseases listed as the primary diagnosis and estimated how many beds we could save if we could decrease the length of stay for patients with these three diseases. All the data were collected from the national hospitalization database in the Israel Health Ministry.

**Results:** There were 32,000 discharges for these three diseases in 2016, with the average length of stay between 5–5.7 days. Assuming we had an alternative setup such as home care that would allow us to decrease the average length of stay by two days, we estimated that we would save 60,000 bed days, reducing the occupancy by 5%, or, alternatively, reduce the number of beds by 165.

**Conclusions & Health Policy Implications:** Although this is an exercise based on very crude but large data, in this very conservative model, we show that establishing an intensive home-based care system that would allow reducing the length of stay could help decrease the burden of hospitalization in the general medicine wards.



## WHERE TO GO IN AN EMERGENCY? DETERMINANTS OF CHOICE OF OUT OF HOURS SERVICES IN MEUHEDET HEALTH SERVICES

Eyal Ariely, Liora Valinsky, Itai Kadim, David Dvir, Roei Bitcher, Anat Toledano, Nuriel Burak

*Meuhedet Health Services, IL*

**Background:** Out of hours services for medical emergencies are based on three options: emergency departments (ER) in hospitals, in-house emergency clinics (IHC), and emergency clinics run by external providers (EPC). The distribution of the clinics varies across the country. For both clinical and financial reasons it is preferable that members requiring out of hours care attend clinics rather than ER's unless it is strictly necessary.

**Study Question:** What are the demographic, geographic and service-related predictors of the out of hours services used?

**Methods:** We examined all visits to emergency departments (without hospitalization) and clinics during 2018 from Meuhedet data. We analyzed which patient and system related variables, such as age, gender, cultural group, distance from home, district, physician specialization and season were associated with visits to the ER, in-house and external provider emergency clinics.

**Results:** There was no difference in choice of the facility between summer and winter. Ultra-Orthodox members were more likely to attend IHC's than Secular Jews and Arabs (2.2, 1.1 and 0.65) relative to their population proportion. Secular Jews and Arabs were more likely to attend ER's (1.53, 1.73 and 0.93 respectively). Using Multivariate logistic regression, we found that after adjusting for all variables, older age was associated with more ER attendance (OR 1.012 per year,  $p < 0.000$ ), as well as being a member of the Arab population (OR 1.89, 95% CI 1.85-1.93), and having a primary physician who is not a family or internal medicine specialist. In this model, distance from an IHC or EPC was inversely related with attending an ER. Males were slightly more likely to attend ER and women were more likely to attend IHC' and EPC's.

**Conclusions:** Although we did not take into account reasons for out of hours visits, it appears that choice of a facility is associated with distance, the expertise of primary physician and culture.

**Health Policy Implications:** In order to reduce unnecessary ER visits, it is essential to understand and address the determinants of customer use and preference.

## REGULATORY CHANGES IN THE LONG-TERM CARE INDUSTRY: QUANTITY VERSUS QUALITY IN ISRAELI KIBBUTZIM

Michal Ashkenazi, Yaffa Machnes

*Bar-Ilan University, IL*

**Background:** Nursing care in Israel has undergone a revolution in the last two years. In order to protect insurers, group Long Term Care (LTC) insurance policies were not extended due to government instructions. By that time, to protect the sick, the Ministry of Health introduced quality standards for long-term hospitalization institutions.

**Study Question:** The impact of the new regulations on the number of nursing homes and on the Long-Term Care (LTC) Insurance in Kibbutzim. It is assumed that the Kibbutzim react to the reforms with judicious consideration after getting professional advice.

**Methods:** Data about 267 kibbutzim were collected. Their demographic structure and economic situation were evaluated by questionnaires and by official publications. Most of them were privatized and only 49 are still cooperatives. Multinomial logistic regressions were estimated in order to understand the factors that influenced their decisions to close 43% of their nursing homes and to stop LTC insurance of their elder members.

**Results:** The more veteran the kibbutz, the more likely it is to find there a nursing home. The higher the number of the kibbutz members in LTC needs and the higher the pension, the more likely it is to manage a supervised nursing home. Kibbutzim with low pensions usually offered only home care. The more veteran the kibbutz, and the higher the percentage of elderly members and members in LTC need, it is more likely to face the future LTC expenses by an internal fund rather than by external insurance.

**Conclusions:** While the reform in insurance came to protect insurers from collapse, the reform in nursing homes came to protect the sick hospitalized persons from low-quality care. The improving quality brought to a drastic decrease in the quantity of services supplied.

**Health Policy Implications:** The ability of regulators to interfere in the quality of service has an impact on the quantity supplied by the private sector.

## LIVE KIDNEY DONOR'S ATTITUDES AND SATISFACTION OF THE DONATION PROCESS, AND ITS IMPLICATION ON HEALTH SERVICES

Tamar Ashkenazi<sup>1</sup>, Eyal Katvan<sup>2</sup>, Ruth Rahamimov<sup>3</sup>

*1 Ministry of Health, IL*

*2 College of Law and Business, IL*

*3 Rabin Medical Center, IL*

**Background:** An increasing rate of living kidney donation in recent years (from a yearly average of 70 to 220) forms a large group of donors which enables us to examine their status and satisfaction of the donation process, and to validate retroactively the donation process.

**Study Question:** What are the characteristics of a successful donation from the donor's perspective, which may predict and allow better screening candidates who might regret their donation in the future?

To what degree donor's personal, mental and socio-demographic characteristics relate to post donation satisfaction and adaptation?

To what degree the donation process's logistic and administrative issues relates to its success and with donor's satisfaction?

**Methods:** All living donors in Israel (1,244) between the years 2008–2018 were addressed and asked to fill in a detailed questionnaire. Response rate was 33.6% (419).

**Results:** Demography: 53% of the respondents are male; ages between 23–70 (at time of donation); apx. 50% donated to a non-relative patient.

Evaluation Committee: Apx. 1/3 reported a lack or not-sufficient information provided regarding the evaluation committees' procedure. About 1/5 in the opinion that the committee should not evaluate their mental status as part of the evaluation process.

Medical aspects and procedures: 1/10 rated the hospitalization and surgery experience as very low or low (0–5 out of 10); Currently 4% are not able to make strenuous physical activity; 16% are slightly limited with strenuous physical activity.

Administrative issues: 1/10 rated some aspects of the administrative process during and after the recovery process as very low or low (0–5 out of 10).

Regret: only 4% regret the donation at various levels.

Occupation: 25% were negatively affected by the donation at various levels.

**Conclusions:** Will be added after thorough statistical analysis.

**Health Policy Implications:** Policy consequences will refer to the administrative part of the process and the evaluation committees.

## ELECTRONIC ANESTHESIA MANAGEMENT SYSTEM AS A TOOL FOR QUALITY ASSURANCE: RETROSPECTIVE STUDY OVER 11 YEARS ON CHANGE OF INTRAOPERATIVE BLOOD ADMINISTRATION

Alexander Avidan, Ruven Pizov

*Hadassah-Hebrew University Medical Center, IL*

**Background:** Scientific clinical evidence supports restrictive perioperative blood administration. Reduced administration of blood products has a positive effect on increasing health costs.

**Study Question:** The goal of this study was to inquire whether there was a change in intraoperative blood administration over eleven years in a tertiary referral center.

**Methods:** Study was approved by Institutional IRB. Data were retrieved from the electronic anesthesia information management system (Metavision, iMDsoft, Tel Aviv, Israel). Inclusion criteria: Adults, ASA classification 1-4 (emergency included). Study duration: 01/04/2007-31/03/2018. Patients grouped into quarters for statistical analysis. Sub-analysis for patients who received up to 4 packed cells (PC).

**Results:** From 112,576 patients, 5,917 (5.3%) received at least one PC. Decrease in the percentage of patients (POP) who received PCs over time ( $R^2$  0.63). Mean number of PC/patient (MNPP) remained stable ( $R^2$  0.07). We observed change in PC administration from 2012 on. Before 2012: POP  $R^2$  0.01; MNPP  $R^2$  0.13. From 2012: POP decreased ( $R^2$  0.31); MNPP  $R^2$  0.003.

5,304 (89.6%) patients received up to 4 PC. Before 2012: POP and MNPP were stable ( $R^2$  = 0.004,  $R^2$  = 0.04 resp.). From 2012: Decrease in POP and MNPP ( $R^2$  = 0.29,  $R^2$  = 0.44 resp.). This reduction was only in patient who received 2 or 3 PC ( $R^2$  = 0.32,  $R^2$  = 0.52 resp.).

**Conclusions:** There was an overall reduction in POP and MNPP over 11 years. Interestingly, the study period can be divided in a period without change (before 2012) and a period with continuous reduction in blood administration (from 2012). We can only speculate that this may be related to the publication of the largest randomized controlled study on restrictive blood administration in the NEJM in December 2011 by Carson.

**Health Policy Implications:** It seems that important clinical studies have influence on policy treating patients. Our study showed that this has a positive effect on patients' health and on reduced health costs.

## ARTEFACTS OF AUTOMATICALLY RECORDED VITAL SIGNS IN AN ANESTHESIA INFORMATION MANAGEMENT SYSTEM

Alexander Avidan, Ravid Benabu

*Hadassah-Hebrew University Medical Center, IL*

**Background:** Although vital signs (VS) recording in electronic anesthesia information management systems (AIMS) are accurate, artefacts (like wrong heart rate readings caused by diathermia) are also recorded. This may have medico-legal implications.

**Study Question:** The goal of this study was to assess the number of artefacts of values for arterial oxygen saturation (SpO<sub>2</sub>), hear rate (HR) and invasive blood pressure measurements (IBP) recorded in the AIMS.

**Methods:** The study received IRB approval. A representative sample of 257 anesthesia records (AN) was randomly chosen, 34 with IBP. VS were retrieved from AIMS and then AN was visually reviewed for artefacts.

**Results:** The study received IRB approval. A representative sample of 257 anesthesia records (AN) was randomly chosen, 34 with IBP. VS were retrieved from AIMS and then AN was visually reviewed for artefacts.

**Conclusions:** Mean VS recording duration (minutes):  $117.7 \pm 120.8$  (min 17, max 694).

HR: Number 29,472, mean/AN  $114.7 \pm 118.9$  (min 6, max 690); Artefacts: Number 584 (2.0%), mean/AN  $2.3 \pm 4.5$  (min 0, max 35), records with at least one artefact 142 (55.3%).

SpO<sub>2</sub>: Number 28,947, mean  $112.6 \pm 118.7$  (min 6, max 683); Artefacts: Number 366 (1.3%), mean/AN  $2.3 \pm 4.5$  (min 0, max 35), records with at least one artefact 124 (48.2%).

IBP: Number 8,591, mean  $252.7 \pm 153.0$  (min 35, max 689); Artefacts: Number 387 (4.5%), mean/AN  $11.4 \pm 11.1$  (min 0, max 45), records with at least one artefact 31 (91.2%).

In 180 (70.0% records) were at least one HR or SpO<sub>2</sub> artefact. When including IBP, only one record had no artefact.

**Health Policy Implications:** Vital signs artefacts occur in most AIMS records, but their absolute number/AN is low. Most artefacts are recorded for invasive blood pressure measurements, the least for SpO<sub>2</sub>. Artefacts should be corrected or marked as such to provide accurate anesthesia records. Not adhering to this may have medico-legal implications.

## REPEATED AUTOMATED MOBILE TEXT REMINDERS FOR FOLLOW-UP OF POSITIVE FECAL OCCULT BLOOD TESTS: A RANDOMIZED CONTROLLED TRIAL

Revital Azulay<sup>1</sup>, Liora Valinsky<sup>1</sup>, Fabienne Hershkowitz<sup>1</sup>, Racheli Magnezi<sup>2</sup>

*1 Meuhedet Healthcare Services, IL*

*2 Bar-Ilan University, IL*

**Background:** Fecal occult blood tests (FOBT) are recommended as a screening method for colorectal cancer, but they are only effective if positive results are followed by colonoscopy. Surprisingly, a large proportion of patients with a positive result do not follow this recommendation.

**Study Question:** To examine the effectiveness of a short message service (SMS) in increasing adherence to colonoscopy follow-up after a positive FOBT.

**Methods:** We conducted this trial with patients who had positive colorectal cancer screening results. Randomization was stratified by residential district and socioeconomic status. Subjects in the control group (n=238) received routine care that included an alert to the physician regarding the positive FOBT result. The intervention group (n=232) received routine care and three SMS reminders to visit their primary care physician. Adherence to colonoscopy was measured 120 days from a positive result. Physicians of the study patients completed an attitude survey regarding FOBT as a screening test for colorectal cancer. Intervention and control group variables (dependent and independent) were compared using chi-squared analysis. Logistic regression was used to calculate odds ratios and 95% confidence intervals for performing colonoscopy within 120 days for the intervention group compared with the control group and adjusting for potential confounders of age, gender, socioeconomic status, district, ethnicity, and physician's attitude.

**Results:** Of 232 patients in the intervention group, 163 had a colonoscopy within 120 days after the positive FOBT, and of 238 patients in the control group, 112 of 238 had a colonoscopy within 120 days after the positive FOBT. (70% vs. 47% OR 2.17, 95%CI 1.49-3.17, P<.0001). This association remained significant after adjusting for potential confounders (P=.001).

**Conclusions:** A SMS reminder is an effective, simple and inexpensive method for improving adherence among patients with positive colorectal screening results. This type of intervention could also be evaluated for other types of screening tests.

**Health Policy Implications:** This type of intervention could also be evaluated for other types of screening tests.

## CAN WE IDENTIFY PATIENTS NO-SHOW FOR AN IMAGING EXAMINATION?

Royi Barnea<sup>1</sup>, Yossi Weiss<sup>2</sup>

*1 Assuta Medical Center, IL*

*2 Assuta Medical Center; Ariel University, IL*

**Background:** No-shows of patients to their scheduled appointments have a significant impact on healthcare systems, including lower clinical efficiency and higher costs. The rates of cancelation vary between centers and between different examinations with numerous factors influencing this phenomenon.

**Study question:** Can we identify in advance patients that are prone to not appearing to imaging examination? The purpose of this study was to investigate the factors associated with patients' no-shows in imaging exams.

**Methods:** A retrospective study of 104,607 records for patients scheduled for imaging examination at Assuta Medical Center over an eight months period. Logistic regression analyses were conducted to explore and model the influence of certain variables on no-show rates.

**Results:** The overall proportion of no-shows was 1.57%. According to our analysis, there is a significant association between patient no-show and several variables such as type of the exam (MRI has the highest no-show rate), distance from the medical center and the source of funding (private vs. public).

**Conclusions:** Our predicted probability of no-show behavior can be used to guide changes in scheduling patterns or to recognize patients prone to interventions for behavioral change.

**Health Policy Implications:** An accurate prediction model can be used to enable a precise selective overbooking strategy to reduce the negative effect of no-shows and to fill appointment slots while maintaining short wait times.

## FROM THE PRIMARY CARE CLINIC TO THE INPATIENT DEPARTMENT - AND BACK

Leonid Barski<sup>1</sup>, Shlomi Codish<sup>1</sup>, Jacob Dreiherr<sup>1</sup>, Miriam Kudisz Ovnat<sup>2</sup>

*1 Soroka University Medical Center, IL*

*2 Clalit Health Services, IL*

**Background:** The study's goal was to evaluate the effectiveness of an intervention to improve communication between an internal medicine department and a primary care clinic.

**Study Question:** The intervention's influence on quality and patient experience.

**Methods:** As of June 2014, patients from primary care clinic E in Beer Sheva requiring admission to an internal medicine department in Soroka University Medical Center, are admitted to Internal Medicine "F". Communication between the clinic and the department was improved using multiple interventions. The study included patients from Clinic E admitted to Internal Medicine F during June 2015–December 2016. The comparison groups included a historical control (patients from Clinic E admitted in January 2013–May 2014) and concurrent control (admissions from Clinic A in Beer Sheva). Outcomes included readmissions, length of stay, patient experience and staff satisfaction.

**Results:** The study group included 454 admissions, while the concurrent control included 617 admissions from Clinic A and the historical control included 699 admissions. The one-week readmission rate was 5.9% in the study group, 8.0% in the historical control and 7.3% in Clinic A ( $p=0.416$ ). One-month readmission rates were 15.9%, 20.5%, and 20.9%, respectively ( $p=0.081$ ). Hospital admissions were significantly shorter than the historical cohort (median 2 days vs. 3 days,  $p<0.001$ ). In multivariate analysis, the one-week readmission rate was lower in the study group compared with the historical control group (OR=0.36, 95% CI 0.22–0.58,  $p<0.001$ ). One-month readmission tended to decrease in the study group (OR=0.72, CI 0.50–1.05 vs. Clinic A,  $p=0.086$ ). Patient satisfaction was significantly higher in the study group. Staff satisfaction in Internal Medicine F and in clinic E was also higher in certain aspects from that of staff in other internal medicine departments and clinic A, respectively.

**Conclusions:** The study suggests an optimal model for admitting patients to internal medicine departments.

**Health Policy Implications:** This model can be implemented in other hospitals in Israel and worldwide.



## FACILITATING DECISION-MAKING AND PROVISION OF MEDICAL CARE DURING DISASTERS THROUGH UTILIZATION OF A COMPREHENSIVE COMPUTERIZED INFORMATION SYSTEM

Avishay Bar-Tal, Victor Bero, Adi Giladi, Gal Horowitz, Avishay Bar-Tal

*Meuhedet Healthcare Services, IL*

**Background:** During disasters healthcare systems are required to ensure the provision of medical services to vulnerable populations. In order to monitor vulnerable patients and ensure the efficient management of resources, advanced information systems are required.

**Study Question:** To present the contribution of an innovative, comprehensive computerized information system to decision-making and provision of medical care during disasters.

**Methods:** "Meuhedet", an HMO which insures 1,200,000 patients, developed a comprehensive information system which includes a database concerning patients, infrastructure and personnel, as a unique management tool. The GIS-based system enables to identify the location and current status of patients and providers at all times. During large-scale fires that occurred in Israel between 22.11.16 to 27.11.16 which necessitated mass evacuation of populations, the information system was used to locate vulnerable patients and plan provision of needed services.

**Results:** Following the decree of mass evacuation of all populations from the risk zones due to the fires, the information system enabled the HMO to locate all vulnerable patients within minutes and plan provision of specifically needed services: 2 patients from a nursing home and 1 home-care ventilated patient were located and evacuated within 2 hours. Specific medications were supplied within two hours to patients who were evacuated to absorption centers or hotels, based on their personal files available through the information system. One terminally ill patient was tracked and treated by the home-care unit within 3 hours, based on the data provided by the information system.

**Conclusions:** The comprehensive information system facilitated decision-making and improved ability of primary healthcare workers to provide efficient and continuous medical care in the community during the disaster. During the recent fires in Israel, vulnerable patients were located within minutes and provided with individually-needed medical care within 2-3 hours, due to the availability of the information system that provided vital data concerning each patient.

**Health Policy Implications:** Adoption of this tool at a national level can contribute significantly to synergistic efforts during conflict or natural disasters.

## ROUTINE CHILDHOOD VACCINATION COVERAGE RATES AMONG PRETERM INFANTS IN ISRAEL

Dov Bary-Weisberg<sup>1</sup>, Hanna Shoob<sup>2</sup>, Ziona Haklai<sup>3</sup>, Nesia Cohen<sup>3</sup>,  
Brian Reichman<sup>4</sup>, Liat Lerner-Geva<sup>4</sup>, Chen Stein-Zamir<sup>2</sup>

*1 The Hebrew University-Hadassah, IL*

*2 Jerusalem District Health Office, IL*

*3 Ministry of Health, IL*

*4 The Gertner Institute for Epidemiology and Health Policy Research, IL*

**Background:** Vaccinating premature and low birth weight (LBW) infants according to chronological age has been shown to be safe and effective. Although these infants are more susceptible to infections, vaccinations are often delayed. The Israel National Immunization Registry (INR) has created an opportunity to study immunization coverage in a large national cohort, instead of surveys, health care provider reports or random sampling.

**Study Question:** Is vaccination initiation and completion delayed in preterm infants compared to full-term infants in Israel?

**Methods:** This retrospective study is based on a cohort of Israeli children. Data from the INR was linked with a "birth file" for all Israeli citizens born in 2016. The main independent variables, birth weight and gestational age (GA), were validated by comparing both sources. Dependent variables were vaccinations in the national program for the first two years of life: Hepatitis B, Diphtheria - Tetanus - Acellular Pertussis, Haemophilus influenzae type b, Polio Oral Bivalent, Rotavirus, Pneumococcal Conjugate, Measles-Mumps-Rubella, Varicella and Hepatitis A. These were obtained from the INR so that each child's record includes the list of vaccinations they received.

**Results:** To date, we have obtained the "birth file" and analyzed it; the full dataset is currently under assessment. The birth cohort for 2016 included 181,543 children. The proportion of preterm infants, born before 37 weeks was 7.0% (n=12,264), and 7.7% (n=13,950) for LBW infants, born below 2,500 grams.

**Conclusions:** Preliminary analysis of the data shows that the data is generally valid, much of the missing data easily completed from other sources. We are looking forward to presenting the full results of this original study.

**Health Policy Implications:** Vaccinating preterm and LBW infants according to the official vaccination program, provides protection from life-threatening infectious diseases. Studying vaccination patterns, is important in evaluating the presence of a public health issue. This information will support appropriate interventions.

## MEDIA REPORTS ON MEDICAL ERRORS - COVERT CRITICISM DETECTION USING AUTOMATED CONTENT ANALYSIS

Osnat Bashkin<sup>1</sup>, Eyal Eckhaus<sup>2</sup>

*1 Ashkelon Academic College, IL*

*2 Ariel University, IL*

**Background:** Although interventions to improve the quality of health care and patient safety are developed and applied regularly, recent studies show that the rate of medical errors has not significantly decreased. News media reports on medical errors have the potential to improve patient safety. However, if adverse event data are misinterpreted, it may result in fear and blame.

**Study Question:** In which ways covert criticism is reflected in adverse medical events media reports? What are the links between content characteristics of adverse medical events media reports?

**Methods:** Ninety-six online media news reports on medical malpractices, from 2016-2017, were collected and analyzed using text-mining tools, followed by the construction of estimation models.

**Results:** A significant correlation was found between the use of words reflecting time problems related to medical care and the use of words reflecting patient suffering. The correlation was mediated by words which reflected aspects of the caregiver (Sobel  $z=2.24$ ,  $p<.05$ ). An estimation model showed an excellent fit. Further examination showed the emphasized importance of time problems in a saturated model where the use of words reflected problems of time-related to medical care, mediated the relationship between words that reflected aspects of the caregiver and words that reflected aspects of the medical treatment (Sobel  $z=2.31$ ,  $p<.05$ ).

**Conclusions:** Analyses showed that media reports regarding adverse medical events emphasize the patients suffering, the factor of time problems, and the role of medical systems in adverse medical events.

**Health Policy Implications:** The findings of the study call for appropriate interventions aimed at minimizing the negative effects of media reports on public perception and public-healthcare relationship. Specific attention should focus on exploring the complex communication characteristics of the patient-doctor dialog when it comes to human errors and the highly influential role of the media in this communication. Regulations regarding adverse medical events reported to the public on the media should be considered.

## EXPLAINING SOCIO-ECONOMIC INEQUALITY IN HEALTH AMONG CHILDREN IN MONGOLIA

Enkhjargal Batbaatar, Javkhlanbayar Dorjdagva, Jussi Kauhanen

*University of Eastern Finland, Finland*

**Background:** Reducing socioeconomic inequality in health is one of the key principles of the Sustainable Development Goals. Countries, including Mongolia, have been making efforts to tackle inequality in health. Despite the fact that inequality in health among children is less studied. The aim of the study is to assess the socioeconomic inequality in the child population health in Mongolia in 2012.

**Study Question:** What are the main factors of inequality in health among the child population in Mongolia?

**Methods:** This paper used a nationwide cross-sectional data, the Household Socioeconomic Survey 2012, collected by the Mongolian National Statistical Office. In the survey, there were 16,039 children under the age of 18 participated. The self-reported disability and self-reported health problems during the past month were used as health outcome variables. Household income per capita was used as a socioeconomic indicator. Inequality in health is measured by the Erreygers' concentration index to assess the degree of inequality in health among children in Mongolia.

**Results:** The concentration index of disability among children was  $-0.005$  ( $p < 0.05$ ) and the concentration index of reported health problems during the last month was  $0.019$  ( $p < 0.01$ ). The decomposition analysis shows that inequality in disability is mainly explained by the education level of household head and household income. Employment and urban location contribute to inequality in reported health problems among the children.

**Conclusions:** The study revealed that the existence of inequality in health among children in Mongolia. Inequality in health is one of the central concerns of the health policy and it is required a systematic solution to reach Universal Health Coverage in the country.

The reported illness in the past month was concentrated among the higher income groups which call the further detailed analysis.

**Health Policy Implications:** Implementation of cross-sector policies targeting the improvement of the education level of the population, reducing urbanization and poverty, developing rural infrastructure and increasing work opportunities specifically in rural areas would be beneficial to eliminating socio-economic inequality among the Mongolian child population.

## TIME AND RISK PREFERENCES, AND CONSUMPTION DECISIONS OF PATIENTS WITH CLINICAL DEPRESSION

Yaakov Bayer<sup>1</sup>, Zeev Shtudiner<sup>2</sup>, Oxsana Suhorukov<sup>3</sup>, Nimrod Grisaru<sup>1</sup>

*1 Ben-Gurion University of the Negev; Be'er Sheva Mental Health Center, IL*

*2 Ariel University, IL*

*3 Be'er Sheva Mental Health Center, IL*

**Background:** Clinical depression has been called the “plague of the 21st century”, and a significant increase in the proportion of people with clinical depression has been observed in recent years. Clinical depression has a significant influence on an individual’s behavior and decision making.

**Study Question:** This study examines how depression affects the economic decision making of individuals with clinical depression, looking specifically at time preference (subjective discount rate), attitude toward risk, and economic conduct.

**Methods:** For this purpose, structured questionnaires were distributed to patients with clinical depression at the Be’er Sheva Mental Health Center and a control group of similar size, and with similar demographic characteristics. The questionnaire included questions for assessing the level of depression (processed by a physician), and questions on economic conduct, time preference, and risk preference.

**Results:** The study found that the participants’ level of depression correlated with their economic decisions, time preference and economic conduct, and that there is a significant gap in many aspects of economic decision making between individuals with different levels of depression, and healthy individuals. On one measure of risk preference, individuals with depression showed signs of taking more risks, but there was no uniform trend indicating a disparity between individuals with depression and healthy individuals in other measures of risk preference.

**Conclusions:** Our main conclusion is that clinical depression has a broad, significant impact on the economic decisions of those who suffer from it, and it may harm the short- and long-term economic situation of patients.

**Health Policy Implications:** It is important that individuals with depression, their relatives and therapists be aware of this tendency, and take it into consideration when recommending rehabilitation and social programs.

## LANGUAGE AS A BARRIER IN ACCESSING HEALTHCARE: A QUALITATIVE STUDY AMONG THE KURDISH POPULATION IN SOUTHEAST TURKEY

Tevfik Bayram<sup>1</sup>, Sibel Sakarya<sup>2</sup>

*1 Marmara University, Turkey*

*2 Koç University, Turkey*

**Background:** Language plays a central role in accessing healthcare. Data in Turkey shows that people who do not speak Turkish as their mother tongue have significantly poorer access to healthcare. However, no study has been conducted to understand how language affects their access.

**Study Question:** How does language affect access to healthcare services for people who cannot speak the official language?

**Methods:** We conducted 12 in-depth interviews in Sirnak, using maximum variation strategy (6 men, 6 women; 6 urban, 6 rural; aged 33-68 years; all ethnically Kurdish, non-Turkish speaking, uneducated). The interviews were held in Kurdish by a researcher (first author) with a similar cultural background. We used Levesque's framework of access to healthcare for preparing our interview guide and for the analysis. We used a mix of deductive and inductive coding; and we applied content analysis. Our research was funded by the Pears Seed-Grant Program to Promote Public Health Research, for the Hebrew University, International Master of Public Health alumni.

**Results:** Language barrier was found to cause the following issues: using healthcare services only in serious conditions; not using preventive services; loss of information and unwillingness to talk about private issues in the presence of a translator (particularly if unprofessional); not being involved in treatment decisions and not being able to pursue health-related rights.

**Conclusions:** Language barrier makes people delay or cancel seeking healthcare; and makes them dependent on other people at all stages of access to healthcare, which can lead to poor adherence and poor health outcomes.

**Health Policy Implications:** In places with a dominant ethnic/linguistic group, governments should strive to provide healthcare in their mother tongue and provide professional translation services. Also, health innovation technologies and artificial intelligence might help reduce language barriers and provide multilingual healthcare services. However, first, studies should be conducted to understand which innovations are useful and efficient.

## USING CENTRALIZED DATA MANAGEMENT TO DIVERT PATIENTS TO HOME REHABILITATION - DOES IT WORK?

Gila Ben David, Munira Hamdan, Olga Levi, Orna Kler, Yulia Katz,  
Bat Sheva Sapir, Mali Kusha

*Meuhedet Healthcare Services, IL*

**Background:** Approximately 30,000 patients requiring complex follow-up are discharged from hospital to Meuhedet community care every year. Patient needs are assessed during hospitalization by Meuhedet staff, and patient information is forwarded to Meitiv -center for continuity of care. An individually tailored treatment plan is generated by Meitiv nurses. Making optimal use of community resources and keeping patients as close to home as possible, improves health outcomes and quality of life while reducing costs.

**Study Question:** Does centralized discharge management by nurses promote home-based rehabilitation?

**Methods:** Discharged patient details are received online using a tailor-made CRM database. Patients are referred to outpatient, home-based or institutional rehabilitation, using an individualized care plan based on bio-psycho-social needs. The care plan is forwarded and discussed with the care team. For patients referred to home-based rehabilitation, we assess the home environment and support system and order medical equipment as required. This is all documented within the Meitiv CRM, as well as in the electronic medical record. This creates a one-stop-shop for every discharged patient.

**Results:** From March 2018, (when the program commenced) to March 2019, 21,000 patients were referred to Meitiv. Of these 7,640 required complex cares. Between from 2017 to 2018 there was an increase of 13% in the number of patients referred to rehabilitation annually. During the same period, the number of patients undergoing home rehabilitation increased by 24%. ( $p < 0.05$ ).

**Conclusions:** Centralized management of complex patients discharged to the community based on online data and individualized care plans can divert care into the home thus increasing patient safety and quality of life.

**Health Policy Implications:** To improve continuity and home-based care, a combination of on-line discharge data, patient-centered care plans and teamwork in the community are essential and can be done with a relatively small investment.

## VISUAL ANALYTICS FOR FORECASTING CONGESTIVE HEART FAILURE MORTALITY

Ophir Ben-Assuli<sup>1</sup>, Rema Padman<sup>2</sup>, Tsipi Heart<sup>1</sup>, Nir Shlomo<sup>3</sup>, Robert Klempfner<sup>3</sup>

*1 Ono Academic College, IL*

*2 Carnegie Mellon University, US*

*3 Sheba Medical Center, IL*

**Background:** Visually intuitive methods and tools that support clinicians for early identification of high-risk patients with Congestive Heart Failure (CHF) disease, as well as patients with better adherence to treatment recommendations, can improve both clinical decision-making and patient health outcomes. Several indices exist to classify CHF patients' propensity for early mortality; however, they are largely based on limited data and are not intuitive to use.

**Study Question:** We investigate a novel, data-driven, risk assessment and visualization approach to investigate mortality prediction of CHF patients using data retrieved from an intensively digitized hospital's data repository.

**Methods:** Combining well-known, computationally efficient, dimensionality reduction (DR) methods with 2-d information visualization, the method classifies and visualizes CHF patients into high and low-risk groups, contextualized by the factors driving their classification. We compared the DR results with logistic regression (LR), a common statistical method for predicting mortality.

**Results:** We analyzed two data sets of CHF patients obtained from the Sheba Medical Center: 1) 367 older CHF patients, and 2) 204 much younger CHF patients.

The DR method performed similar to LR, but visualized the classification and its significant factors at the population level and individual patient level as well as the potential impact of viable interventions for an individual patient. The advantages of DR are evident in the lower number of false negatives and identification of modifiable significant factors that distinguish younger and older populations.

**Conclusions:** We found that the DR tool provided a contextualized classification of patients as either low- or high-risk, thus aiding the clinician to refine their assessment. The encouraging results in favor of the proposed visualization approach contribute to the current focus on advancing patient care via large-scale visual analytics.

**Health Policy Implications:** The demonstrated visualization techniques may benefit multiple stakeholders, including patients, clinical practitioners, researchers and policy-makers, with generalizability to many health risk assessment challenges in clinical care delivery.



## COMMUNITY READINESS TO PROVIDE MEDICATION IN CONFLICT AND EMERGENCY SITUATIONS

Victor Bero<sup>1</sup>, Manor Shpritz<sup>2</sup>, Orli Mozes<sup>2</sup>, Avishay Bar-Tal<sup>1</sup>, Gal Horowitz<sup>1</sup>

*1 Meuhedet Health Services, IL*

*2 Tel Aviv University, IL*

**Background:** In Israel during war or protracted conflict, the community health system operates in emergency mode, including activity reduction in some clinics, running unified HMO services, and provision of health services in shelters as needed. Efforts are made to maintain the availability of medical staff and services. In emergency situations, the demand for medications for the treatment of mental distress increases, both in response to emotional distress in people who have not experienced mental disorder before and also due to the aggravation of mental states in others. However, during emergencies, dispensing of drugs for these people could be deficient, due to pharmacy closure.

**Study Question:** Are our emergency infrastructures appropriate for the supply of medication to the population during emergencies, and specifically medications for mental distress, due to the high demand for them during these times.

**Methods:** We reviewed the prescription and distribution patterns of these drugs for patients living in the settlements close to Gaza that were threatened during operation "Protective Edge" (July–August 2014), and compared them to the same data taken from the corresponding periods in which there was no emergency situation in Israel (July and August 2013 and 2015). Data were obtained from the computerized record of Meuhedet Health Services.

**Results:** Prescriptions of anxiolytics increased 1.2-fold ( $p < 0.05$ ) during operation "Protective Edge", but not antidepressants or sedatives, in settlements that are in close proximity Gaza. The proportion of all medications provided remained the same – 70% of those prescribed, over all periods.

**Conclusions:** Medication for stress reduction increased during the conflict period, but not antidepressants or sedatives. Filling of prescriptions was not affected by the conflict, which indicates that the health system is prepared for emergencies in terms of medication provision.

**Health Policy Implications:** We appear to be prepared for the supply of medications for chronic conditions during emergencies, but further analysis needs to be done for at-risk groups such as the elderly or complex patients.

## QUALITY OF LIFE FOLLOWING BARIATRIC SURGERY IN ISRAEL

Orit Blumenfeld<sup>1</sup>, Yael Fridman<sup>2</sup>, Avi Israeli<sup>3</sup>, Lital Keinan-Boker<sup>4</sup>,  
behalf of the departments of obesity surgery in Israel<sup>5</sup>

*1 Ministry of Health, IL*

*2 Israel Center for Disease Control, Ministry of Health, IL*

*3 Hadassah Medical Center–The Hebrew University, IL*

*4 Israel Center for Disease Control, Ministry of Health; University of Haifa, IL*

*5 Assuta Medical Center, Herzliya Medical Center, Ichilov Medical Center, Elisha Medical Center, Shamir Medical Center (Assaf Harofeh), Bnai Zion Medical Center, The Holy Family Hospital Medical Center, Carmel Medical Center, Hillel Yaffe Medical Center, Ha'emek Medical Center, IL*

**Background:** Very few studies have examined patients' quality of life (QOL) following various types of bariatric surgery. In June 2013 the Israel National Bariatric Surgery Registry was established. However, post-operation QOL information is not included in it.

**Study Question:** To study QOL of patients' post-bariatric surgery, with respect to socio-demographic factors, type of surgery, comorbidity and weight loss.

**Methods:** The study comprises two parts: a cross-sectional and a cohort study. The cross-sectional study includes patients who underwent Laparoscopic Sleeve Gastrectomy (LSG) surgery during September–November 2014, and patients awaiting primary bariatric surgery of any type in 2018–2019. Its main objective is to achieve information on QOL 4 years following LSG surgery. The cohort study includes patients who had completed questionnaires prior to surgery and who had agreed to be re-interviewed following surgery. This study component will allow us to compare pre- and post-surgery QOL of each patient. 146 patients post-LSG bariatric surgery were recruited for the pilot study. The main study sample includes 528 patients post LSG surgery and 600 patients awaiting surgery. The study utilizes the SF-36 Quality of Life questionnaire, the CES-D depression questionnaire, the BAROS questionnaire on QOL in bariatric surgery patients, a questionnaire on tolerance to food after bariatric surgery and other questions relating to demographic and medical information.

**Results:** 27 hospitals were authorized by the Ethics Committee to participate in the study. These hospitals started to recruit patients. Data collection software for patients' self-completion of questionnaires was programmed in four languages. In addition, a SAS program was built for data processing. Currently, we have recruited 90 participants for the cross-sectional component, and 89 participants for the cohort component.

**Conclusions:** The study will shed light on the factors predicting improved QOL following bariatric surgery, and its contribution to the health and well-being of many thousands of patients.

**Health Policy Implications:** The findings of this study will provide policy-makers with extensive data on patients undergoing bariatric surgery.

## THE IMPORTANCE OF THE VETERAN INSTITUTION OF TIPAT HALAV IN AN ERA OF TECHNOLOGICAL INNOVATION

Shiran Bord<sup>1</sup>, Carmit Satran<sup>1</sup>, Ella Berkovich<sup>1</sup>, Batya Madjar<sup>2</sup>

*1 The Max Stern Yezreel Valley College, IL*

*2 Ministry of Health, IL*

**Background:** The Israeli healthcare basket entitles women to regular prenatal care visits either at Tipat Halav stations or at health fund clinics. Assessment of the differences in health-promoting behaviors among pregnant and postpartum women, between these settings, has not been tested.

**Study Question:** Are there differences in women's health-promoting behaviors as a function of the prenatal care visit setting?

**Methods:** Cross-sectional study conducted among 850 women up to 9 months postpartum, who filled a self-reported questionnaire during their routine visit at Tipat Halav.

**Results:** About one-third of the participants (274 women, 32.2%) attended their prenatal care visits at Tipat Halav stations, and 576 women (67.8%) attended their prenatal care visits at other health settings. Younger, Arab, traditional/religious women with a lower education level and an average or lower than average income, were more likely to attend Tipat Halav stations for their prenatal care visits. Pregnancy surveillance at Tipat Halav was not directly predictive of health-promoting behaviors or health risk behaviors during pregnancy and postpartum but was associated with obtaining pregnancy-related information and with more positive attitudes toward health promoting behaviors during pregnancy. The women's attitudes and the extent of information they received during pregnancy, were predictors of women's health-promoting behaviors during pregnancy and postpartum.

**Conclusions:** Health promoting attitudes and obtaining information concerning health behaviors are of great importance in promoting women's health. The veteran public health institution of Tipat Halav contributes to the development of such attitudes and to broadening women's information level.

**Health Policy Implications:** Health professionals, who come in contact with pregnant women, should put an emphasis on the provision of information in the areas of health-promoting behaviors, even when these behaviors are not directly related to the clinical checkups. Integrating digital technology in Tipat Halav's practice may enhance women's access to information.

## UNDERESTIMATION OF BODY WEIGHT AMONG OVERWEIGHT AND OBESE ISRAELI YOUTH, 2015-2016 COMPARED TO 2003-2004

Michal Bromberg<sup>1</sup>, Rita Dichtiar<sup>2</sup>, Tal Shimony<sup>2</sup>, Lital Keinan Boker<sup>3</sup>

*1 Israel Center for Disease Control, Ministry of Health; Tel Aviv University, IL*

*2 Israel Center for Disease Control, Ministry of Health, IL*

*3 Israel Center for Disease Control, Ministry of Health; University of Haifa, IL*

**Background:** Underestimation of body weight among overweight and obese adolescents may impair their motivation to lose weight and raise their risk to chronic morbidity.

**Study Question:** To examine if the rise in overweight/obesity in the last decade was accompanied by changes in body perception and to characterize overweight/obese adolescents who underestimate their body weight.

**Methods:** School-based representative National Health and Nutrition Surveys were conducted in Israel in 2003-04 and 2015-16 among 7th-12th grade students. The students filled out a questionnaire, including socio-demographic details and dietary and health-related behaviors, and were measured for height and weight. Overweight/obesity was defined as age- and sex-adjusted body mass index (BMI) percentile of >85%. Underestimation of body weight was defined as body perception of "OK" or "too thin" among overweight/obese students. The differences in overweight/obese prevalence and underestimation between the surveys were calculated and overweight/obese students with weight underestimation were characterized by demographics and dietary habits.

**Results:** BMI was calculated for 5,647 and 4,640 students in the 2003-04 and 2015-16 surveys, respectively. Between 2003-04 and 2015-16 a significant rise in overweight/obesity prevalence was documented, from 24.5% to 32.6% among boys and from 19.6% to 29.3% among girls. Conversely, the percentage of overweight/obese students with weight underestimation also rose, from 62.2% to 74.3% among boys and from 44.3% to 61.1% among girls ( $p < 0.001$ ). In the 2015-16 survey, underestimation of weight among overweight/obese students was characterized by a high prevalence of boys, Arabs and lack of diet to lose/maintain weight.

**Conclusions:** The rise in overweight and obesity among Israeli youth in the last decade was not accompanied in a corresponding change in body perception and was associated with a decline in performing diet. This was especially prominent among boys and Arabs.

**Health Policy Implications:** Body misperception should be addressed in interventions aimed at losing weight among overweight/obese adolescents.

## FIRST OPEN MEDICAL RESEARCH PLATFORM

Yinon Brosh

*MK&M Research & Innovation Institute, IL*

**Background:** MKM Morris Kahn and Maccabi Institute for research and innovation was created with the goal of enhancing human healthcare by providing a platform to enable secure and anonymized access to medical data for advanced data-driven research in the fields of predictive analysis and personalized medicine.

**Study Question:** Enabling secure and fast access to Maccabi vast data records to enable big data research.

**Methods:** Using a set of platforms we allow secure access to a big data platform have an advanced semantic search platform that allows creating complicated data queries in a simple web-based interface the web-based interface and software enables researchers without data training to perform research on the vast amount of data that we hold. We also provide IT infrastructure and support for conducting big data studies.

**Results:** The institute started its activity late 2017, since then we have about 40 studies and more than 100 researchers working on our platform creating cutting edge research with great results.

**Conclusions:** This new innovative project is aimed to change the way we think and interact with data, allowing the latest advances in ML and technology to have an impact on the medical and healthcare industry, by setting free the power of data we hope to make major breakthroughs in healthcare all over the world.

**Health Policy Implications:** Studies using the data we provide will change the way we engage in healthcare using predictive analytics and personalized medicine, models and platforms are being created and implemented using the results of these studies.

## DO HEALTH CARE NEEDS INFLUENCE MOVING BETWEEN HMO'S? COMPARING HEALTH SERVICE UTILIZATION COSTS BETWEEN NEW AND EXISTING MEMBERS IN "MEUHEDET"

Nuriel Burak, Eyal Ariely, Liora Valinsky

*Meuhedet Health Services, IL*

**Background:** Israeli citizens can move between healthcare providers every quarter, without significant loss of benefits. Only a small proportion chose to do so, but there is fierce competition between health funds for every member. The reasons for moving are usually due to changes in life circumstances (marriage, change of domicile), dissatisfaction with a current health fund, and aggressive marketing including offers of special benefits, such as perinatal refunds.

**Study Question:** Do new members differ from current members in healthcare utilization costs, and can this indicate reasons for changing provider?

**Methods:** We analyzed costs of healthcare utilization - physician visits, outpatient visits, emergency and hospitalization for all members for the year 2017. We then compared between members who joined "Meuhedet" from 1/1/2015 to 1/1/2016. We also examined the costs separately for members with chronic illness, age, and gender.

**Results:** The proportion of members who incurred any cost (excluding medications and lab tests) was 78% in existing members and 75% in new members. When looking at the population as a whole there was no significant difference in cost. Among those aged 18-34, new members incurred 20% higher costs, both those with chronic illness and those without. Among females w/o chronic illness in this age group, costs were 58% higher for new members. This excess was similar for Jewish secular, Arab and Ultra-orthodox populations. New members aged 55-64 had the highest differences in costs - those with chronic illness 35% higher, in the Arab population 57% and in Ultra-orthodox Jews 180% higher. In this age group, those without chronic illness were 29% higher, and all relative costs were significantly higher for women.

**Conclusions:** Our findings indicate that health care utilization related to maternal care, and that related to older middle age may be associated with the choice to change healthcare provider.

**Health Policy Implications:** The government encourages competition among health funds. Understanding what motivates these moves will lead to better management of this competition.

## EFFICIENT AND FOCUSED MEDICAL RECORD REVIEW AS A QUALITY IMPROVEMENT TOOL

Nurit Cohen, Jacob Dreiherr, Jenia Lecht, Leah Cohen, Shlomi Codish

*Soroka University Medical Center, IL*

**Background:** Medical record review facilitates the quality of documentation in the medical record. This review is required by the Joint Commission International standards. In Soroka University Medical Center, the quality of the medical record was chosen as one of the priority areas for quality in 2018.

**Study Question:** To describe the tools used for medical record review.

**Methods:** A computer-generated report was implemented to assess the quality of documentation of several fields in the admission and discharge letters. Nursing directors of the department perform a monthly review of records. In 2018 we added a focused medical review tool with 20 items relating to important opportunities for improvement. Department heads performed a monthly review of the medical record and the results were entered into a web-based system for internal benchmarking. The data were presented by the departments as part of their annual review and work plan and in the quality, a committee headed by the Director General of the hospital.

**Results:** Computerized reports of medical record included 52,617 admissions in 2018. The rates of documentation of present illness, the examination of heart and lung, discussion and care plan were 99%, 79%, 88%, and 73%, respectively. In addition, 74,742 discharge letters were included in the report. The rates of documentation of admission course and discharge recommendations were 72% and 92%, respectively. 1,272 records were reviewed by nursing directors with a mean score of 97.2 and a score higher than 90 in 45/47 items (96%). Medical record review included 356 records with a mean score of 87.4 and a score higher than 90 in 11/20 items (55%).

**Conclusions:** Using a mainly electronic medical record facilitates computer-generated medical review combined with human review. The medical record review tool focuses on leadership's attention on issues requiring organization-wide improvement.

**Health Policy Implications:** An efficient and focused medical review is an important tool for improvement of documentation in the medical record.

## EARLY DETECTION OF DIABETIC RETINOPATHY: COMPARING THE USE OF A MOBILE UNIT FOR EYE EXAMINATION WITH THE STANDARD EYE CLINIC OF AN EYE DOCTOR IN AN URBAN LOCATION - SOUTHERN DISTRICT, MEUHEDET

Ruchama Cohen, Liora Valinsky, Arie Solomon, Fabienne Hershkowitz, Tzvia Kessel, Dimitri Rubinchik  
*Meuhedet Healthcare Services, IL*

**Background:** Diabetes Mellitus is the main risk factor for blindness. Diabetic retinopathy is one of the complications caused by untreated or uncontrolled disease. The World Health Organization (WHO) recommends an annual eye examination of a diabetic person.

The Association "LiroT", dedicated to fighting blindness, uses a mobile unit with the necessary equipment and an eye doctor to check isolated populations.

**Study Question:** To find out the benefit and efficiency of detecting early diabetic retinopathy using the mobile unit.

**Methods:** A retrospective analysis of the results of the eye examination during the period 2014–2016. The population examined by the mobile unit was compared with populations examined in urban locations. A prospective study was done during the period April–June 2016 using the mobile unit and questionnaires were performed.

**Results:** During the period 2014–2016, 475 people were examined (80% of invitees). In localities in which mobile ophthalmologic equipment was provided in 2015, there was an increase in eye examination compared to the previous year ( $p=0.002$ ). This increase was not observed in localities with a regular ophthalmologic clinic. In localities in which mobile ophthalmologic equipment was provided in 2015, there was an increase in the percentage of first time diagnosed retinopathy (from 2.9% in 2014 to 3.6% in 2015). The rate in localities with a regular ophthalmologic clinic remained stable (.1.3%).

Qualitative study: Quotes from the interviews among 30 patients: "I came to the check up because of my trust in the medical team and the fear from the complications"; "calling me to the mobile unit helps me in the personal treatment and the control of the diabetes"; "Meuhedet helps in the treatment, I feel that they remember me". The main reasons for the patients to treat diabetes are: to avoid complications, keeping their quality of life and health. The main difficulties are many checkups and maintaining a proper diet and exercise.

**Conclusions:** The use of a mobile unit to detect early diabetic retinopathy is an effective tool in the prevention of blindness.

**Health Policy Implications:** Mobile units have the potential to reduce inequality in health care by increasing access to preventive services.



## BUILDING BIG DATA FROM EXPERIENCE: A NEW MODEL FOR PREMS COLLECTION AND UTILISATION

Ilaria Corazza, Kendall Jamieson Gilmore, Manila Bonciani, Sabina De Rosis

*Sant'Anna School of Advanced Studies, Italy*

**Background:** Patient-reported experience measures (PREMs) can help the design and management of healthcare services, and inform policymaking. However, the experience is typically measured using standard closed-ended questions, collected only periodically and unsystematically. This dearth of data is particularly problematic in pediatric settings due to exacerbated information and power asymmetries.

**Study Question:** How can healthcare providers make use of new technologies and analytical techniques to enable the systematic and continuous collection and utilisation of pediatric PREMs?

**Methods:** This study describes the cases of Meyer Hospital (Florence) and Children's Clinical University Hospital (Riga) that, from December 2018, adopted a digital PREMs survey. The questionnaire was developed by hospital managers and physicians, collaborating with researchers from the MeS Laboratory – Sant'Anna School of Advanced Studies (Pisa). It consists of open-ended and closed-ended questions, some of which are adopted from the pediatric Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). It can be answered directly by adolescent patients or by caregivers and includes a section specifically addressed to children. The questionnaire is administered digitally upon discharge to all enrolled patients. A web platform collects, analyses and illustrates data in aggregate and anonymous form to hospital staff in real time.

**Results:** This study sets out the development of a new pediatric PREMs questionnaire, plus a digital and automatic survey administration and data reporting system.

**Conclusions:** This model has several features which may be of interest to clinicians and administrators and can be replicated elsewhere: notably, inclusion of narrative sections, enabling greater richness of information; differential access for different staff groups and researchers through an online platform, enabling prompt use of data and possibilities for action; dual implementation in two sites in different settings, enabling comparison and shared learning.

**Health Policy Implications:** This approach to PREMs can provide professionals at all levels in healthcare systems with a novel source of insight to support quality improvements.

## IMPLEMENTATION OF NURSES CASE MANAGER AT PUBLIC HOSPITAL TO IMPROVE THE CONTINUITY OF CARE WITHIN THE HOSPITAL AND ALONG WITH THE COMMUNITY MEDICAL AND SOCIAL SERVICES

Efrat Danino<sup>1</sup>, Reut Ron<sup>2</sup>

*1 Shamir Medical Center (Assaf Harofeh), IL*

*2 Assuta Medical Center, IL*

**Background:** The issue of the continuity of care within the hospital and community medicine and multidisciplinary services is increasing in the public discourse in the world and in Israel, with constant efforts to improve the treatment continuum for all patients in the hospital and especially for the patient who is hospitalized. The responsibility for clinical coordination, utilization of resources, development of a treatment program, and measurement of outcomes showed an improvement in the medical condition of many complex patients, and it was decided to implement this model in a public hospital that built in Israel, by nurses' case managers (NCM).

Nursing case management (NCM) has developed along with this trend mainly in the USA as one answer to improve cost and quality care for complex patients. Despite the research carried out over the last few decades and the widespread assimilation of NCM in the USA, NCM is not common in Israeli and European hospitals.

**Study Question:** Providing a quantitative and qualitative assessment and conclusions regarding beneficial and limiting factors affecting the process of NCM integration into the hospital.

**Methods:** A retrospective cohort study based on retrospective data from 60 patient's medical record at the hospital, combined with satisfaction questionnaires. The patients were classified by the multidisciplinary team during their hospitalization. And approximately one week after discharge, each patient hospitalized was asked to his satisfaction by interviewee.

**Results:** The satisfaction survey show that approximately 80% of the interviewees expressed high satisfaction of NCM in general and attention and attention to the needs of the patient in particular.

**Conclusions:** The integration process of the NCM team at the public hospital show that NCM is beneficial to the patient's path, especially within the hospital, enabling saving on hospitalization days and increasing patient satisfaction.

**Health Policy Implications:** The implementation process of the NCM in Public Hospital that provide a quantitative and qualitative assessment and conclusions regarding beneficial and limiting factors affecting the process of NCM integration into all hospitals.

## OVERLAPPING SPATIAL CLUSTERING OF HIGH SUGAR-SWEETENED BEVERAGE INTAKE AND BODY MASS INDEX IN GENEVA STATE, SWITZERLAND

David De Ridder<sup>1</sup>, Stéphane Joost<sup>2</sup>, Pedro Marques-Vidal<sup>3</sup>, Beatrice Bacchilega<sup>2</sup>, Jean-Marc Theler<sup>4</sup>, Jean-Michel Gaspoz<sup>4</sup>, Idris Guessous<sup>4</sup>

*1 University of Geneva, Switzerland*

*2 Ecole Polytechnique Fédérale de Lausanne, Switzerland*

*3 The Lausanne University Hospital in Lausanne, Switzerland*

*4 Geneva University Hospitals, Switzerland*

**Background:** Obesity and obesity-related diseases represent a major public health concern. Recent studies have substantiated the role of sugar-sweetened beverages (SSB) consumption in the development of these diseases. The fine identification of populations and areas in need for public health intervention remains challenging.

**Study Question:** This study aims to investigate the existence of spatial clustering of body mass index (BMI) and SSB intake frequency (SSB-IF), and their potential spatial overlap in adults of the state of Geneva using a fine-scale geospatial approach.

**Methods:** We used data on self-reported SSB-IF and measured BMI from residents aged between 20 and 74 years of the state of Geneva (Switzerland) that participated in the Bus Santé cross-sectional population-based study (n=15,423). Getis-Ord Gi spatial indices were used to identify spatial clusters of SSB intake frequency (SSB-IF) and body mass index (BMI) in unadjusted models and models adjusted for individual covariates (education level, gender, age, nationality, and the neighborhood-level median income).

**Results:** We identified clear spatial clustering of BMI and SSB-IF. 13.2% (n=2,034) of the participants were within clusters of high SSB-IF and 10.7% (n=1,651) were within clusters of low SSB-IF. We identified overlapping clusters of SSB-IF and BMI in specific areas where 11.1% (n= 1,719) of the participants resided. After adjustment, the identified clusters persisted and were only slightly attenuated indicating that additional neighborhood-level determinants influence the spatial distribution of SSB-IF and BMI.

**Conclusions:** A fine-scale spatial approach allows identifying specific populations and areas presenting higher SSB-IF and, for some areas, higher SSB-IF associated with higher BMI.

**Health Policy Implications:** These findings could guide policymakers to develop locally tailored data-driven interventions such as targeted prevention campaigns and pave the way for precision public health.

## ENVIRONMENTAL AND HEALTH EFFECTS OF THE LIVESTOCK INDUSTRY: RELATIONSHIP BETWEEN KNOWLEDGE, ATTITUDES, AND BEHAVIOR AMONG STUDENTS

Keren Dopelt<sup>1</sup>, Pnina Radon<sup>2</sup>

*1 Ben-Gurion University of the Negev, IL*

*2 Ashkelon Academic College, IL*

**Background:** The livestock industry has various destructive impacts on the environment, and therefore on health.

**Study Question:** To examine the level of knowledge and attitudes, and behavior of students on topics related to environmental and health effects caused by industrial animal food production.

**Methods:** In a cross-sectional quantitative-correlative study, 361 students were sampled at Ashkelon Academic College. Using an online questionnaire, they were asked about their demographic details, as well as their knowledge, attitudes, and behavior with respect to the damage caused to the environment and health by the livestock industry.

**Results:** Students have almost no knowledge about the environmental and health impact of the food they consume, their attitudes are moderately pro-environmental yet they are not strict about pro-environmental behavior. Students with higher levels of environmental knowledge demonstrated more pro-environmental attitudes and behavior; attitudes mediate the relationship between level of knowledge and behavior with respect to environmental and health effects caused by the livestock industry. In addition, participants that rear/reared animals and women demonstrated more pro-environmental attitudes and behavior.

**Conclusions:** There is an urgent need to find innovative ways to raise awareness of the environmental and health benefits of consuming plant products and organic products. Different initiatives around the world are now being promoted such as Meatless Monday, increasing awareness to nutritional values found in other products than livestock industry products and awareness campaigns.

**Health Policy Implications:** Decision makers must be aware of the damage caused by the livestock industry to health and to the environment. Discussion of the impacts of the livestock industry is fundamental due to aspects related to human nutrition and health as well as aspects related to the many damages caused by this industry to the environment, is needed. Future campaigns on environmental and health education should place emphasis on the environmental and health benefits of consuming plant-based foods and organic food.

## IS UNIVERSAL HEALTH COVERAGE IN MONGOLIA A DREAM? INEQUITIES IN HEALTH CARE UTILIZATION AMONG CHILDREN: A CASE IN POINT

Javkhlanbayar Dorjdagva<sup>1</sup>, Enkhjargal Batbaatar<sup>1</sup>, Bayarsaikhan Dorjsuren<sup>2</sup>,  
Jussi Kauhanen<sup>2</sup>

*1 University of Eastern Finland, Finland*

*2 WHO, Geneva, Switzerland*

**Background:** Ensuring equity in access to quality health care and providing financial protection for everyone starting from early childhood are key objectives of the Mongolian health system. Primary health care (PHC) funded by the state is free for everyone. In order to ensure equitable health care services at the higher-level hospitals, the government is responsible for the health insurance premium for all children. The aim of this paper is to evaluate income related-inequalities in health care utilization among the children in Mongolia.

**Study Question:** Do the current government policies ensure equitable health services to the children of Mongolia?

**Methods:** Data were derived from the Household Socio-Economic Survey 2012 conducted by the National Statistical Office of Mongolia. A total of 16,038 children aged between 0-18 were involved in the study. The Erreygers' concentration index was applied to measure inequality in health care service utilization (PHC center visit, outpatient care at secondary and tertiary level public hospitals, and private hospitals, as well as the total inpatient care).

**Results:** In 2012, 5.20% of the total children reported hospitalizations. About 2.21%, 0.77%, 0.99% and 0.27% of the participants visited PHC centers and used outpatient care at secondary and tertiary public hospitals and private hospitals, respectively.

The results show that the concentration indices for outpatient care at tertiary level public hospitals, private hospitals and the total inpatient care were significantly positive, indicating that these services concentrated among the children from the higher income households.

Pro-rich inequity was observed in the use of PHC centers and outpatient care at secondary level public hospitals, but those were not statistically significant.

**Conclusions:** Despite higher health needs, children from the lower income families are less likely to use health care services at all types and levels of providers. Subsidizing the health insurance premium and offering free PHC are not sufficient to ensure universal health coverage in Mongolia.

**Health Policy Implications:** Reducing indirect payments and non-financial barriers could be crucial for sustaining universal health coverage.

## USE THE DATA TO MAKE THE CHOICE: SELECTING THE BEST SMOKING CESSATION SERVICE FOR PEOPLE WITH SERIOUS MENTAL ILLNESS (SMI)

Jenny Dortal<sup>1</sup>, Yehuda Neumark<sup>2</sup>, Orit Stein Reisner<sup>1</sup>, Leon Grunhaus<sup>3</sup>,  
Ronit Nezry<sup>1</sup>, Tamar Alcalay<sup>1</sup>

*1 Maccabi Healthcare Services, IL*

*2 The Hebrew University of Jerusalem, IL*

*3 Mind Clinic, US*

**Background:** Between 50–80% of people with SMI are smokers, whilst smoking prevalence in the general community is 23%. The SMI population is more likely to be heavy smokers (23% vs 9%). However, their motivation to quit smoking is no lower than the general population. Maccabi Healthcare provides two services for smoking cessation: groups and a telephone Quitline. This study compared registration, participation, use of smoking cessation medications, and successful cessation rates between the two service types for SMI and non SMI members to determine if either service offered specific advantages over the other.

**Study Question:** Is there a difference in registration, participation, treatment completion, smoking cessation medication use and/or cessation rates between SMI and non-SMI populations and does the choice of smoking cessation service modify these differences?

**Methods:** Data was extracted from the Maccabi database for the years 2013–2017 for all 18+ ever-smokers: SMI status, other health and demographic variables, registration, participation, treatment completion, smoking cessation medication and smoking cessation outcome for both services.

**Results:** SMI ever smokers were 1.8 times more likely to register for smoking cessation services than non SMI ever smokers. However, non SMI smokers were more likely to commence treatment (OR:1.2), complete treatment (OR: 1.4) and quit than SMI ever smokers (OR:1.9). Ever smokers presenting to the Quitline were more likely to commence treatment, complete treatment and quit, irrespective of SMI status.

**Conclusions:** SMI smokers are more likely to seek smoking cessation services but less likely to successfully quit. Smoking cessation rates are higher for those presenting to the Quitline.

**Health Policy Implications:** Quitline services are not available in all HMO's in Israel today. These services should be expanded, given their added benefit to the general population and their use encouraged for the SMI population.

## INFORMATION MANAGEMENT TO CREATE ONGOING PHYSICIANS PROFESSIONAL PRACTICE EVALUATION

Jacob Dreier<sup>1</sup>, Jenia Lecht<sup>1</sup>, Keren Holzman<sup>2</sup>, Shlomi Codish<sup>1</sup>

*1 Soroka University Medical Center, IL*

*2 Formerly, Clalit Health Services, IL*

**Background:** Accreditation standards published by Joint Commission International (JCI) including a requirement for ongoing physicians' performance evaluation (behaviors, professional growth, and clinical results). Objective data, internal and external benchmarking are required.

**Study Question:** The goal of this project was to develop Information systems based on individual quality indicators for physicians, to augment and guide department chair evaluations.

**Methods:** Data sources for physician evaluation included electronic medical records, administrative systems, human resources SAP system, the Customer-Relationship Management system, academic affiliation and feedback from medical students. Each physician was evaluated for quality, patient experience, productivity (throughputs), complying with the training and academic achievements. Physicians were benchmarked against their peers and overall unit performance was added to the evaluation of unit heads. A target was set for each indicator, using either the national or organizational target, a target from the literature or the 75th percentile where a target could not be defined. An aggregate score was calculated for each physician based on the weighted average of all relevant indicators. Outliers with low performance were identified and feedback was sent to the medical leadership of the hospital.

**Results:** We defined 127 indicators: for quality (72), patient experience (8), patient throughputs (31), training (9) and academic achievements (7). Of quality indicators, 40 (55%) were related to documentation, 20 processed indicators (28%) and 12 (17%) were outcome indicators. The evaluation covered 56 heads of departments, 435 senior physicians and 342 residents (total: 833 physicians). Complete data for all fields were available for 59% of department heads, 78% of senior physicians, and 94% of residents - in total, 694 physicians (83%).

**Conclusions:** Information management tools can greatly augment physician professional performance evaluation.

**Health Policy Implications:** Availability of this objective data can guide and direct evaluations that previously relied heavily on subjective assessment.

## SKIN CANCER SCREENING IN SWITZERLAND: CROSS-SECTIONAL TRENDS (1997-2012) IN SOCIOECONOMIC INEQUALITIES

Shireen Dumont<sup>1</sup>, Stéphane Cullati<sup>2</sup>, Christine Bouchardy<sup>3</sup>, Orly Manor<sup>4</sup>,  
Delphine S. Courvoisier<sup>2</sup>, Rastine Merat<sup>5</sup>, Idris Guessous<sup>5</sup>

*1 Hôpital de la Tour, Switzerland*

*2 University of Geneva and Division of Quality of Care, Switzerland*

*3 University of Geneva, Switzerland*

*4 The Hebrew University-Hadassah, IL*

*5 Geneva University Hospitals, Switzerland*

**Background:** Skin cancer is one of the most common malignancies and its incidence has increased worldwide. Despite the controversy over its efficacy, skin cancer screening has become widespread. Important socioeconomic screening inequalities have been documented. Switzerland has the highest rate of melanoma in Europe but Swiss trends in skin cancer screening and social disparities have not been investigated.

**Study Question:** This study aims to evaluate trends in skin cancer screening and its association with socioeconomic indicators in Switzerland between 1997 and 2012.

**Methods:** We used data from four waves (from 1997–2012) of the population-based Swiss Health Interview Survey. Multivariable Poisson regressions with robust variance were used to estimate weighted prevalence ratio (PR) and 95% Confidence Intervals (CI) adjusting for demographics, health status and use of healthcare.

**Results:** This study included 60764 participants with a mean age of 49.1 years (standard deviation (SD) 17.2) and 53.6% of women. Between 1997 and 2012, the weighted prevalence of ever lifetime skin examination and skin examination in the current year increased by 38.2% and 35.3% respectively (p-value <0.001). Participants with a lower education level, lower income and living in non-metropolitan areas were less often screened than their counterparts. Educational differences in ever lifetime skin examination increased over time (p-value for trend = 0.036).

**Conclusions:** While skin cancer screening prevalence in Switzerland increased from 1997 to 2012, most social inequalities remained stable over time, except educational inequalities which increased. Dermatologists should be alerted that uneducated populations should be given special attention.

**Health Policy Implications:** These findings highlight the need for tailored interventions to increase access to skin cancer screening and awareness of its benefits, particularly among individuals with lower socioeconomic status.



## UNDERSTANDING COMMUNITY HEALTHCARE PROVIDER PERCEPTIONS ON ANTIMICROBIAL RESISTANCE

Moriah Ellen<sup>1</sup>, Ruth Shach<sup>2</sup>, Saritte Perlman<sup>1</sup>

*1 Ben-Gurion University of the Negev, IL*

*2 Saint Louis University, US*

**Background:** Antimicrobial resistance (AMR) is a threat to global health, making previously curable diseases disabling or incurable. Human misuse of antimicrobials exacerbates the issue. As stewards to the public and prescribers of antimicrobials, healthcare providers are vital to reducing AMR, thus, their perceptions and experiences around the issue must be explored.

**Study Question:** Our objective is to understand the experiences of two types of central community HCPs, nurses and physicians, regarding AMR, more specifically its causes, ways to address it, and barriers to addressing AMR.

**Methods:** In-depth, semi-structured interviews were conducted with a convenience sample of family physicians and community nurses in Jerusalem and the surrounding area. Interviews were recorded, transcribed, anonymized, and thematically analyzed.

**Results:** Overall, participants expressed that both environmental and human causes at various levels contribute to AMR. Participants also reflected on factors they felt stem or may stem AMR if implemented, including guidelines, patient and provider education, top-down and bottom-up initiatives. Identified barriers included patient demands, physician pressures and fears, and systemic overworking of physicians.

**Conclusions:** While most themes were discussed by both HCP groups, nurses more frequently brought up patient causes and patient education than physicians. Our study demonstrated numerous factors underpinning AMR and many barriers to addressing it, hence a multifaceted approach is required. This work also offers insight into how different groups can be utilized or will react to interventions.

**Health Policy Implications:** The threat of AMR transcends boundaries and in order to build capacity for global health action there is a need to examine local issues in a regional and global context. By understanding the realities of HCPs working on the ground in different health systems around the world, we can begin to find contrasts and, more importantly, commonalities in the way that the issue is perceived and acted upon by those who regularly see AMR in their practice.

## THE LONG-TERM CONSEQUENCES OF 35 YEARS OF TERROR ATTACKS IN ISRAEL: MEDICAL AND NON- MEDICAL COSTS, DISABILITY

Eytan Ellenberg<sup>1</sup>, Zvia Bar-on, Ishay Ostfeld, Mark Taragin

*National Insurance Institute of Israel, IL*

**Background:** Terrorism is a major threat which requires operative preparedness, principally for the emergency structures. Similarly, its rising impact on the healthcare system should interest the researchers in health affairs and policy.

**Study Question:** The number and the nature of disabilities due to terror is insufficiently addressed in the civilian population. In this article, we described the type and number of disabilities in Israel due to war and terror attacks since 1980.

**Methods:** Descriptive analyses of the NII civilian victim of terror database which embraces medical and social information including the number and severity of disabilities and their nonmedical costs (disability pensions) since 1980; the related medical costs (based on hospital and ambulatory invoices) and their principal ICD 9 diagnoses and comparison to the data coming from the START database.

**Results:** There was a surge in the number of disabilities following the years of the second Intifada 2000–2006. Although the number of wounded decreased after the end of the Second Intifada, the number of disabled stayed high due to their ongoing care. The costs of disability pensions grew in parallel to the number of disabled and approached 140 M US\$ for 2016.

**Conclusions:** The different waves of terror attacks have an awful legacy as 4000 disabled who are supported today by the State of Israel. Because of the unique way Israel is tracking and following the victims, including the number of disabled and their attendant social and medical costs we can assess the broad impact of terrorism in Israel.

**Health Policy Implications:** It is interesting to note that when a country supports the victims of terror with an efficient system and dedicated means and resources, the social (non-medical) costs are far more significant than the medical costs.

## A NATIONWIDE POLICY PROJECT TO PROMOTE CONSUMPTION OF HEALTHY NUTRITION IN ISRAEL

Ronit Endevelt, Siegal Sadetzki, Itamar Grotto, Udi Kaliner

*Ministry of Health, IL*

**Background:** The increase in the world's population is expected to lead to a radical increase in food production. Extensive production of food raises a challenge of huge innovation processes. The downside of this production is the ultra-processed food that replaces healthy natural products. This may be associated with microbiota changes, may cause obesity and chronic diseases such as Cancer and Diabetes. To ensure the supply of healthy food, there is a need for a nationwide guidelines regulation and means of enforcement on a national level. Nutritionists are the leading professionals to promote this process, with the collaboration of other sectors such as physicians and food technologists, mediate the regulations to the public.

**Study Question:** How to create national nutrition guidelines that contribute to health, while maintaining sustainability, and equality. How to design methods for implementation and dissemination of the new guidelines.

### **Methods:**

1. Establishment of evidence-based nutritional guidelines of a scientific committee.
2. Agreement on regulatory steps to improve the food environment through a committee lead by the Ministry of Health with the participation of stakeholders from many Ministries, the industry, scientists, physicians and nutritionists.
3. Creation of regulations covering various topics that assist to implement the nutritional guidelines in all areas.

**Results:** The Ministry of Health set a few agreements and regulations with the stakeholders:

1. The industry agreed on front of pack labeling and reformulation of packaged foods.
2. The Ministry of agriculture with the ministry of health is formulating the strategic plan of food in Israel.
3. An equality healthy food basket is built with the collaboration of the Ministry of Economics.
4. The Ministry of Education set regulations over healthy food at the lunch program and Kiosks and nutrition education following the Ministry of Health guidelines.

**Conclusions:** The Israeli nutritional guidelines are being published and implemented in all many areas to improve the food environment and eating behavior for better health.

## THE MORE YOU GET - THE MORE YOU GIVE: THE CORRELATION BETWEEN ORGAN DONATION AND PUBLIC SOCIAL EXPENSES

Esti Engelchin-Nissan, Yaakov Naparstek, Ester Katz

*Ramat Gan Academic College, IL*

**Background:** Due to the constant shortage of organs but to an increase in need, many researchers from different countries have tried to estimate the various variables that can predict an individual's willingness to donate.

**Study Question:** The purpose of the study is to examine whether there is a correlation between the willingness to donate an organ or blood, and the degree of the society's investment in the welfare and health of its members in the OECD countries.

**Methods:** All the data were statistically processed in the SPSS software in Version 24. Pearson correlations were calculated, and relationship modeling was performed using hierarchical linear regression tests in the Stepwise method.

**Results:** Positive correlation was shown between a gap in the Gini index and expenditure on health and willingness to donate organs from the deceased. A similar ratio shows that the greater the gap in the Gini index, i.e. the state imposes a higher level of progressive tax, so the willingness to donate organs from the deceased increases and vice versa. Two other significant but negative correlations were found between the Gini index after tax and the willingness to donate organs from the deceased and between the expenditure from the pocket for health and the willingness to donate organs from the deceased.

**Conclusions:** Since all countries are constantly looking for ways to increase the number of organ donors for transplants, both in legislation and in other ways, this study shows that it is also possible to assist in this lofty goal through economic policy.

**Health Policy Implications:** In our opinion, in the budgetary considerations of the distribution of resources among the different sectors of the population, decision-makers and opinion makers in the economy should take into account that narrowing economic gaps can also lead to narrowing the gaps between supply and demand regarding organ donation, thereby increasing the welfare and the health of the country's residents.

## GUIDELINES AND (NON) COMPLIANCE IN THE TREATMENT OF LOW BACK PAIN PATIENTS IN ISRAEL

Sheera Epstein-Sher, Amir Shmueli

*The Hebrew University of Jerusalem, IL*

**Background:** Low back pain (LBP) is a major public health problem worldwide and has been estimated to cost 2% of the gross domestic product in developed countries. Studies have shown that there is overuse, exposure to excess radiation, and inappropriate care being provided by primary care physicians (PCPs). In 2007, Israeli LBP guidelines were disseminated with the aim of reducing inappropriate care and costs.

**Study Question:** Did the introduction of the LBP guidelines in 2007 cause a change in the patterns and cost of LBP treatment in Israel?

**Methods:** We compared the use of services and the cost of LBP care in the two leading Israeli health plans, before the dissemination (2006) and after (2009 and 2012).

Analysis of variance and regression models were used to estimate the effect of the change on use and cost.

**Results:** Note: At present, only Clalit Health Services results are available. By September, Maccabi Healthcare Services will also be available.

The mean number of x-ray imaging rose from 0.079 in 2006 to 0.261 in 2009 and to 0.229 in 2012 ( $p < 0.05$ ). The mean number of anti-depressants dispensed rose from 0.618 in 2006, to 0.695 in 2009, and to 0.741 in 2012 ( $p < 0.05$ ). The mean number of nonsteroidal anti-inflammatory drugs dispensed decreased from 2.260 in 2006, to 2.135 in 2009, and to 2.088 in 2012 ( $p < 0.05$ ). The mean number of visits to orthopedists decreased from 1.041 in 2006 to 1.001 in 2009, and to 0.917 in 2012 ( $p < 0.05$ ). The total mean LBP utilization cost per LBP patient rose when comparing both 2006 to 2009 (mean difference: 60.13 nis) and 2006 to 2012 (mean difference: 35.99 nis).

**Conclusions:** Our results show that PCPs continue to provide LBP treatments which are inconsistent with guidelines and thus inappropriate and not cost-effective.

**Health Policy Implications:** Incentives to PCP might prove more effective.

## CLINICAL CHARACTERISTICS AND OUTCOME OF ELDERLY PATIENTS ADMITTED FOR ACUTE CHOLECYSTITIS TO MEDICAL OR SURGICAL DEPARTMENTS

Itamar Feldman, Dvora Shapiro, Lena Feldman, Gabriel Munter, Amos M.

Yinnon, Reuven Friedmann

*Shaare Zedek Medical Center, IL*

**Background:** Acute cholecystitis is a common clinical condition. Even though cholecystectomy is the definitive treatment, in many instances, conservative treatment is both feasible and safe. In our hospital, it is not uncommon to encounter elderly patients with acute cholecystitis in medical and acute geriatric wards.

**Study Question:** Which is the most appropriate admissions' practice for elderly patients with acute cholecystitis, medical or surgical departments?

**Methods:** A retrospective review of all patients >65 years of age admitted for acute cholecystitis during a 7-year period.

**Results:** A total of 187 patients were detected, 54 (29%) in medical and 133 (71%) in surgical wards. The mean age ( $\pm$ SD) of the patients was  $80\pm 7.5$  and was higher among those in medical than surgical departments ( $84\pm 7$  versus  $79\pm 7$ ) ( $p < 0.05$ ). Patients hospitalized in medical wards had more comorbidity, disability and mental impairment. However, there was no difference in mortality between the two groups, 1 (2%) and 6 (4%) respectively. Independent predictors for hospitalization in medical departments were COPD (OR=9.8, 95% C.I 1.6-59) and the Norton Scale score (NSS; OR=0.7, 95% C.I 0.7-0.8). The impaired mental condition was the only predictor for hospitalization for more than 1 week. The strongest predictor for having cholecystostomy was admission to the surgical department (OR=14.7, 95% C.I 3.9-56.7). Linear regression showed a negative correlation between NSS and length of hospitalization (LOH; Beta=-0.5), for patients with NSS<17 the mean LOH was lower in the medical group.

**Conclusions:** Elderly patients with acute cholecystitis who require conservative management, especially those with severe functional and mental impairment, can be safely hospitalized in medical wards.

**Health Policy Implications:** Our findings suggest a new policy regarding the hospitalization of elderly patients with acute cholecystitis. Medical departments may be an appropriate site for the management of such patients- for their own benefit as well as that of the surgical department.

## OBESITY-RELATED CHRONIC MORBIDITY AND ESTIMATED ANNUAL COST BURDEN: HEAT MAP ANALYSIS OF ELECTRONIC HEALTH RECORD DATABASE AS AN INNOVATIVE TOOL FOR POLICY MAKERS

Becca Feldman<sup>1</sup>, Orna Reges<sup>2</sup>, Morton Leibowitz<sup>1</sup>, Dror Dicker<sup>3</sup>, Nick Finer<sup>4</sup>, Christiane Lundegaard Haase<sup>4</sup>, Maya Leventer-Roberts<sup>1</sup>

*1 Clalit Research Institute, IL*

*2 Clalit Health Services, IL; Clalit Research Institute, IL*

*3 Hasharon Hospital, Rabin Medical Center, IL*

*4 Novo Nordisk A/S, Søborg, Denmark*

**Background:** The prevalence of obesity and its complications pose a large burden on the individual and health care systems worldwide. We present detailed heat maps describing the distribution of healthcare cost burden across different segments of the population as an innovative tool allowing policymakers to identify sub-populations for targeted interventions.

**Study Question:** Based on BMI groupings, age, and sex, which subgroups have the highest co-morbidities and costs?

**Methods:** This cross-sectional study uses population-based electronic medical record data from Clalit Health Systems, the largest payer-provider health fund in Israel. The population included individuals aged  $\geq 25$  years as of 01/01/2014. Two heat maps depicted a novel approach presenting a) body system-related morbidity (BSRM) prevalence and b) total annual cost burden for the year 2015 both across strata of BMI group (healthy weight, overweight, Class I obesity, Class II obesity, and class III obesity) sex, and age (25-29, 30-39, 40-49, 50-59, 60-69,  $\geq 70$ ).

**Results:** Among 1,756,791 adults, 65% had an elevated BMI ( $BMI > 25 \text{ kg/m}^2$ ). Heat map analysis demonstrated a higher multi-BSRM ( $> 2$  body-system related morbidities) prevalence and relative estimated annual cost burden among males and females across all obesity classes relative to the non-obese in all age groups. There was a notably higher multi-BSRM prevalence among both young men and women aged 25 to 29 (26% and 30%, respectively) with class III obesity compared to those with BMI  $18.5\text{--}25 \text{ kg/m}^2$  (5% and 9%, respectively). Healthcare costs were 1.72 times higher among men aged 25-29 with class III obesity and 2.75 times among women aged 25-29 with class III obesity compared to those of healthy weight.

**Conclusions:** The detailed analysis demonstrates the distribution of burdens across BMI groups, age, and sex and identifies target sub-populations.

**Health Policy Implications:** This study presents the spectrum of morbidity and cost data for reviewing obesity-related health care presented by heat maps and can serve as an innovative tool for policymakers for targeted interventions.

## MULTIDISCIPLINARITY TO ADDRESS PUBLIC HEALTH ISSUES IN DRUG SAFETY

Irene Fermon<sup>1</sup>, Herve Le Louet<sup>2</sup>, Matatiahou Berkovitch<sup>3</sup>, Peter Pitts<sup>4</sup>, Ronald Litman<sup>5</sup>, Guila Lion<sup>6</sup>, Ophir Lavon<sup>7</sup>

*1 ISOP ISRAEL, The Israeli Chapter of the International Society of Pharmacovigilance, IL*

*2 CIOMS, France*

*3 Shamir Medical Center (Assaf Harofe), IL*

*4 Center for Medicine in the Public Interest, US*

*5 ISMP, US*

*6 Maayaney Haheshua Medical Centre, IL*

*7 Carmel Medical Centre, IL*

**Background:** Adverse drug reactions remain the 4<sup>th</sup> to the 5<sup>th</sup> cause of death in the US and Europe, an increasing trend with population aging. Cost reaches \$136 billion annually (USA). Anticoagulants are the most frequent medications involved in emergency admissions. Why does healthcare systems lag after aeronautics or nuclear plant where risk is managed in a multidisciplinary approach? ISOP ISRAEL has designed a new multidisciplinary strategy to address this issue and chose anticoagulants as a case study.

**Study Question:** Objectives

- to prove the feasibility and efficiency of our strategy to decrease the risks of the anticoagulant.
- to extend it at the national level and to other high-risk medications.

**Methods:** ISOP ISRAEL gathers and combines tools:

- ISMP (US Institute for Safe Medications Practices) Self-Assessment for antithrombotic therapy® which, led by a hospital multidisciplinary team, allows to identify weaknesses in the whole treatment process and therefore to implement Corrective Actions.
- My eReport®, Mobile Application to report Adverse Drug Reactions.
- BeMedWise campaign “Talk before you Take” an FDA funded organization dedicated to patient education.
- Real world data collection and AI (Artificial Intelligence) analysis tools to identify Adverse Reactions.
- AI-based personalized prescription.

Two projects are currently fully or partly displaying this strategy:

- Maayaney Hayeshua Medical Centre and Carmel Medical Centre: Implemented and translated several tools with a multidisciplinary team.
- Superpharm, a chain of community pharmacies: pharmacists have been trained and advise each patient under anticoagulants.



**Results:** Results will be presented at the International Symposium 360 of DRUG SAFETY, 3-4 June 2019; it will present multidisciplinary solutions for preventing medication errors, initiatives on anticoagulants, opioids, pregnancy, polypharmacy and a range of start-ups providing AI tools.

**Conclusions:** Thanks to its HMOs databases and organization and its Risk Management culture, Israel has the technical and scientific resources to build a unique system to improve drug safety.

**Health Policy Implications:** Up to 77% of the Adverse Drug Reactions can be avoided. Any initiative to decrease them has public health in lives and cost.

## PREVENTING HOSPITAL READMISSIONS: HEALTHCARE PROVIDER PERSPECTIVES ON "IMPACTIBILITY" BEYOND EHR 30-DAY READMISSION RISK PREDICTION

Natalie Flaks-Manov<sup>1</sup>, Einav Srulovici<sup>2</sup>, Rina Yahalom<sup>1</sup>, Henia Peri-Mazra<sup>1</sup>, Ran Balicer<sup>3</sup>, Efrat Shadmi<sup>2</sup>

*1 Clalit Research Institute, IL*

*2 University of Haifa, IL*

*3 Ben-Gurion University of the Negev, IL*

**Background:** Electronic health record's (EHR) predictive models are extensively used to identify patients at high-risk for 30-day readmission, yet, their ability to accurately detect patients who could benefit from inclusion in prevention interventions, also termed "impactibility", is yet to be realized.

**Study Question:** We aimed to explore provider perspectives about patient characteristics that are associated with decisions regarding which patients should be referred to readmission prevention programs (RPPs), beyond an EHR 30-day readmission prediction risk score (PREADM).

**Methods:** Our study employed a multi-source mixed method design, combining EHR data with nurses' and physicians' self-reported surveys. Between May 2016 and June 2017, surveys from 15 internal medicine units of three general Clalit Health Services hospitals in Israel were performed. A patient's referral to an RPP was the dependent variable. We performed a decision tree analysis to identify characteristics to be considered deciding whether a patient should be included in an RPP.

**Results:** A total of 817 questionnaires were collected on 435 patients. PREADM score and RPP inclusion were congruent in 65% of patients, whereas 19% (n=70) had a high PREADM score but were not referred to a RPP and 16% (n=59) had a low PREADM score but were referred to a RPP. The decision tree analysis identified five patient characteristics that were of the highest importance regarding referral to an RPP: high readmission score; eligibility to be referred to a nursing home; any of patient's condition not under control; need for support of social services; and need for special equipment at home.

**Conclusions:** Our study provides empirical evidence for the partial congruence between classifications of a high PREADM score and impactibility.

**Health Policy Implications:** The findings emphasize that EHR data should be combined with information from healthcare providers on patients' characteristics, which can allow for better selection of patients to be included in RPPs.

## INFLUENZA SURVEILLANCE IN HOSPITALIZED PATIENTS: UTILIZATION OF DIGITAL ALERT AND ELECTRONIC DATA

Aharona Freedman

*Ministry of Health, IL*

**Background:** Influenza causes significant morbidity and mortality every year. While there is a well-established community influenza surveillance system, information regarding the impact of the disease among hospitalized patients is lacking. The World Health Organization recommended establishing hospital surveillance systems that rely on data obtained from patients who fulfill the case definition of Severe Acute Respiratory Infection (SARI).

**Study Question:** To assess the usefulness of digital alert and electronic medical data for influenza surveillance among hospitalized patients during the 2017–2018 influenza season.

**Methods:** Five Internal Medicine and four Pediatric departments in the Sheba and Rambam Medical Centers, participated in this pilot study. A digital screen alert was designed to appear at the end of each new hospital admission. This alert instructed medical personnel to fill a short questionnaire, designed to identify patients fulfilling the case-definition of SARI in real-time, and to obtain a sample for respiratory viruses. Medical record data and laboratory data were then integrated and an epidemiological curve was generated and updated weekly. The data obtained during the 2017–2018 season was correlated with the community-based influenza surveillance system using Pearson correlation and a linear regression model.

**Results:** During the 2017–2018 influenza season the electronic questionnaire was filled by departmental medical teams for 84.4% –100% and 69.3–100% new admissions weekly at Rambam and Sheba Medical Centers, respectively. For new admissions with unfilled questionnaires on admission, data was completed by designated influenza coordinators. The epidemiological curve generated by integrating data of SARI patients followed a clear seasonal pattern. A correlation of 0.9 and adjusted r-squared of 0.9 was found between hospital and community data.

**Conclusions:** The use of digital alert and integration of electronic medical record and laboratory data were valuable for influenza surveillance in hospitalized patients.

**Health Policy Implications:** Extending the system to other medical centers is recommended.

## PRO (PATIENT REPORTED OUTCOMES) IMPLEMENTATION AT SHEBA MEDICAL CENTER

Alex Galper, Ora Shamai-Rosler, Varda Stanger, Eyal Zimlichman

*Sheba Academic Medical Center, IL*

**Background:** Patient-reported outcomes measure patients' views of their health-related quality of life as received directly from the patient. With the increasing interest and usage of PRO's in the world, Sheba Medical Center is the pioneer in the field in Israel, since 2015, looking at the potential value in PRO implementation in routine practice as a quality improvement and decision support tool together with the opportunity to drive changes in healthcare delivery.

**Study Question:** Feasibility of PRO collection and reporting platform at Sheba Academic Medical Center.

**Methods:** A comprehensive process, initiated by department leading clinician and involving multidisciplinary staff, results in a tool set build up and department implementation. The tool set used to gather the PRO data from patients in various methods, on specific periods, processed and presented in an easy to read format in the EMR.

**Results:** Program continues growth from three to over fifty areas in various implementation stages doubled the number of questionnaires collected and patients enrolled between 2018 (5,784 questionnaires, 3,475 patients) and 2017 (2,542, 1,815) and more than tripled in relation to 2016 (1,729, 479). The increased use of the patient portal had a significant impact and involved 11% of all complete tool sets and 30% of the follow-up questionnaires.

**Conclusions:** Program expansion shows success in increasing number of patients and fields enrolled. In order to scale up to include large target populations, a better use of electronic mass data collection methods is required.

**Health Policy Implications:** Basic usage of a patient generated report in a clinical practice during patient-physician encounter provides insights on the ongoing patient journey that can help focus all parties on the patient status, goals and progress.

Combining patient centered care with data driven care and other EMR existing data can be used to create and measure outcome benchmarking as well as construct patient predictive tools to make informative treatment decisions and to perform as a clinical decision support tool for both patients and clinicians.

## CLINICAL OUTCOMES, QOL AND COSTS ANALYSES OF TELEMEDICINE APPLICATION IN LOWER EXTREMITIES ULCERS TREATMENT

Alexander Gamus, Varda Shalev, Gabriel Chodick

*Maccabi Healthcare Services, IL*

**Background:** The estimated annual prevalence of the foot and leg ulcers in Israel, where the prevalence of diabetes mellitus (DM) is estimated at 8.4 %, up to 15% of DM patients may develop diabetic foot ulcers. Providing medical services to Lower Extremities Ulcers (LEU) patients in geographically remote regions is a growing concern in healthcare systems. Telemedicine (TM) has been suggested to be a potential solution to this problem.

**Study Question:** The study aimed at assessing the clinical effectiveness, cost-effectiveness, and quality of life (QoL) of TM application.

**Methods:** The research was conducted at Maccabi Healthcare Services, a 2.2 million-member sick fund in Israel, and performed during Jan 1st, 2013 - Jun 31st, 2017 period. Both TM and face-to-face modalities were implemented using identical treatment settings with the same nurse at each location. The same specialist supervised patients in each modality.

**Results:** A total of 650 cases (nTM=277, nFTF=373) with 5,203 visits. Comparable ( $P=0.475$ ) proportions of healed ulcers (52% in TM vs. 55% in FTF) were detected. Survival analyses found a non-significant advantage of TM (0.887; 0.650-1.212) compared to FTF. A total of 83 TM and 94 FTF patients' questionnaires included in the QoL trial. The mean quality-of-life in TM was  $0.546(\pm 0.249)$  compared to an FTF cohort with  $0.507(\pm 0.238)$ ,  $p=0.291$ . The cost-per-patient in TM, compared to FTF, was 7% higher; however, with similar quantities of TM and FTF patients, the cost in TM becomes lower. The alternative of FTF-only treatment demonstrated higher direct cost-per-patient by 30%.

**Conclusions:** Synchronous video-conferencing based TM may be a feasible and efficient method of LEU management.

**Health Policy Implications:** The Costs and Benefits study brings new evidence of cost per patient to a LEU treatment domain with little previous research.

## OCCUPATIONAL STRAIN AND JOB SATISFACTION: CAN WORK RESOURCES MODERATE THE CHALLENGE OF WORK DEMANDS

Mohamad Ghanayem, Cheryl Zlotnick, Einav Srulovici

*University of Haifa, IL*

**Background:** The healthcare system continues to undergo changes that result in greater work demands on the nursing profession, and these demands can result in adverse outcomes such as occupational strain. However, demands may be moderated by work resources, such as autonomy and support, which in turn, can improve nurses' job satisfaction. Efforts to reduce demands and increase resources can produce positive clinical, professional, and economic implications.

**Study Question:** Can work resources reduce occupational strain, and in turn job satisfaction, regardless of work demands?

**Methods:** This cross-sectional study design examined surveys from nurses (n=85) working on six hemodialysis units.

**Results:** Under low workload levels, there was no association between autonomy and occupational strain, but under high workload levels, high levels of autonomy were associated with low levels of occupational strain. Additionally, the lowest levels of occupational strain were found when the workload was low and social support was high. Nevertheless, occupational strain levels were higher when both workload levels and social support levels were higher. Finally, there was no association between occupational strain and job satisfaction in the presence of all other variables.

**Conclusions:** In a period where nurses are compelled to work in high demand environments, strengthening the nurse's autonomy can reduce occupational strain. However, head nurses should note the paradox that at high workload levels, nurses with high social support are those who suffer from high occupational strain.

**Health Policy Implications:** Promoting greater autonomy for nurses can be a first step towards creating high quality and safe work environment. Additionally, providing these nurses with other sources of support will help them cope with the workload and occupational strain. This can reduce the number of nurses that leave the profession and increase the quality of care, which in turn will decrease the financial costs for the health organization.

## CONSULTATION, SURVEILLANCE, MONITORING AND INTENSIVE CARE (COSMIC): A NOVEL FOUR-TIER PROGRAM TO IDENTIFY AND MONITOR HIGH-RISK OBSTETRIC PATIENTS FROM THE CLINIC TO CRITICAL CARE

Yehuda Ginosar<sup>1</sup>, Thomas T. Klumpner<sup>2</sup>, Walter Boyle<sup>3</sup>, Ellen M. Lockhart<sup>3</sup>

*1 Hadassah-Hebrew University Medical Center, IL*

*2 University of Michigan Medical School, Ann Arbor, US*

*3 Barnes Jewish Hospital, Washington University St Louis, US*

**Background:** We describe a novel, four-tiered approach to high-risk obstetric care including electronic surveillance to aid the identification of early clinical deterioration, and telemedicine maternal monitoring in obstetric units, supervised by a remote intensive care team.

**Study Question:** To assess the feasibility and cost-benefit ratio of the described COSMIC paradigm.

**Methods:** COSMIC is an acrostic for: 1. Consultation: Maternal diagnostic criteria that trigger automatic referral for antenatal anesthetic/multidisciplinary planning. 2. Surveillance: Electronic screening for maternal deterioration in the in-hospital obstetric population, using AlertWatch-OBTM for both a census population overview and views of selected individual patients. Data are derived from manually-entered nursing data, continuous monitoring data and laboratory data. Deviations from pre-programmed limits automatically trigger team-specific, automatic, early-warning alerts. 3. Monitoring: Remote, high-fidelity, ICU telemedicine to monitor known high-risk obstetric patients in the labor unit with bedside care by an ICU-trained OB nurse, and ICU-level monitoring and vasopressors if needed, with oversight by remote ICU telemedicine with 2-way video communication. Intensive Care: Formal ICU admission is reserved for those obstetric patients who require intubation, mechanical ventilation or aggressive hemodynamic or other intensive therapy.

**Results:** The COSMIC study is in its feasibility stage.

**Conclusions:** High risk obstetrics requires rational allocation of healthcare resources. COSMIC incorporates both low-tech (consultation) and high-tech (surveillance and monitoring) components in a four-tier paradigm for managing high-risk pregnancy.

**Health Policy Implications:** COSMIC aims to improve identification of risk factors, provide early-warning for deterioration, and additional vigilance for high-risk patients not currently severe enough for ICU. For most patients currently referred to ICU, COSMIC provides ICU facilities at the bedside in the labor unit. COSMIC provides opportunities for medical outsourcing. The expenditures in automated surveillance and remote telemonitoring may be offset by savings from reducing ICU referrals and the revenue from providing outsourcing services. It is likely that the realities will change from institution to institution.

## DIGITAL PILL - ETHICAL ASPECTS OF DRUG INNOVATION

Orit Golan, Gila Yakov

*The Max Stern Academic College of Yezreel Valley, IL*

**Background:** In 2017 the Food and Drug Administration (FDA) approved a Digital Pill (DP) technology for psychiatric patients. This pill, embedded with a sensor, provides doctors with data relevant to the patient's medication compliance. This approval marks a significant advance in the growing field of digital devices designed to monitor medicine-taking and to address the longstanding problem of patient compliance. Patients taking the digital medication sign consent forms allowing physicians and family members to receive electronic data tracking their medication compliance.

**Study Question:** What are the ethical aspects of implementing DP-technology?

**Methods:** Theoretical study.

**Results:** DP-technology might have a significant impact of the on the physician-patient covenant which is currently practiced in precise time and location dimensions, primarily during the time of an appointment in the physician's clinic. As a result of this continuous monitoring, are physicians obligated to be continuously available and responsive to the patient's behaviors and condition? Does the data, which is generated continuously, create a new medical responsibility?

**Conclusions:** On the one hand, DP can greatly benefit many groups of patients, especially patients who struggle with compliance. Promotion of public health tracking and efficiency will be measured by the consistency of drug taking. Moreover, monitoring chronic patients protects society in cases that taking the drug is critical. On the other hand, important ethical questions arise: Who is responsible for taking the DP? What are the doctor's duties? What are the implications for health insurance? What are the implications for altering the place and time framing of doctor-patient relationship?

**Health Policy Implications:** We claim that DP-technology is a disruptive technology with direct impacts on the current ethical and legal patient-doctor relationship. New policies and safety standards must be established before DP-technologies are widely introduced into the market.



## "VIRTUAL" IS A REALITY: VIDEO CONFERENCE WITH PRIMARY CARE PHYSICIANS

Avivit Golan Cohen, Eugene Merzon, Izhar Laufer, Shlomo Vinker

*Leumit Health Services, IL*

**Background:** Health care delivery is moving outside traditional settings of physician offices into online synchronous video conference also known as "virtual" visits. Studies have shown that telehealth increases patients' satisfaction and expand their access to medical care. Furthermore, "virtual visits" improve health outcomes reducing ER visits and hospitalizations. Nevertheless, the willingness of primary care physicians (PCPs) to implement this service is lower than expected, because of concerns about the quality of care harms, and workloads that will be difficult to manage.

Leumit Health Services conducted a pilot study providing the patient an opportunity to choose between a regular and a "virtual" visit. After about 1,000 visits, all 22 PCPs who participated in the pilot were interviewed about the quality of care and coping with the workloads.

**Study Question:** What are the PCPs attitudes regarding the ability to provide quality and efficient medical services through "virtual" visits?

**Methods:** A qualitative study that used personal interviews. The questionnaires included seven open-ended, semi-structured questions accepted in similar studies.

**Results:** The PCPs who participated in the pilot found that most patients chose video appointment in cases that are appropriate for a "virtual" visit. They also found that the "virtual" visits optimize the treatment of emergency cases, the monitoring of chronic illness and the management of self-referrals to secondary care, as well as it opens up new opportunities in monitoring patients discharged from hospitalizations. "Virtual" visits found to be shorter than the regular frontal visits and they reduced the workloads because there was a protected time to respond to patients' requests instead of handling it by phone calls and correspondence with patients that until then occurred beyond work hours.

**Conclusions:** Understanding physicians' attitudes toward "virtual" visits helps to remove their barrier and to increase their confidence.

**Health Policy Implications:** Effective implementation will ensure a basis to improve the quality of telecare.

## MORTALITY AND MORBIDITY IN EVER HOSPITALIZED DIABETICS FROM CAUSE OF DEATH DATA

Nehama F. Goldberger, Ethel-Sherry Gordon, Ziona Haklai

*Ministry of Health, IL*

**Background:** Data on medical outcomes for diabetics is important to direct interventions and treatments improving their health, and measure the effectiveness of current care.

**Study Question:** What rates of diabetes as underlying cause of death (UC) and diabetes or other comorbid diseases mentioned among multiple causes (MC) have been recorded over the last decade, in previously hospitalized diabetics.

**Methods:** Patients hospitalized until 2016 with diabetes listed as a diagnosis were identified from the national hospitalization database and followed up for mortality between 2007 and 2016, aged 45+. Their age-standardized mortality ratio (SMR) for MC was calculated by year compared to non-diabetics. A logistic model was built to assess the risk of the diabetic group for multiple mention of leading death causes, controlling for age, sex, number of hospitalizations in the 5 years prior to death and death year.

**Results:** In 2016 there were approximately 300,000 people in the diabetic group. Diabetes decreased as UC and MC in the diabetic group between 2007 and 2016, from 17% to 12% of deaths as UC and from 47% to 32% as MC.

The SMR for total deaths of the diabetic group compared to controls was 2.2 and was significantly high for most leading UCs and MCs, especially liver and kidney disease and septicemia. The logistic model showed a significantly higher risk for mention of kidney disease, hypertension, heart diseases, cerebrovascular disease, septicemia and liver disease, odds ratios between 1.5 and 1.2.

**Conclusions:** People hospitalized with a diagnosis of diabetes were found to have a significantly higher risk of death and mention of many leading causes.

**Health Policy Implications:** It is not clear whether the decreasing occurrence of diabetes as UC and mention as MC over the study period is due to changes in coding practice of physicians completing the death certificate, or hopefully, better treatment of diabetics leading to less diabetes-related deaths.

## LONG TERM IMPACT FROM INNOVATIONS IN NATIONAL HEALTH SYSTEMS: THE CASES OF BRAZIL AND ISRAEL

Fabio Gomes

*Brazilian Chamber of Deputies, Brazil*

**Background:** Brazil and Israel are very distinct countries, but both are young multiparty democracies, which adopted universal health systems (UHS) in the late twentieth century.

**Study Question:** The study presents a comparison between the institutions that constitute the UHS of Israel and Brazil, considering the socio-economic context and the health results obtained by the two countries.

**Methods:** The study discusses the characteristics of each health system and compares the evolution of health indicators (on mortality, morbidity, risk factors, health actions, health resources, and health expenditures), from the late 1990's up to 2018. The data were obtained from the World Bank and the Organization for Economic Co-operation and Development.

**Results:** The tables with health indicators of both countries are available on: [https://github.com/DataBrazil/Health\\_Brazil\\_Israel/blob/master/Health%20Indicators%20Br\\_Is\\_2018.pdf](https://github.com/DataBrazil/Health_Brazil_Israel/blob/master/Health%20Indicators%20Br_Is_2018.pdf). Generally, the context by the time the health reforms began was already much more favorable for Israel and, currently, the level of advances are still superior to the one of Brazil. However, Brazil has achieved significant results (such as controlling malnutrition and reducing infant mortality) and, in some cases, more favorable data than Israel, such as smoking control and care for people with HIV/AIDS.

**Conclusions:** It is perceived that the Israeli system, which is concerned about achieving greater equity, could benefit from the observation of the successful experiences of the Brazilian system, to avoid the erosion of universality. The Brazilian system, in turn, could benefit from the reflection on strengths observed in the Israeli system, mainly the efficient planning and management of health services.

**Health Policy Implications:** The results of such studies can be used to support proposals for improvements of UHS, even in countries of varying degrees of economic development.

## PROMOTING EDUCATION AND COMMUNICATION SKILLS AMONG PEDIATRIC NURSING STAFF TO IMPROVE EDUCATION FOR PATIENTS AND THEIR FAMILY

Anat Gonen, Tsipi Srur, Eti Guedj, Michal Leder, Jacob Dreisher

*Soroka University Medical Center, IL*

**Background:** Being a pediatric nurse coordinator includes the coordination between several caregivers. The ability to identify high-risk situations and patient-suffering and to prevent them is a major challenge for this role.

**Study Question:** To facilitate pediatric nursing knowledge, skills and abilities to educate children and their families by using "round table" meetings, and to evaluate the improvement of this intervention.

**Methods:** Twelve Patients education "round table" meetings were performed. A total of 93 nurses participated in those meetings, ten in each. We created an intimate and supporting environment to allow the flow of information, sharing of knowledge and personal experience, using authentic examples from the clinical field. Emphasis was given on education techniques and using specific communication skills with children and their main caregivers.

**Results:** Most participants were women (n=87, 94%). A third of the nurses were under the age of 30, and with less than one year of professional experience. About two-thirds of the nurses were born in Israel and had an academic degree. Most nurses (83%) reported experiencing patients and family's dissatisfaction with the education they received. The difference was found in reports of difficulties in patient education among nurses with less than one year of experienced (41%) and nurses with longer experience (75%) ( $p < 0.05$ ). All nurses but one believed that patient education is an effective tool in problem-solving. There was a 99% consensus regarding the importance of this issue and the relevancy of content to their clinical work. All nurses but one found their participation in the meeting to be very important.

**Conclusions:** "Round-table" meeting are a useful and effective way to promote patient education, especially in pediatric nursing.

**Health Policy Implications:** Such training should be expanded to other medical fields and perhaps other health care professions and included as part of the training of newly hired nurses.

## REPEAT HOSPITALIZATIONS AMONG DIABETICS - IS THEIR RATE HIGHER THAN OTHERS?

Ethel-Sherry Gordon, Ziona Haklai

*Ministry of Health, IL*

**Background:** There are half a million diabetics in Israel, a number that has increased in recent years. How can this population be best cared for in the community to reduce hospitalizations?

**Study Question:** To check repeat hospitalization rate and its risk factors for diabetics compared to the general population.

**Methods:** This study is based on diagnoses in acute care hospitals reported to the Ministry of Health national hospitalization database. We checked the number of hospitalizations and repeat hospitalizations of patients with a diabetes diagnosis in this hospitalization or during the previous 5 years. A multivariate analysis was run to predict repeat hospitalization controlling for age, sex, health fund and diabetic status.

**Results:** In 2017 there were 197,000 hospitalizations of diabetic patients, the majority (88%) aged 55 and over, 69% aged 65 and over, and 41% aged 75 and over. One-fourth of nonmaternal acute hospitalizations were of diabetics, 40% of those aged 65 and over. The proportion with repeat hospitalizations was high for diabetics, 9% in 7 days, and 21% in 30 days, twice that of non-diabetics, 5% and 11%, respectively. Multivariate analysis showed that the odds ratio for repeat hospitalization for diabetics versus nondiabetics was 1.6, controlling for age, sex and health fund. The risk for repeat hospitalization increased with age, 2.3 times higher at age 85 and over compared to 45–54, and 1.1 times higher in males compared to females. Members of Meuhedet and Maccabi health funds were at a lower risk for repeat hospitalization compared to those of Clalit (OR = 0.9).

**Conclusions:** Rate of hospitalizations and repeat hospitalizations amongst diabetics is substantially higher among diabetics than non-diabetics.

**Health Policy Implications:** Increased attention should be given to following diabetic patients in the community, in particular, the elder population, to reduce their hospitalizations and repeat hospitalizations.

## LESSONS LEARNED FROM AN EVALUATION OF REFERRALS TO THE EMERGENCY DEPARTMENT

Roe Gorodetzer

*Jerusalem College of Technology, IL*

**Background:** The reasons for emergency department (ED) overcrowding are distributed between input, throughput, and output factors. Although patients may arrive on their own, many prefer to receive a referral from a primary care provider (PCP) or urgent care center (UCC).

**Study Question:** The study goal is to analyze these referrals to the Shaare Zedek Medical Center (SZMC) in order to improve the input process by determining which are considered unjustified.

**Methods:** This is a retrospective cohort study of patients who were referred by either the TEREM UCC or a Primary Care Physician (PCP) to the General Emergency Department of the SZMC from January through December 2017. The first 166 patients of each month were sampled. The data was analyzed for diagnoses, specialist consultations, and examinations that are presently not necessarily available by the PCP or in the UCC (ultrasound, CT, echocardiogram or stress test). Only these referrals were considered justified. The data was collected into an excel spreadsheet and was analyzed by SPSS.

**Results:** A total of 1,992 medical charts were reviewed - 1,712 referred from the PCP and 280 from the UCC. A higher percentage of patients had unjustified visits who were referred from the HMO as compared to the UCC (13.9 vs. 7.9%,  $p=0.005$ ). Most patients were seen by a physician working in the emergency department (45.1%) but many were seen directly by a specialist. The most common specialty referrals were for general surgeons, obstetricians/gynecologists, or orthopedists.

**Conclusions:** In this study, the majority of referrals to the ED were justified, although more so from the UCC than the PCP. This is significantly more than previously published from other countries and may be due to a robust system of urgent care centers.

**Health Policy Implications:** This data may help health care systems reduce unnecessary referrals to the ED.

## GIS - A POWERFUL PREDICTIVE TOOL FOR POLICY MAKING REGARDING DEMANDS FOR PHYSIOTHERAPY

Ditza Gottlieb, Itzhak Katzir, Benjamin Braustein, Daniel Deutscher,  
Zamir Shemer, Yafit Ben Ami, Yossi Rokni, Neomi Sigal  
*Maccabi Health Services, IL*

**Background:** In reality of chronic lack of resources at the healthcare system, innovative models for services planning is necessary. Physiotherapy (PT) services in Maccabi healthcare services (MHS) suffer from high demands that meet shortage of physiotherapist's clinical hours thus, long waiting list.

A good planning for spreading the PT services will improve availability and patient's satisfaction.

Geographic Information System (GIS) provides data based model taking into account relevant parameters such as: demographic, health related and city programming.

This model will enable us to plan today's and future demands for PT services.

**Study Question:** Optimization of PT services planning at the present and up to 5 years ahead.

**Methods:** Statistical models reflecting the current PT services spreading was calculated. Data of demographics, visits, clinical available hours, doctor referrals, was collected from MHS information systems. Data regarding cities planning for residence and commercial purposes was collected from municipalities' websites. Model was validated quantitatively comparing the results from the model with real life data. Furthermore, the results of the model were validated qualitatively by the district physiotherapy managers.

**Results:** The country was distributed to 100 large area cells (cites) and also to 700 smaller area cells (neighborhoods).

All data was presented on maps and can be analyzed using the numerical values. Using the model we identified areas in which the current demand for PT services was either adequate, or deficient. Furthermore, we can predict using the model, changes in the demands for PT services in 2 and 5 years ahead, and to plan accordingly new clinics and human resources.

**Conclusions:** The GIS model for PT services enables managers to optimize resources allocation and future developments.

**Health Policy Implications:** For medical services of high volume and due to shortage in resources GIS models are a powerful tool for data based decision making.

## PATIENTS' PERCEPTIONS OF DOCTORS USING SMARTPHONES DURING MEDICAL ENCOUNTERS

Amit Gur<sup>1</sup>, Yaron Ariel<sup>1</sup>, Eilat Chen Levy<sup>2</sup>

*1 The Max Stern Academic College of Yezreel Valley, IL*

*2 Ben-Gurion University of the Negev, IL*

**Background:** Interference that occurs during the patient–doctor encounter could have a negative effect on the patient’s perception of service. Research shows that using digital technology that mediates between a doctor and a patient could negatively affect the medical service–quality. The increased prevalence of smartphones in our lives, including in the workplace, raises the question of how patients perceive this use of the smartphone by doctors. While previous studies have examined the use of smartphones among doctors, as far as we noticed from the literature, none have examined this phenomenon from the patient’s point–of–view.

**Study Question:** Does the use of smartphones by doctors during doctor–patient encounters may be perceived by the patients as an interruption and affect their perceptions of service quality and satisfaction?

**Methods:** Through an online survey, 356 participants were asked to refer to one encounter with a doctor over the previous year, in which the latter had used a smartphone. The participants were then asked whether this had bothered them and if they justify it. They were also asked about the service that they received and their satisfaction from it.

**Results:** When a doctor is using the smartphone during a medical encounter, patients perceived it as an interruption. Among patients who had witnessed an active or passive use, the relationships to perceived service quality and patient satisfaction revealed as negative. However, when patients distinguish between justified and unjustified use, it appears that only use for normal personal purposes is negatively related to the quality of service and satisfaction of the patient.

**Conclusions:** Patients are concerned about the use of smartphones during a medical meeting. However, when interpreting the situation as justified, the perception of service and satisfaction will not be affected.

**Health Policy Implications:** Healthcare organizations should be aware of the implications of doctors using smartphones during their work, and should address this issue in patient relationship management.



## HOW TO ENCOURAGE PEOPLE TO CONSIDER PREPARING THEIR ADVANCED DIRECTIVES FOR END-OF-LIFE SITUATIONS: VIEWS OF PROFESSIONALS AND OF MEMBERS OF THE PUBLIC WHO PREPARED THEIR DIRECTIVES

Nurit Guttman<sup>1</sup>, Shai Lavi<sup>2</sup>, Naama Appel Doron<sup>1</sup>, Shir Hadar<sup>1</sup>

<sup>1</sup> Tel Aviv University, IL

<sup>2</sup> Tel Aviv University; The Van Leer Institute, IL

**Background:** By Law, individuals have the right to decide on the medical treatments they receive in end-of-life situations and to prepare advance directives [AD] for situations when they cannot express their wishes. Despite AD's importance to realize treatment preferences, prevent unnecessary treatments and reduce dilemmas facing medical staff and family members, most people do not prepare them. This is attributed to barriers such as limited knowledge, reluctance to deal with death, the medical-legalistic language of the forms, and misconceptions regarding palliative care.

**Study Question:** What barriers in the healthcare system hinder AD promotion? Which appeals, from the perspective of those who have prepared AD, might help encourage members of the public?

**Methods:** Two groups of participants were interviewed (91 total): (1) healthcare professionals (medicine, nursing, social work), bioethicists, legal advisors, staff of non-profit organizations related to end-of-life issues, professionals working to promote AD in public settings (senior homes, clinics etc.) (2) individuals who prepared AD, most from the general public (39 total).

**Results:** Barriers hindering healthcare staff from promoting AD include: lack of training, ignorance of the Law, personal anxieties to discuss difficult issues, the belief that this is not their area. Positive examples of medical practitioners who have overcome them were identified. Factors that help motivate/encourage people to prepare AD are related to personal stories of situations, such as needing to make a decision for a close relative without knowing his/her preference, witnessing situations of conflict in families and concern to avoid burdening others with making a difficult decision.

**Conclusions:** It is possible to identify opportunities in the healthcare system for eliciting and discussing the right to AD in situations not related to serious illness, including in primary care settings and in crossroads in one's life, and to provide practitioners incentives. Public communication campaigns on AD should include personal stories and reasons related to avoiding situations of regret.

**Health Policy Implications:** Findings have implications for developing resources and procedures in the healthcare system, training of professionals and publicizing the right to the public.

## CLINICAL PHARMACIST INTERVENTIONS TO DECREASE MEDICATION ERRORS IN MACCABI

Shiri Guy-Alfandary, Yael Topol, Hanoch Zizamsky, Yossi Lomnicky

*Maccabi Health Services, IL*

**Background:** Medication errors and adverse events are a major cause of harm. In March 2017, the World Health Organization (WHO) announced its third global patient safety challenge, which aims to reduce the global burden of iatrogenic medication-related harm by 50% within five years. Accordingly MHS (Maccabi Healthcare Services) initiated a range of actions involving clinical pharmacists, aimed at reducing medication errors and improving safety and quality of drug therapy.

**Study Question:** What is the effect of clinical pharmacist interventions on reducing drug errors?

**Methods:** We used the MHS computerized system to identify 4 populations at high risk for a drug error:

Patients treated long-term with high amiodarone dose (>200 mg/day).

Patients treated with direct oral anticoagulant (DOAC) and concomitant use of a strong CYP3A4/P-glycoprotein inducer.

Diabetic patients aged  $\geq 75$  with HBA1C < 6 mg/dL treated with insulin and/or sulfonylurea.

Elderly patients with non-valvular atrial fibrillation treated with a standard dosage of DOAC despite requiring dose reduction.

Clinical pharmacists brought the identified potential for the medical error to the attention of primary physicians and recommended considering a therapeutic change.

**Results:** We identified 874 patients with a potential for these drug errors: 216 patients with suspected amiodarone overdose, 160 patients with DOAC and CYP3A4 / P-gp inducer combination, 414 elderly patients with high risk for hypoglycemia and 84 elderly patients with high risk for bleeding. Dose reduction or treatment alteration was achieved in 60% (527 patients) of this target group.

**Conclusions:** Our findings emphasize the importance of using computerized system to identify high risk populations who can strongly benefit from clinical pharmacist interventions.

**Health Policy Implication:** Actively involving clinical pharmacists in medication-use processes has an important role in patient safety and rational use of drugs.

## HEALTH EXPENDITURE IN ACUTE CARE PUBLIC HOSPITALS: A COMPARISON BETWEEN SERVICES IN INTERNAL MEDICINE AND SURGICAL DEPARTMENTS

Ziona Haklai, Ethel-Sherry Gordon

*Ministry of Health, IL*

**Background:** Acute care hospitalizations in Israel represent one-third of national health expenditure, as in the OECD countries. But the bed occupancy rate is higher than the OECD average, and it is highest in the Internal Medicine departments (IMD).

**Study Question:** Examine the distribution of expenditure for inpatients in the IMD compared with surgical departments (SD).

**Methods:** The research focuses on non-maternity public acute care hospitalizations in Israel as reported to the Ministry of Health. Expenditure was calculated according to tariffs reported for each hospitalization to the Ministry of Health (MoH) and applying the published prices for these tariffs. We calculated the expenditure for a selection of diseases/services for each type of department.

**Results:** In 2016, the quasi price per case with acute myocardial infraction was 16,500 shekel, angina pectoris 13,500, heart failure 11,000, cholelithiasis 12,500, pneumonia 11,000, COPD 10,000 and acute bronchiolitis 9,000 shekel. The quasi price per case in SD is higher, for example for knee replacement was 42,000 shekel, hip replacement 54,000, CABG 83,000, PTCA 44,000, discectomy 47,000, hysterectomy 18,000, colorectal resection 53,000, thyroidectomy 18,500 and open prostatectomy was 23,000 shekel.

**Conclusions:** The quasi price per case in the IMD is typically much lower than cases in the SD.

**Health Policy Implications:** Expenditures in the SD are mainly determined by DRG tariffs based on the procedures, while the expenditures in the IMD are usually on a per diem basis. Introducing tariffs in the IMD based on disease and age may reduce the overcrowding in the IMD. Alternative treatment methods in the community/home could reduce hospital expenditure.

## ALLOCATION OF RESOURCES AMONG MEDICAL FIELDS IN UPDATING THE ISRAELI 'HEALTH BASKET', IS THERE A 'CANCER PREMIUM'?

Ariel Hammerman<sup>1</sup>, Noa Triki<sup>2</sup>, Tal Morginstin<sup>3</sup>, Baruch Weinreb<sup>4</sup>

*1 Clalit Health Services, IL*

*2 Maccabi Healthcare Services, IL*

*3 Ministry of Health, IL*

*4 Ben-Gurion University of the Negev, IL*

**Background:** The Israeli 'Health Basket' is updated annually according to a government allocated budget. The budget allocated is far from being sufficient to keep up with the ever-growing demands of the healthcare arena, which makes priority setting inevitable. Among health interventions, the cost of cancer treatment has been receiving increased public attention, mainly because of the hardship and short life expectancy associated with the disease and the high cost of the newly developed anti-cancer drugs.

**Study Question:** We attempted to assess how the resources allocated for updating the Health Basket were distributed by the 'Basket Updating Committee', between the different medical fields in the last two decades, and whether oncology treatment might be receiving a 'cancer premium'.

**Methods:** Data was collected from MoH publications regarding the annual Health Basket updates. Budgets were figured in 2019 values.

**Results:** During 1998-2019, resources for new health technologies in the 'Health Basket' were allocated to 32 different clinical fields. The therapeutic areas that received the highest budget allocation were: Oncology (33.45%) (Solid tumours (22.49%) and Hemato-oncology (10.96%)), Gastroenterology (7.13%), Diabetes (6.65%), Cardiology (6.59%), Neurology (6.09%), Rare diseases (5.76%) and Pulmonology (3.27%).

**Conclusions:** We have found that in Israel, a third of all resources allocated for new health technologies, were dedicated to cancer treatment, mostly solid tumours. Other diseases received significantly smaller amounts.

**Health Policy Implications:** The access to new expensive anticancer drugs is of concern to patients, decision-makers and the general public. Many reimbursement agencies, such as NICE in England, are still debating whether to place a higher value on end-of-life cancer care. It seems that at least de-facto, decision-makers in Israel have already accepted that cancer treatment deserves a special premium and that patients in Israel should have access to the effective cancer treatments, taking into account the necessity of declining funding for other diseases.

## FROM A REACTIVE TO PROACTIVE APPROACH: PHARMACOVIGILANCE AND RISK MANAGEMENT DEPARTMENT IN ISRAEL IS EVOLVING AND IMPLEMENTING RISK MANAGEMENT PLANS

Michal Hirsch-Vexberg, Einat Gorelik, Eli Marom

*Ministry of Health, IL*

**Background:** When marketing authorization is granted for a new medicinal product, data on its safety profile is limited and mainly based on clinical studies. Hence, it is essential to continue monitoring and characterizing safety data throughout the products life cycle and determining the appropriate measures that could minimize the risks and ensure optimal benefit-risk balance.

Over the last few years, the Pharmacovigilance department of the Israeli Ministry of Health has advanced from a reactive to the proactive approach of risk management, by implementing risk management plan (RMP) tool. RMP is a key regulatory tool for characterization, assessment and minimization of risks, associated with the use of a medicinal product.

In addition, guidelines for RMP submission to the Pharmacovigilance department were published in March 2016.

**Study Question:** Has the RMP tool, been successfully implemented by the Pharmacovigilance department?

**Methods:** A review and characterization of all RMPs and educational materials submitted to the Pharmacovigilance department from January 2016 to December 2018.

**Results:** Out of 200 plans submitted to the Pharmacovigilance department until 12/2018, 114 plans were approved for implementation in Israel. These 114 plans include 91 plans for new molecules, 7- biosimilar products and 5- advanced therapies. The main risk minimization measures were: educational cards and brochures - in Hebrew, Arabic, English and Russian (46), special training for the medical staff (5), control access programs (5) patient registry (2) and special follow-up (10). Sixteen plans address the potential risk to the fetus.

**Conclusions:** Until December 2018, RMP tool has been successfully implemented, resulting in 114 marketed medicinal products with an RMP as part of their marketing authorization.

**Health Policy Implications:** Risk management plan intends to minimize risks and hence, contribute to an optimal benefit-risk balance. The Pharmacovigilance department will continue to evaluate and implement such plans for additional drugs in order to improve the safety of drug therapy in Israel.

## THE ASSOCIATION BETWEEN PERSON REPORTED MENTAL HEALTH OUTCOMES AND PHYSICAL HEALTH

Limor Hochman<sup>1</sup>, Galia Moran<sup>1</sup>, Marc Gelcopf<sup>2</sup>, David Roe<sup>2</sup>, Efrat Shadmi<sup>2</sup>

*1 Ben-Gurion University of the Negev, IL*

*2 University of Haifa, IL*

**Background:** Compared to the general population, persons with serious mental illness are at increased risk for chronic comorbidities, deterioration in overall health and mortality. While data on person reported outcome measures (PROMs) is increasingly collected as part of psychiatric rehabilitation service recipients, its relation to physical health outcomes is not known.

**Study Question:** What is the relationship between patient-reported outcomes (PROM) (quality of life and the effect of symptoms on functioning) and future self-reported physical health?

**Methods:** This is a prospective cohort study of secondary data analysis from the National Psychiatric Rehabilitation Outcome Monitoring Implementation and Research Program (PR-PROM) in Israel, based on 2,581 rehabilitation service consumers' self-reports administered at two subsequent years.

**Results:** More than a third of the participants reported having physical health problems which impaired their functioning. Age, sex, marital status, employment, quality of life index, functioning index and the lack of effect of symptoms on functioning index were all found to be strongly correlated with self-reported physical health in the following year. A logistic regression model showed a significant relationship between the quality of life index (odds ratio [OR]= 0.71; 95% confidence interval [CI]: 0.60-0.84) and the lack of effect of symptoms on functioning index (OR= 0.81; 95%CI: 0.74-0.89) (year 1) and suffering from physical health problems (year 2), controlling for all other factors, including physical health at baseline.

**Conclusions:** These results suggest that PROMs can be useful as an early screening tool for people with mental illness at risk of physical health deterioration and an opportunity to direct them in a timely manner to preventive intervention programs.

**Health Policy Implications:** This research emphasizes the need for prioritizing the physical health of mental health patients, investing resources to maintain their quality of life and providing them with a health-promoting environment. The results of the study also may offer PROMs as an implementation tool to use by the rehabilitation services, as they are already routinely monitoring the outcome measurements.

## PROLONGED MECHANICAL VENTILATION: HOME HOSPITAL OR HOSPITAL LONG TERM CARE?

Jeremy Jacobs<sup>1</sup>, Esther-Lee Marcus<sup>2</sup>, Jochanan Stessman<sup>1</sup>

*1 Clalit Health services; Hadassah University Hospital, IL*

*2 Herzog Hospital, IL*

**Background:** The number of patients requiring prolonged mechanical ventilation (PMV) is increasing, and advancing technology supports ventilators easily used in both hospital long term care (HLTC) as well as at home. Data comparing PMV at home to HLTC are lacking, and accordingly policy decisions concerning the place of care remain unclear.

**Study Question:** What differences characterize PMV patients treated at home compared to HLTC, according to sociodemography, indications for PMV, comorbidities, symptom control, caregiver-burden, and costs.

**Methods:** A descriptive observational study of "Clalit Health Fund" subjects in Jerusalem. Data collection by direct interview using a structured questionnaire.

**Results:** Among 120 PMV patients, more Home patients (40/46) were alert and communicative compared to HLTC patients (22/74). They were younger, suffered more degenerative muscle/nerve disease compared to more cerebrovascular disease, post-resuscitation/sepsis/shock among HLTC patients, who also experienced increased comorbidity, pressure sores and mortality. Both Home and HLTC patients reported similarly low levels of shortness of breath, anxiety, and drowsiness. The majority (119/120) were without "Advanced Directives" when initially ventilated. When asked how they would choose today concerning PMV, 85% of communicative patients and 75% of caregivers of patients' unable answer, would choose again PMV. Caregiver self-reported burden was lower at Home. Costs to the Health Fund for PMV at home were one-third of HLTC costs (approx. 15,000 NIS/Month vs. 45,000 NIS/Month).

**Conclusions:** Home PMV patients tended to be younger, suffer more degenerative illnesses, less comorbidity, with lower caregiver burden, reduced mortality, and substantially lower costs to the Health Fund compared to HLTC. Irrespective of setting, PMV patients reported few distressing symptoms, and would again opt for interventional PMV, if necessary.

**Health Policy Implications:** Our findings suggest with appropriate targeting of suitable PMV patients, the delivery of care within the model of Home Hospital is to be encouraged.

## ONLINE OUTREACH: CAREGIVER SUPPORT IN THE DIGITAL ERA

Osnat Karni, Tzvia Kessel

*Meuhedet Health Services, IL*

**Background:** Caregivers in the community are at risk of developing physical and emotional problems as a result of ongoing pressure associated with caring for a disabled family member. We can reduce risk by providing professional support, but caregivers have difficulty in accessing available community care.

**Study Question:** Is virtual support a feasible and effective solution for family caregivers in the community?

**Methods:** We established a virtual meeting space for family members caring for disabled elderly in the home. We conducted proactive marketing of the group through healthcare providers and through our internet site. We established a group consisting of two spouses and three daughters of the disabled elderly. The intervention consisted of seven online weekly meetings, facilitated by a social worker, and one-time sessions with a geriatric specialist and a nurse. We evaluated the intervention using The Zarit Caregiver Burden Interview questionnaire and the SF-12 Quality of Life questionnaire.

**Results:** Participants reported that the format allowed them to control their degree of exposure (they could move away from the camera if distressed), and gave them an opportunity to ventilate without going out. As the sessions progressed emotional involvement increased, and the feeling of loneliness decreased. Questionnaire analysis demonstrated an increase in self-efficacy and their feeling of control over their lives, a decrease in stress when caring for their loved one, and an improvement in their perception of their own health.

**Conclusions:** Online support for caregivers in the community appears to be an effective format for the improvement of caregiver coping and quality of life. Participant recruitment was challenging, and we need to develop better recruitment methods.

**Health Policy Implications:** Digital technology represents an opportunity for developing innovative behavioral interventions for populations that find it hard to leave home, and applies to people of all ages.



## SOCIO-DEMOGRAPHIC CHARACTERISTICS OF ISRAELI YOUNG ADULTS WHO SMOKE HOOKAH

Dolev Karolinsky, Michal Bromberg

*Ministry of Health, IL*

**Background:** Recent studies demonstrated an increase in hookah smoking around the world. Similarly, to cigarettes smoking, hookah smoking is a significant risk factor for chronic morbidities, such as cardiovascular and respiratory diseases and cancer. However, hookah smoking is commonly misperceived as carrying a lower risk for tobacco-related diseases than cigarettes smoking.

**Study Question:** (1) What are the rates of hookah smoking among Israeli young adults (by population group and gender)?

(2) Are socio-demographic characteristics associated with hookah smoking among the Israeli young adults?

**Methods:** A telephone survey was conducted during 2017 using a random representative sample of the Israeli adult population, including 1,168 young adults (aged 21-44). Individuals who answered positively to the question "Do you smoke hookah?" were defined as current hookah smokers. The participants were asked about the following socio-demographic characteristics: population group (Jews/Arabs), gender, age group (21-30/31-44), religiosity (religious/non-religious), an education level ( $\leq 12$ / $> 12$  years of schooling), income level (0-8000/8001-12,000/ $> 12,000$  NIS). Two-tailed  $\chi^2$  analyses were performed to examine associations between these factors and hookah smoking.

**Results:** The overall weighted prevalence of hookah smoking was 8.5% (95% CI 7.1%-10.1%): 8.4% (95% CI 6.4%-11.1%) in Jewish men, 2.7% (95% CI 1.7%-4.6%) in Jewish women, 27.4% (95% CI 20.9%-34.8%) in Arab men and 9.5% (95% CI 5.8%-15.1%) in Arab women. Hookah smokers were more likely to be Arabs (OR=4.1,  $p < 0.001$ ), men (OR=3.9,  $p < 0.001$ ), younger participants (21-30) (OR=1.7,  $p = 0.005$ ), and having  $\leq 12$  years of schooling (OR=1.5,  $p = 0.044$ ). Religiosity and income level did not seem to be associated with hookah smoking.

**Conclusions:** The characterization of hookah smokers with respect to socio-demographic characteristics is an essential step in addressing this major public health problem.

**Health Policy Implications:** Identifying sub-groups at increased risk for hookah smoking may assist in planning interventions aimed at reducing smoking-related morbidity and mortality as well as enhance tobacco control policies.

## APPROPRIATE PRESCRIBING AND MEDICATION USE FOR OLDER ALBERTANS: CREATING CONTEXT, INSIGHTS AND ACTIONABLE MEASURES

Deborah Katz, Mollie Cole, Safia Khalfan

*Alberta Health Services, Canada*

**Background:** According to the Canadian Institute for Health Information, Alberta reports a higher percentage of potentially inappropriate medications prescribed to seniors (53.4%) when compared to the national average (46.8%) for 2016–2017. Building on the success of reducing the use of Antipsychotics Medications in Long Term Care and Supportive Living, the Alberta Health Services Seniors Health Strategic Clinical Network prioritized Appropriate Prescribing and Medication Use for Older Albertans.

**Study Question:** Can detailed and summary reports be prepared for clinicians and care teams to describe prescribing practices and to support audit and feedback?

**Methods:** Data were accessed from the Alberta Health Insurance Plan Registry, the Pharmaceutical Information Network, Supportive Living, Long Term Care, Emergency, Acute Care and Vital Statistics. The data set includes medications dispensed by age and gender to individuals in Community, Supportive Living and Long-Term Care. Additional data elements include Emergency, Inpatient, Physician visits and flags for Falls, Delirium, Dementia, Urinary Tract Infections, Adverse Drug Reactions, Zone, Local Geographic Area and death date. Data were analyzed, integrated and liberated using Oracle, SQL Developer, Excel and Tableau.

**Results:** Detailed and summary reports on Sedatives, Antipsychotics and Antidepressants have been prepared and will be presented for discussion at clinician workshops. Data has been shaped to report on Anticholinergic drugs and medications with anticholinergic side effects as well as Opioids.

**Conclusions:** Drug Use by Seniors can be measured, monitored and reported to provide context, insights and actionable metrics. Measures can be aggregated at the Provincial, Zone and Local Geographic Area levels and in detail for Supportive Living and Long-Term Care Facilities and by the patient, prescribers and dispensing pharmacies.

**Health Policy Implications:** Monitoring, measuring and reporting drugs dispensed to Seniors can inform initiatives to reduce:

1. The complexity and risks of polypharmacy.
2. Variances in drug use by geography, locations of care, age, and gender.

## THE APPROPRIATE USE OF ANTIPSYCHOTICS: SUPPORTING QUALITY IMPROVEMENT IN SUPPORTIVE LIVING

Deborah Katz, Mollie Cole

*Alberta Health Services, Canada*

**Background:** This project aimed to address the appropriate use of antipsychotics in Supportive Living. Side effects of antipsychotics include agitation, confusion, falls, insomnia, sedation, increased risks of infection, strokes and cardiac events. Families, physicians and staff work together to investigate and trial alternate approaches to reduce agitation.

The Alberta Health Services Seniors Health Strategic Clinical Network initiative to reduce the use of Antipsychotics in Long Term Care Facilities continues to achieve success. The existence and publication by the Canadian Institute for Health Information (CIHI) of the interRAI Resident Assessment Instrument (RAI-MDS 2.0) Quality Indicator (QI) – Percent of Residents on Antipsychotics without a Diagnosis of Psychosis provides a metric that can be accessed and reported quarterly. By acquiring and integrating data from Emergency, Inpatients, Physician Claims, Pharmacy Information Network and the Resident Assessment Instrument–Home Care (RAI-HC), a similar metric can be developed to monitor and report on the use of Antipsychotics in Supportive Living environments.

**Study Question:** Can existing data be leveraged to create a metric to support improvements in inter-professional practice and care for residents and families by spreading the Appropriate use of Antipsychotics initiatives from Long Term Care Facilities to Supportive Living environments in Alberta?

**Methods:** Data sources include Home Care, RAI-HC, National Ambulatory Care Reporting System, Inpatient Discharge Abstract Database, Physician Claims and the Pharmacy Information Network. Data analytic, visualization and liberation tools include Oracle, SQL Developer, Excel and Tableau.

**Results:** Referencing the RAI-MDS 2.0 QI, similar core elements have been acquired and a comparable antipsychotic measure for community living clients has been generated.

**Conclusions:** This work allows for measuring, monitoring and reporting on the use of Antipsychotics for individuals residing in Supportive Living environments in Alberta.

**Health Policy Implications:** These antipsychotic utilization measures are designed to support improvements in inter-professional practice and the quality of care delivered to residents and their families.

## HEALTHCARE UTILIZATION ASSOCIATED WITH HERPES ZOSTER INFECTION AMONG THE GENERAL ADULT POPULATION AND IMMUNOCOMPROMISED PERSONS, ISRAEL, 2012-2014

Mark A. Katz<sup>1</sup>, Ilan Brufman<sup>2</sup>, Yigal Plakt<sup>2</sup>, Hagit Kopel<sup>3</sup>, Kelly D. Johnson<sup>4</sup>, Becca S. Feldman<sup>2</sup>

*1 Clalit Health Services; Ben-Gurion University of the Negev, IL*

*2 Clalit Health Services, IL*

*3 MSD Israel, IL*

*4 Merck & Co, Inc., Kenilworth, US*

**Background:** Herpes zoster (HZ) causes considerable morbidity every year. In Israel, little is known about HZ-associated healthcare utilization in the general population and in high-risk populations.

**Study Question:** What additional health utilization is associated with HZ infection in adults in Israel?

**Methods:** We used electronic medical record data from Clalit Health Services, Israel's largest health fund (> 4.4 million members) to calculate annual HZ incidence rates from 2012–2014 among the general and immunocompromised populations aged  $\geq 25$  years. We describe the mean number of ambulatory visits, overall medication use and hospitalization among incident HZ cases in the general and immunocompromised populations during the two years following HZ diagnosis compared to age–sex matched HZ-free controls. Two Poisson multivariable regression models assessed the association between HZ and 1) mean total outpatient clinic visits and 2) mean medications dispensed.

**Results:** We identified 36,404 new HZ cases. HZ incidence ranged from 5.03 to 5.35 per 1,000 person-years (PYs) among the general population, and from 8.76 to 9.23 per 1,000 PYs among the immunocompromised population. In both populations, patients with HZ had a significantly higher mean number of ambulatory visits, medication use, and hospitalizations compared to controls. In the multivariable analysis, in the general population, HZ cases had 12% more mean ambulatory visits (adjusted hazards ratio (aHR): 1.12 [95% CI 1.12–1.13]) and 5% more mean units of medication dispensed (aHR: 1.05 [95% CI 1.05–1.05]) compared to controls. Among the immunocompromised, HZ cases had 8% more mean ambulatory visits (aHR: 1.08 [95% CI 1.08–1.09]) and 3% more medication units dispensed (aHR: 1.03 [95% CI 1.03–1.04]) compared to controls.

**Conclusions:** Over a three-year period, HZ resulted in increased healthcare utilization in the general and immunocompromised populations compared to the HZ-free population.

**Health Policy Implications:** Our findings support the Israeli Ministry of Health recommendation that adults over 60 receive the HZ vaccine.

## USE OF A MOBILE APP BY OLDER PEOPLE IN AN INTEGRATED CARE SETTING

Rachelle Kaye<sup>1</sup>, Bella Azria<sup>1</sup>, Erel Rotlevi<sup>2</sup>, Michal Yeshayahu<sup>2</sup>, Reut Ron<sup>1</sup>

*1 Assuta Medical Centers Network, IL*

*2 Maccabi Healthcare Services, IL*

**Background:** The use of mobile apps by the elderly is receiving increasing attention. There is a growing conviction that mobile apps can support chronic disease management. CONNECARE is a multi-country integrated care project funded by European HORIZON 2020 program that addresses the use of mobile technology by complex chronically ill older adults in an integrated care setting. Monitoring by clinicians as well as patient self-management is supported by the use of a mobile app accompanied by a wearable device. The app is interfaced and interacts with a computer dashboard operated by health professionals prior to elective hospital admission and post-discharge.

**Study Question:** To what extent will complex chronically ill older adults actually use mobile technology in an integrated care setting in proximity to a hospital stay, and what are the factors, both supporting and limiting, that influence use?

**Methods:** Observational study including (1) Documentation of actual frequency of use of mobile technology prior to admission for elective surgery and post-discharge. (2) Evaluation of patient experience in using mobile technology, including satisfaction and ease of use measured by validated questionnaires, and health professional observations.

**Results:** As of March 2019, 63 patients were recruited, with an average age of 66.8. 82% of the patients used the wearable, with or without the app, 42% of the patients reported performance of tasks assigned to them in the care plan via the app, and 32% of the patients used the apps messaging function.

**Conclusions:** Two of the most important lessons learned are (1) Technologies in healthcare cannot work in isolation and should be seen as part of an integrated care solution. (2) Older adults are motivated to use mobile technology only if they perceive an actual and immediate benefit.

**Health Policy Implications:** The lessons learned may be applicable in general to the use of mobile technology by older adults in the healthcare setting.

## USING THE TEACHABLE MOMENT: CONTINUITY OF CARE FROM THE HOSPITAL TO THE COMMUNITY TO PROMOTE SMOKING CESSATION

Tzvia Kessel, Olga Aharonovitch, Liora Valinsky

*Meuhedet Healthcare Services, IL*

**Background:** Smoking is the most significant preventable risk factor and increases hospitalization by 30%. Hospitalization provides a window of opportunity for health behavior changes, and intensive intervention, beginning during hospitalization and continued in the community, promotes smoking cessation among discharged patients.

The MOH defined continuity of care is essential for quality care, and significant for the prevention of re-hospitalization. It is the responsibility of the HMOs to prepare the community for patient needs, including health promotion.

In Israel, smoking cessation programs within hospitals are limited. Some discharged patients receive a written recommendation in the discharge form to stop smoking, but there is no liaison with the community to continue this process.

**Study Question:** Do the continuity of care processes between the hospital and the community promotes smoking cessation?

**Methods:** From January 2017, The Metiv, a continuity of care unit for discharged patients, forwards all discharge summaries of patients advised to stop smoking to the Health Promotion Department. Data is forwarded to health promotion coordinators in clinics. Health coordinators contact patients and offer them smoking cessation support.

**Results:** From January 2017 to August 2018, 160 patients were referred from eight hospitals, of whom 80% were men. Most of the cases from Kaplan, Assaf Harofeh and Assuta Ashdod. Of the 160 patients, we were able to contact 131 (81%). Of these, 20 patients stopped smoking (15.2%), and 13 (9.9%) completed smoking cessation workshops.

**Conclusions:** Hospital discharge is a window for behavior change. A structured, focused, patient-centered, team-based approach to smoking cessation improves continuity of care and patient health. We need to examine the reasons for the differences in the rate of recommendation and smoking cessation between hospitals.

**Health Policy Implications:** This process can be adapted easily to other health behaviors such as weight loss, and physical activity.

## HEALTHTECH EXIT PATHWAY – TIME TO PATIENT BED SIDE

Dudi Klein<sup>1</sup>, Ari Shamiss<sup>1</sup>, Ascher Shmulewitz<sup>2</sup>, Joshua Shemer<sup>1</sup>

*1 Assuta Medical Centers, IL*

*2 ALIVE Israel Health Tech Fund, IL*

**Background:** Israel has a worldwide reputation of being a “startup nation” that grows technologies in various fields every year. And yet, it is a known fact that Israeli startups, encounter their main struggle at market entry and product implementation. The healthcare ecosystem, falls behind the swift pace of technology. Also, we see a worldwide phenomenon of reaching to an inclination point where Healthcare systems cannot increase their expenses any further and moreover.

**Study Question:** It would be presumed that the healthcare system would be overflowing with new technologies and most old school procedures that can be replaced by cheap accessible and precise technology would no longer be practiced. As we know, this is hardly the case, and the existence of large financing alone fails to assure the implementation of these groundbreaking technologies into the healthcare systems worldwide by thus improving medical service and lowering burden of cost.

**Methods:** A new investment model for healthcare startups – financing from within the healthcare ecosystem.

**Results:** Assuta Innovation model consists of 4 pillars that provide the infrastructure for accelerating and implementing technology in healthcare: Financial investment, startups incubation for clinical, product & business validation, strategic partnerships and Tech transfer office and clinical trials. The key parameter for the success of a med-tech company is the timing of the technology’s first implementation to the “patient’s bed”, the actual measurement of the medical outcome and as the economic benefits.

**Conclusions:** The benefits for Assuta and Maccabi are many, the most significant value is the fact that we have the priceless ability to put the companies’ market penetration on the fast track and accordingly, create a dramatic increase in the valuation and return rate of our investments. For the startups, the collaboration with Assuta and Maccabi Group brings them directly into the real life and provides priceless insights to their product, thus dramatically increasing their chances for a successful market penetration.

**Health Policy Implications:** This game changing workflow that raises and engages new innovative technology from within the healthcare system, provides the medical and healthcare world with technologies that are in fact “ready to go”– created for easy implementation into healthcare systems and proven to make a clinical difference.

## HOLOCAUST EXPOSURE AND THE RISK OF DEMENTIA

Arad Kodesh<sup>1</sup>, Tuncho Levav<sup>2</sup>, Nuriel Burak<sup>1</sup>, Stephen Levine<sup>2</sup>

*1 Meuhedet Health Services, IL*

*2 University of Haifa, IL*

**Background:** Competing hypotheses state that past genocide exposure reduced (owing to resilience) versus increased (owing to vulnerabilities) the risk of dementia, are yet to receive empirical support.

**Study Question:** Compare competing hypotheses that past genocide exposure reduced versus increased the risk of dementia.

**Methods:** Data were from a national registry of Israeli residents without dementia, born between 1901 and 1945 by 2012 (N=51,752). They were followed-up for the risk of dementia from 2013 to 2017. Groups were classified as exposed to the European Holocaust based on government recognition, or unexposed. Hazard ratios from Cox regression models were used to quantify the risk of dementia between the groups, adjusting for demographic and diagnostic covariates. Twelve sensitivity analyses were computed to test the robustness of the results.

**Results:** In total 10780 (20.8%) were Holocaust exposed and 5584 (10.8%) were diagnosed with dementia during the follow-up period. Dementia rates were 16.5% (n=1781) in the exposed group and 9.3% (n=3803) in the unexposed group. In the primary analysis, the exposed group compared to the unexposed group had an adjusted HR=1.21 (1.15, 1.28). Sensitivity analyses significantly (P<.05) replicated the primary results with similar point estimates (range adjusted HRs=1.18 to 1.28).

**Conclusions:** Exposure to the maximum adversities of genocide was associated with an increased risk of dementia in later life, consistent with the hypothesis that genocide exposure heightened vulnerability to the risk of dementia.

**Health Policy Implications:** Holocaust survivors is a specific risk group that should be screened for the risk of dementia.



## FIRST OF ITS KIND WORLDWIDE; MACCABI'S CLINICIAN - RESEARCHER TRAINING PROGRAM FOR FAMILY MEDICINE RESIDENTS

Gideon Koren

*MK&M Research & Innovation Institute, IL*

**Background:** Research training for clinicians is becoming relatively common for postdoctoral trainees in academic institutions. In contrast, there are almost no such training programs for family physicians during their residency.

We describe a novel program for family medicine trainees in Maccabi Health Services, a large Israeli health fund.

**Study Question:** Can we develop an effective training program for family medicine trainees?

**Methods:** Following organizational approval and budget allocation, a call for family residents resulted in 18 applications, of whom 15 were selected for a two-year research training program. Each trainee submitted a study protocol, dealing with a community-based research question. Each protocol was allocated a budget. The program, overseen by a steering committee of family physicians and scientists, has a designated clinical epidemiologist that coordinates all activities.

The Project runs a monthly face-to-face meeting where trainees present their protocols and the group review the protocol ahead of time, comment and criticize it. In parallel, the trainees discuss their protocols face to face with the program director and clinician. epidemiologist in a detailed manner and the revised protocol is submitted to the IRB.

**Results:** The Project is receiving an enthusiastic response from the trainees and from Maccabi, which has already approved the budget for the second year of the program with a new stream of trainees. The research protocols approved the deal with original and important clinical questions.

**Conclusions:** With the aim of developing clinician-researchers in the field of family medicine, this novel program is changing the climate in a large organization, where community-based family practitioners were not typically involved in the research.

**Health Policy Implications:** With the aim of developing clinician-researchers in the field of family medicine, this novel program is changing the climate in a large organization, where community-based family practitioners were not typically involved in the research.

## NEW MODELS OF CARE: EXPANDING COLLABORATIVE FNP PRACTICE INTO THE COMMUNITY USING A "SHARED CARE" PRACTICE MODEL

Abigail Kra Friedman<sup>1</sup>, Julie Vosit Steller<sup>2</sup>, Tamar Fishman<sup>3</sup>, Judy Beal<sup>4</sup>, Caryn Andrews<sup>1</sup>

*1 Hadassah-Hebrew University, IL*

*2 Brigham and Women's Hospital, US*

*3 Meuhedet Health Services, IL*

*4 Simmons University, US*

**Background:** The growing shortage of physicians and the increasing patient population in Israel necessitate the implementation of new models of healthcare delivery to provide safe, quality and efficient care. In 2015 one Israeli health maintenance organization (HMO) partnered with a US academic institution to teach Israeli nurses the American Family Nurse Practitioner (FNP) model of collaborative care delivery. Exploring FNP role development and future integration into the Israeli healthcare system, we studied the process of interprofessional education (IPE) to show examples of improved outcomes of collaborative care as per World Health Organization (WHO) and Institute of Medicine (IOM) recommendations. Wondering how FNPs could be integrated to improve the efficiency of healthcare delivery and outcomes, we assessed the role of IPE from physician preceptors' perspectives.

**Study Question:** Describe a pathway for FNP integration into the Israeli HMO by examining physician perspectives on IPE with FNP students.

**Methods:** A qualitative critical ethnographic approach focused on physician experiences precepting FNP students through IPE and the future integration of FNPs. Interviews consisted of open-ended questions and thematic saturation was reached with a sample of 11 physicians recruited from a larger pool of 50.

**Results:** Interviews were analyzed and revealed nine themes that collapsed into three categories: Role clarification, Logistics, and IPE Education. Exemplar cases showed the impact on measurable outcomes. Responses led to the development of our Applied Model for IPE in FNP Implementation.

**Conclusions:** Describing actual benefits in care delivery, health outcomes, workflow, productivity, and work environment, our model illustrates IPE as a way to integrate FNPs into the Israeli HMO.

**Health Policy Implications:** Integrating FNPs into the Israeli healthcare system using IPE is cost effective, time efficient, and promotes collaborative practice between multiple disciplines using shared resources. We were able to show that IPE promotes an iterative learning environment and can positively promote true collaboration to ultimately change the face of healthcare delivery.

## THE SCANDAL OF THE LOST YEARS: MEDICAL SERVICES UTILIZATION AS A MODERATING FACTOR OF EARLY MORTALITY IN PATIENTS WITH SCHIZOPHRENIA

Amir Krivoy<sup>1</sup>, Ran Balicer<sup>2</sup>, Moshe Hoshen<sup>3</sup>, Mark Weiser<sup>4</sup>, Abraham Weizman<sup>1</sup>

*1 Geha Mental Health Center, IL*

*2 Clalit Research Institute, IL*

*3 Hoshen Research, IL*

*4 Tel Aviv University, IL*

**Background:** People with schizophrenia have a shorter life expectancy in about 20 years, in comparison to the general population, mostly due to preventable physical illnesses. Although they have increased the propensity to frailty, they do not have access to longevity-associated medical services.

**Study Question:** Does utilization of medical services moderate the association between physical morbidity and early mortality in patients with schizophrenia?

**Methods:** a retrospective cohort study derived from Clalit Medical Services electronic database. A three years follow-up (2012-2014) of 24,679 individuals with a diagnosis of schizophrenia (ICD 10 Code: F.20) and control the general population (N=2,295,579) in the age range of 6- 75 years.

**Results:** Schizophrenia was associated with an HR for mortality, adjusted for age, sex and socioeconomic status, of 3.52 (95% CI 3.35-3.72). Patients' mortality rate was 5.6% with about half dying from physical illnesses (cardiovascular, neoplasms, respiratory, and digestive). Metabolic syndrome parameters were more prevalent in the schizophrenic population, with the exception of hypertension. The adjusted OR for GP contact was 0.42 for schizophrenia patients; the OR for hospitalization was 1.25 with more than double mean length of hospitalization. A higher number of contacts with GP or specialists was associated with lower mortality in schizophrenia patients with metabolic disturbances.

**Conclusions:** Israeli patients with schizophrenia tend to die earlier, mostly from preventable physical illnesses, similar to reports in other countries. Utilizing primary and secondary medical service was associated with less mortality at least when having metabolic dysregulation

**Health Policy Implications:** The main Health Policy implication is to establish a national system to detect and manage physical morbidity in schizophrenia patients by increasing their accessibility to primary and secondary medical services for this high-risk population.

**BEST RESULT PRESENTATION - DATA TRUNCATING TO PREVENT OVER-COMPETITION**

Michael Kuniavsky, Olga Bronstein, Hanni Schroeder, Netanel Goldshmidt, Ofir Werthaim, Yuval Dadon

*Ministry of Health, IL*

**Background:** The MoH National Program for Quality Measures performs quarterly assessments of quality measures throughout the healthcare system: general, geriatric and psychiatric hospitals, well-mother-baby clinics and pre-hospital emergency services. The results are open to the public.

**Study Question:** What is the best way to present the results of the program?

**Methods:** A steering committee annually decides on optimum targets for each measure, based on data received by the program. The optimum target is aimed to ensure both attainability and improvement-driving goals.

**Results:** Recent concerns regarding over-competition of the medical care providers have been raised. The aim of reaching the maximum attainable result and the best comparative scores, regardless of the target defined by the program, raised concerns for possible overtreatment. For example: performing hip fracture operations within 48 hours has only an 85% compliance target, due to preexisting medical conditions requiring medical inquiries prior to the operation. Data received by the program revealed providers aiming to get better results than the compliance level defined for the measure. In theory, this might cause a rush to operate, prior to full patient preoperative assessment. To prevent such situations, the decision was made to truncate the results of all providers at the target level, thus making public only provider data which is compliant with the target. As such, provider results will be truncated at the target level (for hip fractures at 85%, whether they attained 85%, 88% or 95%). Providers who don't reach the measurement targets were presented "as is" without truncation. The latest data publication was compiled on this basis preventing uncontrolled results publicized in the media.

**Conclusions:** Target data truncation prevents over-treatment and over-competition among providers, while openly sharing valuable data with the providers and the public, enabling a responsible improvement of clinical care.

**Health Policy Implications:** Appropriate data publication is crucial to quality processes success.

## "MY TRIAL"- THE ISRAELI CLINICAL TRIAL REGISTRATION SITE - PROVIDES ACCESSIBILITY TO CLINICAL TRIALS IN ISRAEL

Eyal Lavi, Eli Marom, Cathrine Ela, Hanna Billig

*Ministry of Health, IL*

**Background:** Finding a relevant clinical trial can be life-saving for patients whose physicians informed them that all their treatment options have been exhausted. Now, thanks to this new site, the patients and/or their care providers can find current treatment options online, in just one click.

**Study Question:** Is the information about all clinical trials in Israel transparent and accessible to the public?

**Methods:** The clinical trials department in the Ministry of Health set up a website which presents all the interventional trials that are active in Israel. The registration in this website is a pre-requisite for final approval of the trial. This website is in Hebrew – for the benefit of the public.

From the site, one can obtain information anywhere and anytime without the need for code no. or identification.

Any individual can find a relevant trial using a friendly search tool which enables sorting by the medical field, medical condition, investigational medical product name, age of participants and geographic location.

**Results:** In January 2019, 18 months since the website launched, 1,170 approved clinical trials in 43 medical categories appear in the registry. Most of the trials involve the use of an investigational product, i.e. pharmaceuticals, medical devices or advanced therapies. Entering into the chosen trial will offer information regarding the study protocol in lay-man language, including medical background, study endpoints, study time frame, inclusion/exclusion criteria, procedures the participant will undergo in this trial, contact details of the study personnel, etc.

**Conclusions:** Using the computerized clinical trial registry site creates readily available information on clinical trials both to the public and the professional staff.

**Health Policy Implications:** Using this platform significantly increases transparency of this area. The site can also be beneficial to the trial sponsors by promoting the recruitment of subjects to their studies.

## INDEX OF EARLY CHILDHOOD IN THE LOCAL AUTHORITY

Anna Lerner-Zacut, Kempinsky Polina

*Ministry of Health, IL*

**Background:** The first years of life are the most critical years for the child's development, health, and success in later life. The development of the child in these years depends on his parents, the investment of the public system and the investment of the municipal system.

**Study Question:** The index was created in order to encourage local authorities to invest in early childhood, with an emphasis on the family unit, the proposed intervention programs, and the required infrastructures. Another goal is measuring and evaluating the success of local authorities in cultivating the issue of the first years of life, with the possibility of comparison and receiving feedback from the residents.

**Methods:** 29 representative Israeli localities have been selected. The index consists of two types of sub-indices: results and processes. The process measures include an immunization rate and the ratio of areas allocated to welfare, health and public parks in the PA. The outcome measures include infant mortality rates, first-grade obesity and sub-grades, premature births, hospitalization rates, and visits to injury-related classification.

**Results:** There is a high correlation between the socio-economic index and level of peripherality of the Authority and the index of the first years of life. A third interesting finding is that while the Arab localities received a consistently low ranking, the Ultra-Orthodox communities were ranked higher than the other types of localities.

**Conclusions:** Developing the theme of the first years of life requires mobilization by the authority in many areas.

**Health Policy Implications:** This measure can serve as an effective tool for self-assessment and self-evaluation by the authorities, in relation to their past achievements and in relation to other authorities, and to choose the intervention programs tailored to the ISA in order to promote various issues that are included in early childhood.

## IMPROVEMENT OF THE EXTERNAL REQUEST TREATMENT APPROVAL PROCESS

Gidon Leshetz

*Maccabi Healthcare Services, IL*

**Background:** Maccabi oversees and handles around 1.3 million requests per year for care and advisory services based on third-party providers. The requests can arrive either from Maccabi's internal doctors' network or from the hospital and external professional experts. The process, which is in the heart of the services provided by Maccabi, is perceived as a very sensitive and a critical professional junction. The process begins with the submission of a request by the patient which enters the experts' authorization funneled by five regional centers. The unit operating the authorization process decides based on professional experience and certain criteria whether to approve the request or divert the request to community treatment. The process is fully manual and based on human decision-making mechanism.

**Study Question:** Can the process become a more effective and efficient process that will reduce the SLA and achievement higher customer & employee satisfaction?

**Methods:** Implementing two technologies, OCR and RPA, as well as defining a robust and standardized rule-based decision mechanism. After mapping the various codes and request options, several codes were selected. A process of defining a rule base criteria mechanism as well as developing the required code script based on the integration and implementation of the two technologies (OCR & RPA).

**Results:** The results of the pilot performed by Maccabi's innovation unit demonstrated the feasibility of the technology as well as the integration with Maccabi's IT system. The results supported the potential ability to divert and replace around 30% of the human decision process into a semi/fully automated process. Reducing around 30-40% of the overall time by technology support and creating an almost 24/7 robotic process reducing SLA from 3 days (avg.) to 17 min for more than in 80% of the defined target audience. The use of technology and methodology increases employee satisfaction by removing technical and routine elements and allowing focus on value-added activities.

**Conclusions:** By implementing the methodology the organization will have a better mechanism to manage the requests and the process, allowing a faster and more effective funnel. The process will create a shorter track for certain areas and allow the organization to focus its effort on cases that the service can be provided within the community boundaries or define other methods of approaching the request.

**Health Policy Implications:** We believe that by diverting repetitive rule-based activities to robotic resources Maccabi employees will be able to focus on value-added activities and will enable more human contact were truly needed in a better time frame.

## NEW CHALLENGES AND THREATS IN THE AGE OF TOBACCO INDUSTRY INNOVATION: THE CASE OF THE NEW ISRAELI LEGISLATION

Hagai Levine<sup>1</sup>, Shira Kislev<sup>2</sup>, Yael Bar Zeev<sup>1</sup>, Leah Rosen<sup>3</sup>

*1 Hadassah-Hebrew University, IL*

*2 The National Initiative to Eradicate Smoking, IL*

*3 Tel Aviv University, IL*

**Background:** Traditional cigarette smoking is declining in many countries, including Israel, due to the implementation of successful public health policy and de-normalization of smoking. The tobacco industry uses novel marketing tools through digital media, and develops new products, aiming to get new generations addicted. Landmark tobacco control legislation was passed in Israel on Dec. 31st, 2018. Regulations concerning marketing and advertising, including for the first time in digital media, were substantially strengthened to address all products, including electronic cigarettes, which were previously unregulated.

**Study Question:** What happened and what next?

**Methods:** We analyzed the previous and new regulation progress in the context of the World Health Organization's Framework Convention on Tobacco Control (FCTC) and MPOWER (Monitor, Protect, Offer, Warn, Enforce, Raise) measures.

**Results:** The changes overrode intense opposition from the tobacco lobby, and occurred despite the fact that the basic elements for prevention policy postulated by the Richmond model were not in place. The cohesive partnership was critical to this success.

Despite the extensive progress achieved with this legislation, many of the measures are not included in the MPOWER scoring system, which was only improved by one point in one measure. The FCTC provides a much more comprehensive framework, yet currently does not specifically include innovative products, such as vaping products.

**Conclusions:** It is now time to prepare for careful implementation and enforcement of the new legislation; develop a rigorous monitoring system including for novel marketing strategies; and plan for further strong measures, which should include increasing the minimum age for tobacco sales, restricting flavors in all tobacco and nicotine products, graphic warnings on smoking products, including the print press in the advertising ban, and wise regulation of innovative products, in order to prevent death and disability due to tobacco use.

**Health Policy Implications:** This case study provides important lessons for up-to-date tobacco control policy, in the age of tobacco industry innovation.



## EXPLORING NEEDS FOR INNOVATION - SMOKING CESSATION NEEDS ASSESSMENT AMONG THE ARAB COMMUNITY IN ISRAEL

Diane Levin-Zamir<sup>1</sup>, Anati Yom-Tov<sup>2</sup>, Shosh Gan-Noy<sup>2</sup>, Calanit Key<sup>2</sup>

*1 Clalit Health Services; University of Haifa, IL*

*2 Clalit Health Services, IL*

**Background:** The prevalence of tobacco use among the Israel Arab community (38.2%—mainly males) is higher than in the general population (23.3%). Greater understanding is needed to reduce smoking offering culturally appropriate services.

**Study Question:** To identify the enabling factors and barriers to smoking cessation among the Israeli Arab adult population for effective program planning and implementation.

**Methods:** A two-stage study was conducted: (1) Focus groups in 4 Arab communities to learn of the significance of smoking and to develop the quantitative research tool; (2) A cross-sectional telephone survey among a random sample of 306 current and previous smokers, members of Clalit healthcare organization in Israel. Half of the sample recently participated in smoking cessation programs. Data gathered included smoking status and quit attempts, attitudes towards smoking, suggested action for prevention and cessation, and personal characteristics (gender, age, residence, SES).

**Results:** Older smokers (>35 yrs) and those residing in mixed population cities, compared to Arab towns, quit smoking at a higher rate ( $p<.05$ ). Cessation program participation was associated with higher rates of cessation maintenance, than attempting to quit alone ( $p<.05$ ). Health concerns of those in the smoker's close proximity were the leading factor for quitting; the family physician was the most important influence in the decision to quit. Recommendations for improved health promotion practice include separate cessation programs for each gender and more school-based programs for preventing smoking in youth.

**Conclusions:** Social environmental and cultural factors are critical for promoting smoking cessation. A more systematic effort is needed to enforce smoke-free policies in Arab towns and to stress the risk of second-hand smoke. More in-depth research is needed to understand the needs of female Arab smokers, to remove stigma, and enable participation in cessation programs.

**Health Policy Implications:** Community healthcare teams need to be more proactive regarding smoking prevention and cessation. The conclusions were integrated into the Clalit 2019 health promotion work plan.

## THE ASSOCIATION BETWEEN MODIFIABLE RISK FACTORS AND FIRST-EVER ISCHEMIC STROKE IN ISRAEL: A CASE-CONTROL STUDY

Carmit Libruder<sup>1</sup>, Inbar Zucker<sup>2</sup>, Amit Ram<sup>1</sup>, Yael Hershkovitz<sup>1</sup>, Dolev Karolinsky<sup>2</sup>, David Tanne<sup>3</sup>, Tamy Shohat<sup>2</sup>

*1 Israel Center for Disease Control, Ministry of Health, IL*

*2 Israel Center for Disease Control, Ministry of Health; Tel Aviv University, IL*

*3 Tel Aviv University, IL*

**Background:** Stroke is a leading cause of death and disability. According to the Global Burden of Disease Study 2013, 90.5% of the burden of stroke is attributable to modifiable risk factors. The vast majority of stroke cases are of ischemic origin.

**Study Question:** We aimed to estimate the contribution of potentially modifiable risk factors to ischemic stroke incidence in Israel.

**Methods:** We conducted a case-control study based on adult cases aged 21-90 with first-ever ischemic stroke, reported to the Israeli National stroke registry during 2014-2015, and controls with no history of stroke from the third Israel National Health Interview Survey (INHIS-3), conducted between 2013 and 2015. Controls were matched to cases in a 1:1 ratio by age, sex and ethnicity. Comparable information for cases and controls was available for 5 risk factors: hypertension, diabetes, current smoking, obesity and hyperlipidemia. A conditional logistic regression was used in order to estimate the adjusted odds ratios (ORs) for stroke associated with each individual risk factor. We calculated the population-attributable risk (PAR) for every risk factor, and the composite PAR for all five risk factors, using the adjusted ORs.

**Results:** The final analysis included 584 matched pairs. The mean age was 69.5 ( $\pm 12.1$ ), 55.8% were males and 83.0% were Jewish. Ischemic stroke was significantly associated with all five risk factors and was most prominent for hypertension (OR=3.4, 95% CI 2.5-4.7; PAR=58.7%, 95% CI 51.6%-65.8%). The composite PAR for all 5 risk factors was 77.1% (95% CI 71.5%-82.6%).

**Conclusions:** Results of our study show that five known and potentially modifiable risk factors can explain 77% of ischemic stroke risk in Israel.

**Health Policy Implications:** Targeting these risk factors, especially hypertension, could result in a marked reduction in the burden of ischemic stroke in Israel. Therefore, primary prevention efforts should be continued and intensified.

## HEALTH SERVICE INTEGRATED CONSTRUCTION IN AGRICULTURAL & PASTORAL VILLAGES AND TOWNSHIPS OF QINGHAI, CHINA

Yongnian Liu, Rong Wang, Mingyu Huang, Xiang Gao

*Medical College, Qinghai University, China*

**Background:** Qinghai Province is located on the Tibet Plateau, covering a large area (722,300 km<sup>2</sup>), but with a small population (5.73 million). People living in the remote have poor access to health services.

**Study Question:** To describe the current existing integrated management of rural health services, and to analyze the determinants of the quality of rural health service, thus improving the health service capacity in Qinghai, particularly among the rural minority villages and townships.

**Methods:** We have selected the pilot areas through stratified sampling from the aspects of health services utilization and satisfaction, performance and changes in the health sector, and conducted surveys on rural health services and health authorities in the pilot areas and surveys on agricultural and pastoral households residents, and qualitative interviews with medical staff and medical managers to understand the implementation and problems on integration management and improvement of rural health service.

**Results:** With the achievements of the project, the village doctors have obtained the identities equal to that of social welfare jobs, e.g. pension and medical insurance. We have put forward multi-compensation system on village doctor post subsidies, zero added profit drug subsidy, water, electricity and heating subsidies running costs, network operating subsidies. Besides, we have established systems on conducting business guidance in medical institutions of villages, townships and counties, technical support, personnel training and training system.

**Conclusions:** The central pharmacy has been established for village clinics to be engaged in unified order, drug distribution and supervision on drug utilization. The minority clinics have been established, which are the indispensable in rural health service.

**Health Policy Implications:** The achievements on the resources being integrated, the management being accessed and service quality and capacity being promoted could be realized to build an appropriate model for rural health service in Qinghai.

## COMPARING CHILD DEVELOPMENT IN THE FIRST TWO YEARS BY MATERNAL ORIGIN: A NATIONWIDE POPULATION-BASED STUDY IN ISRAEL

Shakked Lubotzky-Gete<sup>1</sup>, Ronit Calderon-Mrgalit<sup>1</sup>, Asher Ornoy<sup>2</sup>, Itamar Grotto<sup>3</sup>

*1 The Hebrew University of Jerusalem, IL*

*2 Hadassah Medical Center, IL*

*3 Ministry of Health, IL*

**Background:** Immigrant status is consistently associated with social conditions and medical challenges which may affect the health of immigrant women and the development of their children.

**Study Question:** This study aimed to examine the association between immigration and child development in the first two years of life.

**Methods:** A population-based historical cohort study in the setting of Mother and Child Health Clinics (MCHC). Data on developmental milestones in domains of gross and fine motor, personal-social skills and language skills up to 24 months of age were retrieved on 159,227 infants born in 2014–2015. Mothers' origin was divided into five groups: "Native" Israelis, Former-USSR (FSU) and Ethiopia (EB) immigrants and mothers born in Israel with either FSU (IBFSU) or Ethiopian (IBE) mothers. Logistic regressions were used to compare the associations between origin and developmental delays, controlling for potential confounders.

**Results:** Migrants' children were less likely to meet development milestones compared with Israelis. Delays were observed in language skills including making various sounds (OR=2.01 and OR=1.80, EB and IBE, respectively), in personal-social skills as pointing selected objects (OR=2.29 and OR=1.51, respectively) and social smile (1.98 and 1.50, respectively) and in fine motor skills including building a cube tower (1.66 and 1.28, respectively). Associations were smaller among offspring of FSU and IBFSU mothers and there was seemingly no change across first and second generations (speaking 2–3 words: OR=1.28 and OR=1.16, FSU and IBFSU, respectively; building a cube tower: OR=1.33 and OR=1.55, respectively).

**Conclusions:** In this population-based large-scale study, maternal origin and immigration status were associated with early child neurodevelopment. The specific mechanisms could include lack of acculturation or stressful life circumstances that may withhold families from investing in their child development. Targeted interventions should aim these population groups of increased risk for the prevention of developmental gaps.

**Health Policy Implications:** Building programs for identifying and treating populations at risk.

## IS PRE-TEST IN-PERSON GENETIC COUNSELING EFFECTIVE IN PREPARING WOMEN FOR ADVANCED PRENATAL GENOMIC TESTS? VIEWS OF HEALTHCARE PROFESSIONALS (HCPs) AND PATIENTS

Michal Macarov<sup>1</sup>, Vitalia Libman<sup>2</sup>, Vardiella Meiner<sup>1</sup>, Yechiel Friedlander<sup>2</sup>, Hagit Hochner<sup>2</sup>, Shiri Shkedi-Rafid<sup>1</sup>

*1 Hadassah Medical Center, IL*

*2 The Hebrew University of Jerusalem-Hadassah Medical Center, IL*

**Background:** Recent years have seen a steady rise in advanced prenatal genomic tests such as chromosomal microarray analysis and exome sequencing. These tests increase diagnostic rates, but can also yield uncertain and probabilistic information, posing a challenge to counselees and HCPs. Pre-test genetic counseling is considered good clinical practice in prenatal care, yet its effectiveness in the setting of advanced genomic prenatal testing has not been sufficiently studied.

**Study Question:** To what extent does pre-test counseling prepare women for the possibility of receiving uncertain test results and enable informed decision-making?

**Methods:** Semi-structured interviews with 20 genetic HCPs and 10 women who received uncertain genomic results in their pregnancies were analyzed using grounded theory methodology.

**Results:** The vast majority of women stated that they were not aware of the possibility of receiving uncertain results, despite having in-person counseling, and in this sense, their choice to undergo prenatal testing was not entirely informed. Women felt that pre-test understanding of the possibility of uncertain findings could have reduced their anxiety upon receiving such results.

HCPs recalled a routine discussion of the possibility of uncertain findings with all women/couples. However, they felt that this information is highly complex for most counselees, especially given the limited time-frame and the stressful situation.

Women and HCPs alike feel that when the pre-test counseling and the invasive procedure are carried-out on the same day, women/couples are mainly concerned by the actual procedure and cannot fully internalize the information.

**Conclusions:** Our study shows that pre-test counseling in its current format fails to prepare counselees for the possibility of uncertain genomic test results.

**Health Policy Implications:** In order to prepare counselees for the possibility of uncertain genomic test results it is important to develop alternatives and/or supplements to in-person counseling, such as web-based aids, provided sufficient time before testing. The impact of these tools should be explored before their incorporation into clinical practice.

## THE NEED FOR DIFFERENTIAL TARIFFS IN ISRAEL IN THE ERA OF AGING POPULATION AND EMERGING TECHNOLOGY: CARDIAC SURGERY AS A CASE STUDY

Joseph Mendlovic, Rachel Tauber, Shuli Silberman

*Shaare Zedek Medical Center, IL*

**Background:** Reimbursement for surgical procedures in Israel does not account for diversity in costs of various procedures. With new and more costly technology coupled with higher risk patients needing more complex surgery, these tariffs may not reflect the true financial burden on caregivers.

**Study Question:** Does case mix and complexity of procedures significantly affect cost to justify differential tariffs?

Objective: To determine the relative cost of heart surgery as function of predicted risk and complexity of surgery.

**Methods:** Cardiac surgery was taken as a case study. All patients (n=4,409) undergoing cardiac surgery at Shaare Zedek Medical Center between 1993–2016 were stratified according to (1) type of surgery and (2) clinical profile (predicted operative risk according to EuroSCORE). Approximate cost of each group was assessed by the average number of days in ICU and ward multiplied by the respective daily cost as determined by the Ministry of Health, plus the cost of fixed components used in the operating room (manpower and disposables). Cost was evaluated according to these variables. Cost variability was determined using ANOVA.

**Results:** Both increased value of EuroSCORE and type of surgery were directly correlated with cost ( $p < 0.0001$ ): up to 180% increase in cost between low and high risk patients in identical surgery and up to 77% increase with respect to type of surgery. There was up to 330% increase in cost between low risk and low fixed price surgery and high risk patients with high fixed price surgery.

**Conclusions:** Cost of heart surgery is directly influenced by patient profile as well as type of surgery. Modern day technology is more costly yet has become mandatory. Thus reimbursement for heart surgery should be based on differential criteria: clinical risk profile as well as type of surgery.

**Health Policy Implications:** An urgent need for design and implementation of a realistic differential tariff model in the Israeli medical reimbursement system.

## TIME TO CANCER DIAGNOSIS IN YOUNG WOMEN PRESENTING TO SURGEONS WITH BREAST-RELATED SYMPTOMS; A POPULATION-BASED COHORT STUDY

Tehillah Menes<sup>1</sup>, Tal Sella<sup>2</sup>, Gabriel Chodick<sup>2</sup>

*1 Tel Aviv Sourasky Medical Center, IL*

*2 Maccabi Health Services, IL*

**Background:** The association between young age and advanced disease suggests that delay in diagnosis may be a contributing factor. We examined time to cancer diagnosis in women presenting to a surgeon with breast-related complaints.

**Study Question:** Is age associated with delay to a breast cancer diagnosis?

**Methods:** A population-based cohort study including all women aged 18 to 44 presenting to a surgeon with breast-related complaints between 2005 and 2015 in a large healthcare plan (N=157,264). Data included demographics, diagnosis codes, breast imaging and biopsies. Breast cancer diagnosis within one year of the visit was ascertained from the national cancer registry. Time to breast imaging and biopsy was compared between the different age groups. Logistic regression analysis was used to determine the association between age and delay to biopsy while adjusting for possible confounders.

**Results:** During the first year after the visit, 45,434 (29%) women had a breast imaging study; 5,767 (3.7%) women had a breast biopsy; and 676 (0.43%) were diagnosed with breast cancer. Overall, time to first breast imaging and biopsy did not differ significantly between the age groups. Non-specific visit codes (other than breast mass) were associated with delays to imaging and biopsy. Among women diagnosed with breast cancer, age under 40 (OR 2.3, 95% CI 1.4; 3.9), being post-partum (OR 2.6, 95% CI 1.1; 5.9) and a non-specific visit code (OR-8.3, 95% CI 4.9; 14.2) were associated with delay to biopsy.

**Conclusions:** Symptomatic women with a lower a-priori likelihood of breast malignancy (younger age, post-partum, or non-specific visit code) are at a significantly greater risk of delayed diagnosis of cancer.

**Health Policy Implications:** Physicians should be aware of the challenging diagnosis in young women with non-specific symptoms.

## PATIENTS OUTCOMES AND CLINICIANS' WRITING IN ELECTRONIC MEDICAL RECORDS: EVALUATION OF DIABETES ASSESSMENT USING TEXT ANALYTICS (POWER DATA) STUDY

Eugene Merzon<sup>1</sup>, Avivit Golan-Cohen<sup>1</sup>, Izhar Laufer<sup>1</sup>, Gabriel Catan<sup>2</sup>, Inbal Meir<sup>3</sup>, Dror Ben Moshe<sup>3</sup>, Shlomo Vinker<sup>1</sup>

*1 Leumit Health Services, IL*

*2 Deloitte Analytics, IL*

*3 Deloitte Analytics; Ministry of Health, IL*

**Background:** Type 2 diabetes may cause complications of macro and microvascular origin. Clinical guidelines recommend detailed and comprehensive assessment of all diabetic patients. Leumit Health Services (LHS) in collaboration with Israeli Ministry of Health (MoH) conducted a study using the Electronic Medical Records' (EMR) existent information in order to provide comprehensive and personalized care to diabetic patients.

**Study Question:** To evaluate the ability of Big Data tools and Natural Language Processing text analytics to extract meaningful insights from the EMR.

**Methods:** The study population was composed of 41,483 patients who were diagnosed with Diabetes Mellitus Type 2 and are over 35 years old. We analyzed over 40,000 variables from different sources (visits, labs, treatments, hospitalizations) and over 2.6 million the physician's notes to extract insights from various perspectives. We used an advanced algorithm for feature selection (ElasticNet) to get the strongest variables and Decision Trees Classification models to build a prediction model. For the text mining a rule base approach was implemented.

**Results:** The application of Big Data allowed extracting different insights from EMR. We established a clinical/data-driven definition for HBA1C non-controlled patients. The text mining enriched the EMR with important inputs from the physician's notes (lifestyle, self-monitoring, and quality of care). New risk factors affecting the diabetic population were defined. The database allowed building models to anticipate the deterioration of target organs of a diabetic patient due to previously unconsidered risks factors. Finally, we combined unstructured and structured data to provide a more personalized healthcare.

**Conclusions:** The model, which combined clinical expertise, big data capabilities and text mining to conduct deep research and analysis, allowed LHS to discover new factors, build personalized care stories, take action and change policies for early intervention.

**Health Policy Implications:** MoH and LHS HMO collaboration opening new research perspectives using Big Data and text analytics technics.



## OVERDOSE FROM PRESCRIPTION OPIOIDS IN ADOLESCENCE, 1999-2017

Oren Miron<sup>1</sup>, Kun-Hsing Yu<sup>1</sup>, Rachel Wilf-Miron<sup>2</sup>, Isaac S. Kohane<sup>1</sup>

*1 Harvard Medical School, US*

*2 The Gertner Institute for Epidemiology and Health Policy Research, IL*

**Background:** Opioid prescriptions increased in the U.S. from 1999 to around 2009, which lead to an increase in overdose deaths from prescription opioids. Since then, there has been a decrease in opioid prescription, including in adolescence.

**Study Question:** What is the trend in overdoses from prescription opioids in adolescents, and does it differ from young adults.

**Methods:** We searched the CDC mortality database for ages 10–19 years (adolescents) and 20–29 years (young adults). We extracted ICD–10 counts for overdose from prescription opioids (ICD–10 codes: X40–X44, X60–X64, X85, Y10–Y14; multiple-causes T40.2). We analyzed the trends for each age group from 1999–2017 using Join Point–Regression (NIH–Version 4.7).

**Results:** At ages 10–19 years, the overdose rate from prescription opioids increased from 1999–2008 by an annual percent change (APC) of 15.12% (95% confidence interval, 9.6% to 20.9%). The rate decreased from 2008–2017 by APC of –5.8% (95%–CI, –9.5% to –1.9%). In 2017 the overdose rate per 100,000 at ages 10–19 years was 0.34 (95%–CI, 0.28–0.39).

At ages 20–29 years, the overdose rate from prescription opioids increased from 1999–2010 by an annual percent change (APC) of 15.18% (95%–CI, 13.3% to 17.1%). There was an increase from 2014–2017 by APC of 13.8% (95%–CI, 5.2% to 23.0%). In 2017 the overdose rate per 100,000 at ages 20–29 years was 4.62 (95%–CI, 4.43–4.82).

**Conclusions:** Our analysis shows that age 10–19 years had a decreasing trend from 2008–2017, while age 20–29 years had a non-significant decrease from 2010–2014, followed by a significant increase. The large decrease in adolescent overdoses might stem from the reduction in an opioid prescription from around 2009. The lack of a decrease in young adults may stem from them receiving opioids as adolescents before 2009 and becoming addicted. Another explanation might be adolescent-specific restrictions.

**Health Policy Implications:** Future studies should also examine the effect of specific restrictions on opioid prescribing in adolescence and sequelae in adulthood.

## PRIVATE SECTOR ENGAGEMENT FOR TUBERCULOSIS CONTROL: EVIDENCE FROM A PILOT INTERVENTION PROJECT IN MEERUT CITY, UTTAR PRADESH, INDIA

Rajna Mishra, Preeti Kumar

*Public Health Foundation of India, India*

**Background:** Though India has been engaged in fight against Tuberculosis (TB) over the last 50 years, one out of every four TB patients is from India. More than a million 'missing' cases are not notified, undiagnosed/inadequately diagnosed and treated in private sector which accounts for 80% of treatment. Keeping in view the growing concern of TB as a major public health challenge, PHFI along with multiple stakeholders, initiated a pilot intervention - Project CHETNA, in Meerut city, UP with high prevalence (400 per 100,000 population) and having large presence of private providers.

**Study Question:** What is the private sectors contribution to TB notification, capacities of providers and level of knowledge and awareness among the community?

**Methods:** Mixed methodology was adopted. For implementation, innovative tools, trainings and an array of communication activities were undertaken.

**Results:** Notification in the district was abysmally low. With continuous engagement it doubled and 2,800 notifications were submitted. CHETNA played substantive role in bridging gap between private-public players. Innovative approach of training support staff was one of the key success stories. Before seeking services of specialists, patients sought treatment from local drug stores/ chemists/doctors. Cost of treatment at private facilities was presumed to be high and average out of pocket expenditure was INR 4,000-5,000. Costs were incurred on doctors' fees and medicines. Patients were seldom counseled on side effects/contraindications and nutrition. Stigma and discrimination prevailed. 5,000 students, 500 teachers, 250 madrasa students, 270 moulavis, 600 factory workers and 6,000 households were sensitized and "a lakh voices" against TB were raised.

**Conclusions:** CHETNA is a non-incentivized scalable model. The challenges include delayed diagnosis, inadequate treatment, high treatment cost and lack of follow up mechanisms.

**Health Policy Implications:** The need of the hour is to enhance engagement with the largely unorganized/unregulated private sector through stringent policies, innovative strategies for surveillance, monitoring, regulation, patient tracking, and adherence.

## EMERGENCY ROOM VISITS OF UNDOCUMENTED MIGRANTS TO THE ICHILOV MEDICAL CENTER IN TEL AVIV, ISRAEL

Zohar Mor<sup>1</sup>, Sarit Sahaf<sup>2</sup>, Pinhas Halperin<sup>3</sup>, Nadav Davidovitch<sup>2</sup>

*1 Ministry of Health, IL*

*2 Ben-Gurion University of the Negev, IL*

*3 Tel Aviv Medical Center, IL*

**Background:** Undocumented immigrants (UI) are excluded from health insurance in Israel and may use the emergency department (ED) as a source for medical care.

**Study Question:** To compare the use of UI in ED with that of Israeli citizens (IC) in Tel Aviv Medical Center - Ichilov.

**Methods:** This cross-sectional study included all UI and IC patients aged >18 who attended the ED between 2007 and 2011 and compared their socio-demographic and administrative variables, hospitalization rates and causes for hospitalization by age and year of visit.

**Results:** A total of 549,713 patients attended the ED, while 528,218 (96.1%) were IC and 21,495 (3.9%) were UI. Of all the patients who referred to the ED, 169,878 (30.9%) were admitted to one of the hospital's wards: 165,697 (97.5% of all those who were hospitalized) were IC and 4,181 (2.5%) were UI.

UI who referred to the ED were younger (mean age was 39 vs. 22 years, respectively), mostly males (1.4 male/female ratio) and mainly originated from developing countries compared with IC. UI more commonly self-referred themselves to the ED, tended to attend ED in evening hours and weekends, complained of occupational injuries and frequented the surgical rather the medical ward of the ED compared with IC. UI stayed longer time in the ED than IC (3.1 vs. 2.9 hours, respectively), yet their hospitalization rate was lower compared with IC (19.4% vs. 23.5%, respectively), possibly reflecting milder medical conditions.

**Conclusions:** The longer stay of UI in ED and their lower hospitalization rates compared with that of IC after adjusting for age may represent milder medical conditions. It is possible that UI used the ED for urgent but also for non-urgent medical conditions.

**Health Policy Implications:** Improving the access of UI to ambulatory care may reduce unnecessary referrals to the ED. Hospitals should respond to the high-volume of UI by shifting staff to busy hours and employing translators.

## ETHICAL ISSUES OF USE OF AI IN ISRAEL REFLECTED IN THE ISRAELI CHAMBER OF ETHICS POSITION

Mohammed Morad

*Ben-Gurion University of the Negev, IL*

**Background:** Ethical questions have been discussed recently around the use of AI in medicine and healthcare. Many national and international medical organisations published their ethical standards and position in this regard.

Israeli researchers and health organisations expressed enormous interest in the use of AI in the Israeli Health system and some authorities expressed the need for an ethical guidelines on the use of AI in the healthcare system.

**Study Question:** What are the ethical standards adopted by the Chamber of ethics in this regard and how has this position historically developed.

**Methods:** To review the publications and the protocols of the Chamber of ethics discussing ethical issues related to the use of AI in medicine and healthcare in Israel.

**Results:** The Israel Medical Association asked the Chamber of Ethics to formulate new ethical standards while expressing its concern about the use of AI and big data. The chamber started its discussions and issued its first publication on the use of e-health and e-medicine inc. tele-medicine, social media and marginally commented on AI use. Recent discussions focused specifically on the ethical issues of AI use when HMO's in Israel presented its first pilot projects in this field.

**Conclusions:** The Israeli health system face the same challenge of developing and applying ethical standards related to the use of digital health, big data and artificial intelligence use in health care.

The concern is apparent in the organisations of health professionals and patients.

Pros and cons are evident but the fears of abuse and bias are paramount.

**Health Policy Implications:** The regulator, policymakers, leaders of patient and health professionals organisations should move quickly in putting the ethical standards of the use of AI in the Israeli health system and disseminate it to the public in order to minimise the stress on behalf patients and professionals and prevent the abuse of it by regulated work based on ethical clear standards.

## BUDGET-IMPACT OF DRUGS FOR ORPHAN DISEASES (ORPHAN DRUGS) IN THE ISRAELI HEALTH BASKET: A LONGITUDINAL ANALYSIS

Tal Morginstin<sup>1</sup>, Ariel Hammerman<sup>2</sup>, Noa Triki<sup>3</sup>, Baruch Weinreb<sup>4</sup>

*1 Ministry of Health, IL*

*2 Clalit Health Services, IL*

*3 Maccabi Healthcare Services, IL*

*4 Ben-Gurion University of the Negev, IL*

**Background:** Since the adoption of orphan-drug legislation in the US and Europe, the development of orphan drugs has grown rapidly. The rareness of each disease has led manufacturers to request extremely high prices for such drugs, and therefore their reimbursement has become a significant issue for healthcare decision makers. Although their high cost per patient, the Israeli Health Basket updating committee has tended to recommend accepting most orphan drugs, mainly because of 'rule of rescue'; saving identifiable patients with life-threatening illnesses, regardless of treatment costs.

**Study Question:** The aim of this study was to evaluate the total budget-impact of reimbursing orphan drugs in Israel in the last two decades.

**Methods:** Although there is no agreed definition of a rare disease, we chose to focus on treatments for diseases with a prevalence of less than 1: 80,000. Budgets were figured in 2019 values. Data was collected from MoH publications regarding the annual Health Basket updates.

**Results:** The first orphan drug added to the Health Basket was Agalsidase alfa for Fabry Disease, in 2002. During 2002–2018, a total of 316 million NIS, 4.4% of the entire budget allocated for all Health Basket updates, was provided for reimbursing 41 novel orphan medicines.

**Conclusions:** We have found that in Israel, although a permissible attitude, the proportion of the total budget allocated for orphan drugs, seems to be tolerable, mainly due to small patient numbers.

**Health Policy Implications:** The price of orphan drugs is a substantial challenge, especially since it has very little to do with incremental benefit. Fears that growth in the availability of novel orphan therapies will lead to an unsustainable cost escalation are currently not justified. However, it cannot be expected that the Health Basket will accept at any price all effective orphan drugs, since numerous significant and cost-effective treatments will need to be forgone for many other patients.

## PATIENTS' AND THEIR FAMILIES' EXPERIENCES OF HOSPITALIZATION IN A COHORT ISOLATION UNIT DUE TO CARBAPENEM-RESISTANT ENTEROBACTERIACEAE: A QUALITATIVE STUDY

Keren Naor Maman<sup>1</sup>, Paula Feder-Bubis<sup>1</sup>, Ronit Nativ<sup>2</sup>, Abraham Borer<sup>2</sup>, Ilana Livshiz-Riven<sup>2</sup>

*1 Ben-Gurion University of the Negev, IL*

*2 Soroka Medical Center, IL*

**Background:** The Carbapenem-resistant Enterobacteriaceae (CRE) outbreak affected almost all Israeli hospitals in 2006. A national strategy was implemented to control and contain the spread of the pathogen in hospitals. This included setting up cohort isolation units of CRE positive patients in a separate ward or an allocated area in a general ward, with designated nursing personnel and strict contact precaution. After 13 years, this is still extant in some of the hospitals.

**Study Question:** To explore the patients' and their families' experiences of the hospitalization due to CRE in a cohort isolation unit.

**Methods:** A qualitative, descriptive study using semi-structured interviews.

**Results:** Eight persons participated in the study, 3 patients and 5 family members. Analysis of the data identified 3 major themes: (1) patients' and their families' emotional experience. The overall emotional experience was negative. All of the participants, except one, expressed fear, loneliness, and frustration; (2) information management. Most of the participants described confusion about isolation. They expressed dissatisfaction regarding communication with staff; (3) the physical conditions of the cohort isolation unit. Most of the participants described the physical environment as unpleasant and uncomfortable.

**Conclusions & Health Policy Implications:** The negative experiences of the patients and their families challenge the design of cohort isolation units. More research is needed to identify communication and design characteristics of isolation that are more favorable to patients and their families. This data might help to establish patient-friendly policies for pathogens containment in hospitals.

## PERCEPTIONS OF PRIMARY-CARE PHYSICIANS REGARDING A QUALITY MEASURES PROGRAM IN PRIMARY MEDICINE IN ISRAEL

Rachel Nissanholtz-Gannot, Bruce Rosen, Tamar Medina Hartom

*Myers-JDC-Brookdale Institute, IL*

**Background:** An innovative program to measure quality in the community has been implemented in Israel since 2000. It includes ongoing monitoring of selected preventative, diagnostic, therapeutic and rehabilitation services provided by the health plans. The program examines various measures in areas such as diabetes, vaccinations, early detection and care of heart problems. In recent years, additional measures were added such as the use of antibiotics, mental health and a social-economic measure.

In 2010 we conducted a study examining the attitudes of primary physicians regarding the program. It revealed that the physicians were of the opinion that the program helps them to provide quality medicine and that the measures used were adequate. However, they also thought that the program increased their burden and caused more competition and extra pressure from management.

We are currently conducting a continuation study to examine how the perceptions of primary-care physicians regarding the quality measures program have evolved over the past decade.

**Study Question:** (1) To examine how primary physicians experience the process of monitoring the quality of medical care in the community.

(2) To examine the perceptions of physicians regarding the extent to which the program helps their professional practice.

(3) To examine the attitudes of the physicians regarding the changes introduced to the community quality measures program and to what extent they affect their practice.

(4) To learn about the physicians' position regarding ways to improve the program.

**Methods:** A survey among 800 health-fund primary-care physicians (about 200 from each health fund) will be conducted in April-May and the results will be analyzed and presented in the conference.

**Results:** The results will address the physicians' attitudes in the areas examined.

**Conclusions:** The study will allow front-line physicians to sound their voice and will help policymakers upgrade the program and employ best-practice methods to improve the quality of medical care.

**Health Policy Implications:** N/A

## LIFE STYLE SELF EFFICACY AMONG COMMUNITY NURSES AND HEALTHY LIFE STYLE PROMOTION WITH TYPE 2 DIABETICS

Galit Palacios Klein, Patricia Zimmermann, Pnina Shimoni, Orna Weinziger, Marina Leonenko

*Clalit Health Services, IL*

**Background:** Self-efficacy (SE) is defined as the perception of ones' ability to affect life events. Patients with high SE have better disease control. Health coaching identifies the gap between desired and actual behavior and increases SE, empowering patients to make healthier choices. The Sharon-Shomron District of Clalit Health Services, Israel, has embraced health coaching as an essential part of day-to-day care in community nursing.

**Study Question:** To explore the differences between SE and lifestyle among nurses before and after participating in a health coaching workshop. To examine whether the nurses' SE influences patients with Type 2 diabetes SE and control level.

**Methods:** 2-phase intervention study: (1) 42 nurses participated in a health-coaching workshop and completed a pre and post questionnaire on SE and lifestyle. (2) 50 Patients with uncontrolled diabetes underwent 4-6 nurse-led coaching sessions. Patient SE questionnaire and medical records prior to and 3 months post-intervention were collected.

**Results:** Nurses' SE increased post-workshop (2.92 vs 3.19,  $p < 0.01$ ) and health behaviors improved (5.97 vs 6.64,  $p < 0.01$ ). Nurses' personal health SE correlated with the ability to affect patients' SE and health behavior ( $r_s = 0.38$ ,  $p < 0.05$ ). Patients' SE increased following intervention (5.34 vs 7.88,  $p < 0.01$ ), also BMI and HbA1C improved (BMI: 32.17 vs 30.56, HBA1C 9.43 vs. 7.85,  $p < 0.01$ ).

**Conclusions:** Health coaching was effective in improving nurses' health behavior and SE. Nurses' SE positively correlated with better disease control in diabetic patients.

**Health Policy Implications:** Today, the use of the health coaching method is not routine work for all nurses in the community setting in Israel. The findings of the study should be considered regarding future training resources and the using of the method.



## MAPPING NEEDS AND CHALLENGES IN PROVIDING OUTLETS FOR HEALTHY SEXUAL EXPRESSION ON PATIENTS IN LONG-TERM PSYCHIATRIC HOSPITALIZATION

Tal Peleg-Sagy

*Be'er-Sheva Mental Health Center, IL*

**Background:** Approximately 250,000 people are currently diagnosed in Israel with mental illness, 3,200 of whom are hospitalized in long-term psychiatric wards.

Although healthy sexuality is one of the basic human rights, it is not being addressed by the medical staff of the relevant wards. Moreover, when sexuality is expressed in any manner, the reaction is often negative.

**Study Question:** What are the needs and challenges of the patients and of the health care providers in the long-term wards? We will map these factors, in order to formulate a better policy regarding hospitalized patients' sexual conduct.

**Methods:** A mixed-method investigation with a sample of 30 patients and 30 nurses in the long-term wards of Be'er-Sheva Mental Health Center. The participants answered self-report questionnaires regarding their attitudes towards sexuality and were interviewed regarding the sexual needs and limitations.

**Results:** Three dominant themes were recognized for the medical staff: (1) Insecurity and anxiety regarding legal guidelines (2) Embarrassment in the face of sexual expressions (3) Need for practical supervision and guidance groups. Three dominant themes were recognized for the patients: (1) Providing sexual accessibility (2) Recognition by the medical staff as human beings with needs and desires (3) Confusion towards sexual boundaries in the long-term wards.

**Conclusions:** It is crucial to address sexuality in long-term wards which serve as a home for the hospitalized patients. This includes support for both the staff and the patients, both emotional (i.e. supervision groups for nurses) and practical (i.e. providing sexual accessibility for patients).

**Health Policy Implications:** The current study provides a novel perspective as well as the innovative knowledge and direction of action regarding sexual conduct of patients living in long-term wards. This understanding will serve to change current health policy (or, if to be accurate, lack of it), and will contribute to ameliorating the condition of patients, their human rights and their general well-being.

## THE HEALTH OF “ANSWER SEEKERS” - ADDRESSING THE NEEDS OF YOUNG ISRAELIS MOVING FROM THE ULTRA-ORTHODOX TO THE SECULAR COMMUNITY

Ronit Pinchas-Mizrachi<sup>1</sup>, Baruch Velan<sup>2</sup>

*1 Ramat-Gan Academic College, IL*

*2 The Gertner Institute for Epidemiology and Health Policy Research, IL*

**Background:** Many young Israelis leave the Orthodox religious community to join the mainstream non-religious community. These groups often referred to as “Answer-Seekers” are gaining volume in the Israeli society both in number and visibility. The transition process could be very strenuous on the individual and result in undesired effects on wellbeing and health. Moreover, their emerging health needs could be jeopardized by inherent barriers in access to healthcare.

**Study Question:** To examine the health consideration of “Answer-Seekers” in an attempt to define their vulnerabilities and needs, and define measures for improving accessibility.

**Methods:** 12 young adults who have recently made the transition were asked to relate to health problems bothering the community and to accessibility barriers. The semi-structured interviews were analyzed qualitatively.

**Results:** Interviewees indicated that the “Answer-Seekers” population could be affected by mental health problems, including stress and depression, by sexual health problems related to unsafe practices, and by risks related to substance abuse and hazardous behavior. Interviewees suggested that these problems are associated with difficulties encountered prior to and during the post-transition process. Quest for help is often hampered by health illiteracy, stigmatization of mental and sexual vulnerabilities and prejudice.

**Conclusions:** The “Answer-Seekers” population is a newly developing community with specific health needs. Comparison to findings regarding the health of immigrants, and LGBT populations suggest that the process of transition per se could trigger health problems.

**Health Policy Implications:** Health authorities are urged to pay attention to the problems of this emerging group and provide appropriate health measures.

## INSTANT MESSAGING APPS IN MEDICINE - OUR ACCOUNT OF A NATION WIDE MONITOR PROJECT

**Dror Raif<sup>1</sup>, Ofer Tadmor<sup>2</sup>, Yaakov Segal<sup>2</sup>, Miri Mizrahi-Reuveni<sup>2</sup>, Nachman Ash<sup>2</sup>**

*1 Hadassah-Hebrew University of Jerusalem, IL*

*2 Maccabi Healthcare Services, IL*

**Background:** Maccabi Healthcare Services provides healthcare services nationwide. One of those services is a prenatal evaluation of fetal well-being through a non-stress test (NST). Recently, Maccabi started providing this service nationwide, by relying on central analysis of tele-monitors by six doctors, who provided real-time support to 250 nurses in 142 healthcare centers. The large and dynamic numbers of nurses performing the tele-monitors and the need for real-time response from the doctors required a new and unique communication paradigm.

**Study Question:** What are the technical possibilities and the medical and economic benefit of using instant messaging in order to manage a real-time tele-monitor system nationwide?

**Methods:** Six doctors provided real-time medical support to 250 nurses in 142 healthcare centers, dealing with 600 fetal tele-monitors monthly. The communication was based on WhatsApp groups, including a large all-inclusive group for all doctors and nurses participating in the project, over 100 individual groups for each nurse and all the supporting doctors, and an all-doctor group. The traffic in the groups was analyzed according to wait time for response, number of messages required to handle a case and number of emergencies dealt with through this communication channel.

**Results:** A sample of 2,626 messages, sent between January and August 2018 was analyzed. In 282 cases, a nurse notified the doctors that a tele-monitor had been awaiting response in the system for over 20 minutes, and received a prompt replay, average replay time by at least one doctor being 4.3 minutes. 58 urgent cases where the patient was evacuated by ambulance to the hospital were handled, requiring on average 3.8 messages.

**Conclusions:** With the use of instant messaging apps, we have proved that a limited number of doctors can provide medical support to 142 healthcare centers providing tele-monitor services to local patients. The use of instant messaging apps was integral to the day to day operation of such a large-scale project and stressed the need for instant communication in making healthcare more accessible to more patients outside the large metropolitan areas.

**Health Policy Implications:** Instant messaging apps are now a part of daily life, and implementing them into healthcare is inevitable. This inevitability brings to light both opportunities for new models of care, anywhere and anytime, but also confidentiality and data security challenges. We must face those challenges, but also take advantage of the new possibilities for larger scale projects, and faster, better, medical care, wherever and whenever it is needed.

## PHYSICIANS' ROLE IN THE RISE IN PRIVATE HEALTH INSURANCE IN ISRAEL - A MIXED METHODS STUDY

Alon Rasooly, Tal Michael, Dani Filc, Nadav Davidovitch

*Ben-Gurion University of the Negev, IL*

**Background:** Since the legislation of the Arrangement Law in 1998, that allowed the sick funds to sell supplementary insurances, we witness a sharp increase in the share of the population owning such insurance. Today, Israel is among the countries with the highest share of the population owning a private insurance scheme. This situation is characterized by growing gaps in access to healthcare, reduced efficiency of the provision of health services and growing inequalities.

**Study Question:** The high share of the population owning private insurance is puzzling since those are mostly duplicate insurance schemes. In order to understand this, we investigated the role and underlying reasons for physicians to recommend patients to purchase or use private health insurance (PHI).

**Methods:** In-depth interviews were conducted during 2017 with 21 physicians from specialty groups where private practice is less common - infectious disease and intensive care - and more common - orthopedics, cardiology and cardiothoracic surgery. This was followed by a quantitative survey of 197 physicians from the specialties above.

**Results:** In our qualitative findings, reducing waiting times for elective surgeries was the most common reason for physicians to recommend patients to purchase or use PHI. Within our quantitative results, this recommendation was correlated with the physician being dissatisfied from the public system ( $\beta=0.68$ ;  $p<0.001$ ) and with dissatisfaction from his/her workplace ( $\beta =0.684$ ;  $p<0.001$ ), regardless of physicians' specialty.

**Conclusions:** As the public system faces enormous budgetary constraints, physicians recommend patients to seek solutions within the private system. On a system level, this response damages equitable access and induces inefficiencies in healthcare provision.

**Health Policy Implications:** While much attention has been given to patients' and policymakers, physicians roles at the patient-system intersection may have been overlooked. Greater emphasis on physicians' working conditions and how they try to maximize their patients' benefit must be included in private-public policy discourse. More studies are warranted to evaluate the implication of recent regulatory changes.

## CONTINUITY OF CARE REGIMENT FOR PEOPLE WHO ATTEMPTED SUICIDE AND WERE ARRIVED AT GENERAL HOSPITALS

Gil Raviv, Arad Kodesh, Revital Ordan, Dany Villa, Katy Samooha, Gila Ben David, Nuriel Burak

*Meuhedet Healthcare Services, IL*

**Background:** Previous research suggests that improved continuity of care would likely reduce the number of subsequent suicidal attempts following a previous nonfatal attempt. Meuhedet Health Services (Meuhedet) developed a systematic care process for those patients to ensure continuity of care (CoC).

**Study Question:** Is it possible to offer a pragmatic approach for suicide prevention among high-risk patients by improving continuity of care?

**Methods:** We developed a computerized daily report of suicide attempts. Includes persons who attempted suicide in the last 24 hours, treated in the Emergency room (ER), and were then discharged or hospitalized. A Meuhedet liaison nurse initiates intervention with those patients as soon as they are hospitalized. A report that includes clinical and psychiatric status is transmitted to the Meuhedet's' transitional unit (IU). This unit coordinates the treatment of all complex patients who were discharged from hospital and require immediate and specific treatment in the community. In 2016, we defined suicide attempters as "complex patients" so the IU assumes further treatment. We evaluated whether this procedure increased the number of medical visits among this group.

**Results:** In 2015, 49% of suicide attempters visited a primary physician within 2 weeks of their hospital release, compared with 51% in 2016 and 52% in 2017. A more significant increase was observed in the number of mental health visits: 12% in 2015, 21% in 2016 and 48% in 2017.

**Conclusions:** The suicide attempters COC process led to a significant increase in mental health visits after hospital discharge following a suicide attempt. We need further investigation to evaluate if improving CoC led to the reduction of suicide rates.

**Health Policy Implications:** Closing the treatment gap between hospital admission and the follow up in the community for suicide high-risk group is an indicator for a good medical practice that may decrease suicide rates. We recommend other healthcare organizations to adopt this proactive preventive model.

## THE ASSOCIATION BETWEEN INPATIENT HYPERGLYCEMIA AND THIRTY-DAY MORTALITY IS MODIFIED BY PRE-HOSPITAL GLYCEMIC STATUS

Hana'a Rayyan-Assi<sup>1</sup>, Becca Feldman<sup>1</sup>, Maya Leventer-Roberts<sup>1</sup>, Itamar Raz<sup>2</sup>

*1 Clalit Research Institute, IL*

*2 Hadassah Medical Center, IL*

**Background:** There is a well-established association between "inpatient hyperglycemia" (HG) and mortality. However, the evidence is inconsistent regarding whether this association is differential among those with and without Type 2 Diabetes Mellitus (T2DM). Most studies are based on convenience samples or are unable to adjust for comorbidities.

**Study Question:** Is the association between HG and 30-day mortality modified by pre-hospital glycemic status (T2DM, pre-diabetes, unscreened and non-T2DM) among a population-based cohort while controlling for 15 years of medical history?

**Methods:** This was a retrospective cohort study of individuals who were hospitalized between 2012–2015. Thirty-day mortality was assessed during the first inpatient stay up to 30 days post discharge. The adjusted association between HG and mortality was assessed with logistic regression models. Then, four interaction terms were entered into the model to assess if the association of HG with mortality differed by pre-hospital glycemic status. In a sensitivity analysis we examined the relationship between HG and mortality among controlled vs. uncontrolled T2DM.

**Results:** The multivariate model demonstrated a 2.18-fold risk of mortality associated with HG (OR [95%CI]: 2.19 [2.08–2.31]). Adding the interaction terms between HG and pre-hospital glycemic status the ORs of 30-day mortality were 1.41 [1.25–1.60] in non-T2DM status (n=57,806), 1.32 [1.16–1.51] in pre-diabetes status (n=39,704), and 1.30 [1.04–1.62] in unscreened status (n=11,871), as compared to T2DM status (n=65,290) with HG. The sensitivity analysis showed consistent magnitude with and OR of 1.62 [95%CI: 1.33–1.97] for 30-day mortality among controlled T2DM as compared to the uncontrolled with HG.

**Conclusions:** HG is positively associated with mortality and both those without T2DM and with controlled T2DM are at highest risk.

**Health Policy Implications:** These findings may help medical staff identify the potential increased risk of mortality at hospital entry and upon discharge, and direct further research to assess how hyperglycemia control and proactive deterioration prevention throughout the entire inpatient stay may prevent adverse outcomes.

## INTEGRATED CARE IN ISRAEL: CAN WE OVERCOME THE CHALLENGE OF PROVIDING COMPREHENSIVE CARE FOR THE ELDERLY WITH COMPLEX NEEDS?

Shirli Resnizky, Michal Laron, Yitschak Shnoor, Yafit Cohen

*MYERS-JDC-Brookdale Institute, IL*

**Background:** The aging of society is one of the largest challenges in the coming years. Despite the extensive development of services for the elderly, there is structural fragmentation among ministries and agencies in Israel; this leads to difficulties in providing comprehensive care, especially for those with complex needs. A pilot program initiated by several government agencies and NGOs was implemented in four Israeli localities, based on nurse-social worker care-manager teams.

**Study Question:** A comprehensive evaluation study was designed to evaluate the pilot program. The study goals were to evaluate the service model, the outputs and the outcomes.

**Methods:** Using a randomized control trial, elderly individuals were randomly divided upon referral into control and treatment groups and interviewed face-to-face 8 months later (n=104). Administrative data from the medical record and intake forms and care-plans were also analyzed.

**Results:** Most of the participants (84%) had a combination of health and social problems. In comparing various health and social measures one year prior to the program to one year after, we found a greater decrease among the treatment group than the control group in the number of return hospitalizations, hospitalization duration, and family physician visits. The treatment group received more homecare services, geriatric assessments and days in rehab/geriatric institutions. They experienced greater co-operation among the care services. Nevertheless, no differences were found in health-related quality of life (SF-12), satisfaction with life (Cantril Self-Anchoring Scale) or trust in services.

**Conclusions:** As with other integrated care programs, the findings are inconclusive. The program managed to improve several health measures, but not wellbeing. One reason could be the difficulty in creating confidence and trust in the service system.

**Health Policy Implications:** As the program of integrated care was approved as part of the nursing reform of 2018, this study helps in defining the pros and cons of the pilot and offers suggestions to overcome barriers.

## THE EFFECTIVE AND JUDICIOUS ADAPTATION OF INNOVATIONS FROM OTHER COUNTRIES - THE ISRAELI CASE

Bruce Rosen

*The Myers-JDC-Brookdale Institute, IL*

**Background:** Health care systems around the world face the challenge of how best to learn from one another in an age in which innovation is widespread, rapid, expensive, and risky.

**Study Question:**

1. Is the importation and adaptation of innovations from other countries an extensive phenomenon in Israeli health policy and health care?
2. What types of innovations tend to be imported and adapted?
3. From which countries are the innovations imported?
4. What were the main reasons for the adaptations?

**Methods:** Over the course of 2016, the investigator asked approximately 20 Israel health care leaders to share stories of innovations that they helped import to Israel.

**Results:**

1. Several of the most important changes in Israeli health care over the past 25 years were included among the 20 "adaptation stories" collected via conversations with these leaders.
2. The main substantive areas were: National systems and policies related to the organization, financing or monitoring of care (7); National initiatives to advance population health and disease prevention (5); Provider initiatives related to delivery of care.
3. The sources of the innovations were distributed as follows: The United States (10); Europe (7); International organizations (3).
4. The main reasons for adapting the original innovations were: the need to overcome an Israeli limitation - typically related to financial capacity or workforce availability (9) and the opportunity to take advantage of an Israeli strength, such as advanced health information systems (4).

**Conclusions:** Israeli health care has an impressive ability to identify relevant innovations developed in other countries, and then adapt them to Israel.

**Health Policy Implications:** Israeli health care should continue, and perhaps expand and modernize, the wide range of activities it undertakes to ensure that its professionals are exposed to important developments in other countries.



## THE ESTABLISHMENT OF A NATIONAL BIRTH REGISTRY

Lisa Rubin<sup>1</sup>, Liraz Yehoshua-Levi<sup>2</sup>, Shlomo Almoshano<sup>2</sup>, Nirah Fisher<sup>2</sup>, Ziona Haklai<sup>2</sup>

*1 Ministry of Health; University of Haifa, IL*

*2 Ministry of Health, IL*

**Background:** Accurate birth data is essential for health services providers, administration and evaluating health markers. The Ministry of Health (MoH) has established a national birth registry with administrative and clinical information, enabling sharing of data between healthcare organizations while adhering to strict security measures.

**Study Question:** (1) Improve data quality by computerizing manual processes and reducing human error. (2) Secure real-time transfer of information critical for follow-up of healthy and at-risk infants. (3) Improve services and patients' experience.

**Methods:** A national steering committee oversees registry development. Hospital-generated files of live births (regardless of legal status) transferred to MoH National Newborn Screening (NNS) laboratory form the basis for the registry. Data is uploaded after five days to permit updating and correction of errors. Data includes demographics, birth weight, gestational age, and normal newborn screening results. Congenital malformations are entered from hospital reports. Linkage to the death certificates registry provides information on child deaths from 0-5 years. Additional clinical data will be culled from digital hospital records. Births are cross-referenced with the Ministry of Interior Population Registry.

**Results:** The birth registry permits combining individual-level data for pregnancy outcomes excluding terminations. Cross-referencing has permitted the identification of missing data and results in improvements in completeness and accuracy.

**Conclusions:** A new platform to access NNS results for the public has been developed. Information on all births including preterm and low birth weight infants for each health fund are transferred regularly. Outreach to parents for well-child care using messaging and reduced bureaucracy for easier parental registration of births are in development. The platform allows for flexible data analysis.

**Health Policy Implications:** The registry's establishment is an additional step in improving health data for Israel. Secure sharing of information from the registry will improve services in hospitals and patients' experience on a national level.

## CONTINUED GLYCEMIC CONTROL IN DIABETES PATIENTS - DATA FROM THE ISRAELI NATIONAL DIABETES REGISTER (INDR)

Mor Saban<sup>1</sup>, Miri Lutski<sup>1</sup>, Debbie Novick<sup>1</sup>, Itamar Raz<sup>2</sup>, Inbar Zucker<sup>3</sup>

*1 Israel Center for Disease Control, Ministry of Health, IL*

*2 Diabetes Research Center; Hadassah-Hebrew University Medical Center, IL*

*3 Israel Center for Disease Control, Ministry of Health; Tel Aviv University, IL*

**Background:** Continued glyceimic control has important clinical implications for the prevention of long-term complications. Clinical data from the Israeli National Diabetes Register (INDR) enabled the analysis of long-term glyceimic trends among diabetes patients.

**Study Question:** To explore the rates of continued glyceimic control ( $HbA1c \leq 7$ ) and lack of control ( $HbA1c > 9$ ) among the diabetic population in Israel, as well as to examine the relationship between continued glyceimic control and sociodemographic variables.

**Methods:** Five years of population-based data from the INDR (2012–2016,  $n=664,335$ ). Data included  $HbA1c$ , age, gender and socioeconomic status (SES). Patients with at least 3 years of follow-up were included.

**Results:** 473,212 individuals were included in the analysis, mean age  $63.4 \pm 13.3$ , 50.5% were men and 70% had 5 years of follow-up. Annual  $HbA1c$  data was available for 73% of the included patients. Only 33% of the patients maintained glyceimic control for the whole period (3–5 years), while 40% of the patients had at least one test result of  $HbA1c \leq 7$  during that period. Rate of continued control was higher in women (37%) vs. men (31%) and it increased with age (8.4% before age 18 to 43% in age 85 and over) and with SES score. In contrast, 4.3% had uncontrolled  $HbA1c$  during the entire period, and 20.3% had at least one test result of  $HbA1c > 9$  during that period. More imbalanced patients were found to be younger (18–44), predominantly male (54.2% vs. 45.8%), and with lower SES score.

**Conclusions:** Only one-third of diabetic patients maintain continuous glyceimic control and at least 25% will have episodes of uncontrolled  $HbA1c$ .

**Health Policy Implications:** There is a strong need for better treatment interventions especially among the young and underprivileged.

## PARTIAL SMOKING BAN BREAKS THE PROMISE OF SMOKE-FREE ENVIRONMENT IN KAZAKHSTAN

Jamilya Sadykova<sup>1</sup>, Ardak Baizhaxynova<sup>2</sup>

*1 National Coalition "Smoke free Kazakhstan", Kazakhstan*

*2 Nazarbayev University, Kazakhstan*

**Background:** The fundamental human rights and principles of Article 8 of the WHO Framework Convention on Tobacco Control (FCTC) requires 100% smoke-free public places. Kazakhstan ratified the FCTC in 2006 but only has a partial smoke free policy; current law allows designated smoking rooms (DSR) in public dining establishments, while other public places must be 100% smoke free.

**Study Question:** Assess the effectiveness of specially designated places for smokers, in protecting people from second-hand smoking exposure, in the public dining venues of Kazakhstan by means of air quality monitoring.

**Methods:** A cross-sectional study of indoor air quality was conducted from September to October 2017 in the largest city of Kazakhstan. A total of 29 public dining establishments with different smoking policy were monitored in the evenings. The real-time measurement of PM<sub>2.5</sub> particulate matters was conducted by TSI SidePak AM510 Personal Aerosol Monitor and was ranked using the WHO target air quality guideline.

**Results:** The highest mean PM<sub>2.5</sub> level was detected inside the DSRs (648 µg/m<sup>3</sup>), followed by venues with similar results where smoking was allowed throughout the venue (180,3 µg/m<sup>3</sup>) and inside the smoking hall (182 µg/m<sup>3</sup>). The third rank belongs to non-smoking areas venues which allows smoking only in DSRs (73.1 µg/m<sup>3</sup>). The lowest mean PM<sub>2.5</sub> level was observed in 100% smoke-free venues (26 µg/m<sup>3</sup>).

**Conclusions:** PM<sub>2.5</sub> concentrations at DSRs which comprise hazardous level severely undermines the smoke-free environment national agenda. Unhealthy levels of PM<sub>2.5</sub> concentrations at smoking areas confirm that a partial smoking ban violates the fundamental human right to be protected from second-hand smoke.

**Health Policy Implications:** Air quality monitoring data confirms that anything less than 100% smoke-free policies is hazardous to people and must be amended to eliminate DSRs and other exemptions from public places, as mandated by the Framework Convention on Tobacco Control.

## MULTIDISCIPLINARY INTERVENTION TO DECREASE THE INCIDENCE OF CLOSTRIDIUM DIFFICILE ACQUISITION AT A PUBLIC HOSPITAL

Lisa Saidel-Odes, Ronit Nativ, Nurit Cohen, Orly Sagi, Jacob Dreiherr, Abraham

**Borer**

*Soroka University Medical Center, IL*

**Background:** Clostridium Difficile (CD) is the major cause of Nosocomial Diarrhea. Preventing cross-transmission requires strict isolation, disinfection, and intensive cleaning.

**Study Question:** Our aim was to assess the effect of rapid identification and diagnosis of CD and environmental cleaning on the incidence of CD acquisition in the hospital.

**Methods:** The intervention began in 2017. The indication for sending a stool sample to the lab for CD toxin identification was revised according to the CDC guidelines. A form was designed including the date, time, and indication for sending the sample. The bacteriology laboratory doubled its service for testing CD toxin. A positive test result was immediately reported to the referring department and the infection control unit. A dedicated cleaning team was formed under the guidance on the infection control unit.

**Results:** Comparing the pre-intervention (1-4/2017) to the intervention period (1-4/2018) there was a decrease in the total positive results from 54 to 43 respectively; total hospital acquisition decreased from 72% to 63%,  $p=0.22$ . Acquisition in Internal Medicine departments decreased from 51.8% to 25.6%,  $p=0.007$ . An indication was documented in 81.5% of forms during 2017 and in 100% during 2018,  $p=0.002$ . The turnaround time for results was shortened from 6 to 2 hours. Physician's documentation of a positive result in the patient's file increased from 68.5% to 86%,  $p=0.056$ . Terminal cleaning of the patient zone by a dedicated team was performed within 75 minutes vs. 3 hours in 2017. The incidence of nosocomial CD acquisition was reduced from 27/10,000 hospitalization-days in 2017 to 20.7/10,000 hospitalization-days in 2018,  $p=0.004$ .

**Conclusions:** Multidisciplinary intervention for rapid identification and diagnosis of CD, immediate patient isolation, and using a rigorous environmental cleaning team has decreased the incidence of CD acquisition.

**Health Policy Implications:** This multifaceted intervention could be copied to other hospitals in Israel.

## USING INDIVIDUAL-LEVEL GEOGRAPHIC DATA TO UNCOVER SOCIOECONOMIC STATUS-INDEPENDENT SPATIAL CLUSTERS OF MAMMOGRAPHY ADHERENCE IN GENEVA (SWITZERLAND)

José Luis Sandoval, Rebecca Himsl, Jean Michel Gaspoz, Stéphane Joost, Idris Guessous

*Geneva University Hospitals, Switzerland*

**Background:** Individual behaviour and health-related outcomes are influenced by the local physical and social environment. It remains undetermined if the environmental influence is independent of individual socioeconomic status.

**Study Question:** We aimed to determine the spatial distribution of mammography adherence in a Swiss urban population (Geneva, Switzerland) and evaluate how independent it was from socioeconomic status (SES).

**Methods:** We used geo-referenced individual-level data ( $n = 5,002$ ) from participants in the population-based cross-sectional Bus Santé study. We calculated local indicators of spatial association (LISA) and assessed the spatial dependence of mammography adherence. Reported spatial clusters are unadjusted; adjusted for individual educational attainment and neighborhood income; and demographic variables (Swiss nationality and age). We also evaluated the association between adjusted clusters and the proximity to the nearest screening center.

**Results:** Mammography adherence was not randomly distributed in Geneva. Spatial clusters coincided with known SES distribution. Adjustment for SES indicators reduced spatial clusters to 56.2% of their initial size ( $n = 1,033$ ). Further reduction in individuals exhibiting spatially-dependent behavior (36.5% of the initial size) was observed after adjustment for age and nationality. Proximity to the nearest screening center was not related to the identified SES-independent spatial hot-spots and cold-spots of mammography adherence.

**Conclusions:** Demographic and SES factors shape the spatial distribution of mammography adherence. However, the persistence of spatial clusters after adjustment for these confounders indicates that additional neighborhood-level determinants are influencing the spatial variation of mammography adherence. Further studies to identify these additional local determinants could lead to targeted public health interventions to improve population health outcomes.

**Health Policy Implications:** Spatial analysis of individual data is a powerful tool to characterise population behavior and identify spatial clusters that are determined by individual behaviors rather than by pre-determined administrative units (e.g. neighborhood and postal code). Taking into account high definition spatial distribution studies has the potential to improve current data-driven health policymaking significantly.

## IMPROVING DETECTION OF CHILD MALTREATMENT AMONG CHILDREN WITH DISABILITY: SUGGESTIONS FROM A CHILD DEVELOPMENT CENTER

Mitchell Schertz<sup>1</sup>, Yael Karni-Visel<sup>2</sup>, Irit Hershkowitz<sup>3</sup>, Flaisher Michal<sup>1</sup>, Fabian Hershkowitz<sup>1</sup>

*1 Meuhedet Healthcare Services, IL*

*2 Meuhedet Healthcare Services; University of Haifa, IL*

*3 University of Haifa, IL*

**Background:** Under-identification of child maltreatment (CM) remains a significant problem. Children with a disability are at significantly greater risk of experiencing CM compared to the general population.

**Study Question:** To examine rates of CM identification in a child development center vs. a community clinic.

**Methods:** This was a cross-sectional study, for the period 2011-2015. The study group consisted of children 0-18 years belonging to the Meuhedet Health Maintenance Organization (HMO) Northern Region, who attended the CDC, for assessment/treatment. The CDC employed a multi-disciplinary approach to improve CM identification. The comparison group consisted of children with disability belonging to the HMO, who attended a CC, but were not known to the CDC.

**Results:** CM identification during the study period was 2.1% for the CDC vs. 0.8% for the CC. Children visiting the CDC had five times higher odds to be identified with suspected CM than children in the CC, after adjusting for age, gender, socioeconomic status, ethnicity, and disability severity.

**Conclusions:** CM identification rates in children with a disability were higher in a CDC vs. CC. The approach used in the CDC may significantly improve CM identification in children with disability.

**Health Policy Implications:** Our results support a systematic approach integrating screening and training for CM in a holistic manner that includes screening at different time points and settings which can be implemented in different health settings. This can lead to improved CM identification with obvious health and social benefits to the child and family and the associated cost savings to society.

## USING DISAGGREGATED DATA TO MEASURE EQUITY OF ACCESS TO HEALTH CARE IN LOW INCOME SETTINGS

Elena Schmidt<sup>1</sup>, Emma Jolley<sup>1</sup>, Thomas Engels<sup>2</sup>

*1 Sightsavers, UK*

*2 Oeconomia, Senegal*

**Background:** With growing recognition of Universal health coverage as a fundamental human right, attention begins to turn to how this global commitment can be achieved and effectively monitored. Data on disability and access to healthcare is particularly scarce.

This presentation will share results of the data disaggregation pilots in Malawi and Mozambique and discuss implications for policies and practice.

**Methods:** In Mozambique data disaggregation was integrated in the survey of visual impairment and routine HMIS. In Malawi, the tools were used in trachoma outreach camps. To disaggregate data by disability the Washington Group Short Set has been used. Data on wealth has been collected using the Poverty Score Card and the Equity Tool.

**Results:** In Mozambique, 4,002 individuals aged 50+ years participated in the survey. The prevalence of disability was 11.9%. After adjustment for confounders, people with non-visual disabilities were 3 times more likely to be bilaterally blind or severely visually impaired. Among 651 patients attending hospitals for a cataract operation, 80.3% had a disability and 45.2% had a non-visual disability. Among 1,358 patients attending the outreach camp in Malawi, 27.5% had a disability and 14% had a non-visual disability. The camp attendees were poor in absolute terms: 42.9% were below the national poverty line; 61.5% were below \$1.25 a day. Relatively however the camp attendees were wealthier than the national population, with over half belonging to the two wealthiest quintiles.

**Discussion/Conclusion:** The integration of additional tools in the standard surveys and HMIS was feasible and provided important evidence on how access to health care differs by sex, disability and wealth. The findings however suggest that the assumption that certain population subgroups experience disadvantage cannot be generalised, and it is important to understand the factors at play in any particular context.

**Health Policy Implications:** In addition to disaggregating programmatic data by sex, all development health programmes should be encouraged to disaggregate data by disability and wealth. Disaggregation should be built in development programme monitoring and reporting systems.

## DATA-DRIVEN CARE: IMPLEMENTATION OF A BI SYSTEM THAT ENABLES A NATIONAL STANDARD OF QUALITY MEASUREMENT

Hanni Schroeder, Nethanel Goldschmidt, Gilad Saar, David Levine, Michael Kuniavsky, Olga Bronstein, Ofir Werthaim

*Ministry of Health, IL*

**Background:** Performance measurement of the quality of care is a vital component of the modern healthcare system. In 2012, the Quality Department of the Ministry of Health (MoH) developed a program for quality indicator measurement: the Israeli Hospital Quality Indicators Program (IHQIP). The IHQIP measures quality indicators in 81 hospitals, 720 Well-Mother-Baby Clinics and 20 emergency medical services and dialysis centers.

With the rapid expansion of the Indicators Program, the need arose for a data management system. This would reflect in near to real-time the quality indicator performance rate by service providers and would be stratified to patient characteristics, such as sex and age, as well as event characteristics such as the shift and day of admission. The IHQIP in conjunction with the MoH's IT department developed a Business Intelligence (BI) System for internal use of the service providers. The system enables the service provider to identify barriers specific to each hospital and implement data-driven changes in health care management.

**Study Question:** Is it feasible for the regulator (MoH) to embed a BI system into Israeli health service providers?

**Methods:** Data is transmitted quarterly to the MoH. To ensure patient confidentiality, information is de-identified, encrypted, and transmitted through a one-way gateway (called a "vault"). Within hours of transmission to the MoH, the service provider sees QI performance rates on the internal BI system.

**Results:** The BI system was successfully embedded in general hospitals, paving the way for psychiatric and geriatric hospitals, as well as Well-Mother-Baby Clinics.

**Conclusions:** The BI System improves cooperation and transparency between the regulator and service providers and establishes a unified standard of quality measurement care among all parties.

**Health Policy Implications:** Development and accessibility of the system for all service providers enable a national standard of measurement, which improves tracking of quality indicators performance, helps to identify and addresses near to real-time barriers that can enable improvement in the quality of care.



## LIMITING TERMS OF OFFICE FOR DIRECTORS OF NURSING IN THE ISRAELI PUBLIC HEALTH SYSTEM - TO WHO'S ADVANTAGE?

Inga Shalev<sup>1</sup>, Adriana Prodan<sup>2</sup>

*1 Edith Wolfson Academic School of Nursing, IL*

*2 Alexandru Ioan Cuza University, Iasi, Romania*

**Background:** Nurses appointed to senior management positions remain in these roles for a lengthy period, 20 years on average and even until their retirement. This situation of protracted terms of office and of managers who are appointed 'for life' risks resulting in a lack of professional development, burnout, the tendency of best nurses to leave the government system due to a lack of promotion options, a constant decline in encouraging excellence, and more.

**Study Question:** The study aimed to examine the factors related to readiness to implement arrangements limiting terms of office for Directors of Nursing (DONs) in the Israeli public health system.

**Methods:** This research employed a mixed methods design based on a sequential exploratory strategy. In the first, qualitative stage, 16 semi-structured in-depth interviews were conducted with stakeholders in order to identify the factors and main themes involved in limiting terms of office for DONs. The second, quantitative stage, was designed based on the findings of the qualitative stage and included collecting data using self-administered closed-end questionnaires completed by 201 middle range and senior managers from five general government-run Israeli hospitals.

**Results:** The main themes indicated that while limiting terms of office for DONs in the public health system raises ambivalent feelings, it also constitutes a valuable tool for keeping organizations fresh and functioning. Then again, it would require a policy change in the Ministry of Health and an organizational change in the medical organizations and would necessitate the development of a structured career track.

One hundred sixty-five respondents (82.1%) claimed that there is need (i.e., expressed readiness) to limit terms of office for DONs, and agreed that an average term of 6.1 years (SD=1.9) would be optimal for the role of DON.

**Conclusions:** The study emphasized the need to examine the current policy regarding mobility in senior positions in nursing. Undoubtedly, a policy change in this direction will require a significant reorganization in the healthcare institutions and must be accompanied by the development of a structured career track.

**Health Policy Implications:** The study developed a new conceptual framework regarding term limits for directors of nursing, which constitutes a policy change and undermines the current course of action, i.e., "directors for life".

## A PATH TO OPTIMAL CARE: AN INFORMATION-SHARING MODEL FOR ENHANCING RESPONSE CAPACITY FOR MEDICALLY VULNERABLE POPULATIONS DURING EMERGENCIES

Stav Shapira, Paula Feder-Bubis, A. Mark Clarfield, Limor Aharonson-Daniel

*Ben-Gurion University of the Negev, IL*

**Background:** During emergency situations the healthcare system is likely to be overwhelmed by an influx of casualties while also facing a shortfall of resources, impeding its ability to maintain continuity of care for frail individuals such as the elderly and chronically ill. Collaborating with external entities such as local municipalities may assist in bridging this gap; however, this necessitates sharing medical information outside of the healthcare system and may lead to potential breaches of patient privacy.

**Study Question:** Do the benefits of sharing health-related information in times of emergency outweigh privacy risks?

**Methods:** Qualitative interviews with officials from the healthcare system and the welfare services in a local municipality in Israel mapped the capabilities and resources related to the expected needs of medically vulnerable populations following an emergency. A gap analysis was performed and potential solutions were offered through establishing a standardized collaboration while tackling legal and ethical issues of privacy, confidentiality, and securing data.

**Results:** A limited ability to manage data during emergencies was documented. The resources available to local municipalities, including available personnel, can support a proactive approach of care by providing initial and rapid response to health needs of medically vulnerable persons in crisis situations. However, this necessitates the availability of relevant health-related information and location. A standard operating procedure for information-sharing was constructed using a GIS-based tool enabling data integration. Privacy risks are identified and discussed, and practical solutions are offered.

**Conclusions:** Pre-establishing cooperation between healthcare services and local municipalities can facilitate a proactive approach for maintaining continuity of care, mitigate adverse health consequences and minimize privacy risks.

**Health Policy Implications:** Promoting the use of information technologies among all relevant organizations involved in emergency management; as well as establishing an appropriate legal framework and strict procedures is crucial in order to balance between expected risks and benefits.

## IMPROVING MENTAL HEALTH CARE UTILIZATION AMONG THE MOST RELIGIOUS ISRAELIS IN AN AGE OF REFORM

Ephraim Shapiro

*Ariel University, IL*

**Background:** Israel undertook an innovative reform of its mental health care system in 2015, transferring care provision from the state to the health plans. One of the key motivations was the ability to better integrate physical and mental health data. Yet together with this increased data capacity arose increased concerns for privacy. This was particularly true for the most traditionally religious Israelis, where underutilization of mental health services has been observed because of stigma and other barriers. There may be opportunities, however, to overcome these barriers to utilization, yet the topic has been understudied.

**Study Question:** What are the barriers to Haredi Jews and religious Muslims in Israel seeking and/or receiving mental healthcare?

Do results vary by key demographic subgroups, especially religion/denomination?

What initiatives involving medical and faith communities can potentially increase appropriate use of mental health services among religious Israelis?

**Methods:** Intensive interviews were conducted in 2017 with 25 religious and community leaders among both religious Moslems and Haredi Jews, and with senior medical personnel, to better understand the reasons for utilization barriers and identify potential interventions. A grounded theory approach was used in analyzing interview transcripts for themes and subthemes, using Narralyzer software.

**Results:** Barriers to appropriate utilization of mental health services were identified and grouped into four categories: stigma, lack of knowledge, financial issues, and access to care. Parallels between Jews and Muslims were found but also important differences. Opportunities for interventions were suggested by informants, especially through education and collaboration of religious and healthcare sectors, adapted for different communities.

**Conclusions:** The most traditionally religious Israelis, both Jews and Moslems, present special challenges as well as opportunities, to receive appropriate mental healthcare because of their distinctive characteristics.

**Health Policy Implications:** A closer partnership is needed between the healthcare and religious communities to help overcome mental healthcare utilization barriers, such as stigma, after mental health care reform.

## FREQUENT ATTENDERS IN A COMMUNITY PRIMARY CARE CLINIC: IS IT POSSIBLE TO ELIMINATE THIS TENDENCY?

Rachel Sharabani<sup>1</sup>, Stefan Cojocaru<sup>2</sup>

*1 Wolfson Academic School of Nursing; Clalit Health Services, IL*

*2 University of Aexandru Ioan Cuza, Romania*

**Background:** Frequent attenders are a small group of patients characterized by a large number of visits to the family physician. They constitute only about 10% of all patients but occupy a significant proportion (up to 50%) of all activity at the community health clinic. Their health condition does not require visits to medical staff but they nonetheless make frequent appearances at the clinic and their excessive use of primary care resources creates a burden and overload on community-based health services.

**Study Question:** What is the optimal way of managing the phenomenon of frequent attenders in the primary clinic?

**Methods:** This study employed the convergent parallel mixed methods technique. In the qualitative stage, semi-structured interviews were conducted with 18 frequent attenders, 9 men and 9 women aged 25–70. In the quantitative stage of the study, a closed questionnaire was administered to 184 medical staff, (doctors and nurses) with a mean age of 57.1 (doctors) and 38.36 (nurses).

**Results:** The research findings emphasize the clinical challenges and complexity of the phenomenon of frequent attenders, and particularly persistent frequent attenders, as a complex social-health issue whose treatment requires multidisciplinary intervention. The issue is manifested on the patient level by visits of the frequent patient to the clinic for unrealistic reasons and on the caregiver level by a sense of fatigue, avoidance and unwillingness to provide treatment. Therefore, the study raises the need to identify and to act to prevent this tendency as early as the initial stages, even before the patient becomes a frequent attender, and coins the term "potential frequent attender".

**Conclusions:** The uniqueness of this study is in revealing a new phenomenon of potential frequent attenders as well as in offering a modular conceptual framework concerning the phenomenon of frequent attenders in primary care clinics and a way of eliminating this tendency.

**Health Policy Implications:** Creating control mechanisms for managing the phenomenon of frequent attenders at primary care clinics, with the purpose of assessing management of the phenomenon of frequent attenders.

## FLAGGING HIGH-RISK MEMBERS WITH PRE-DIABETES: USE OF PREVENTIVE HEALTH SERVICE

Galit Shefer<sup>1</sup>, Becca Feldman<sup>2</sup>, Mina Rotem<sup>1</sup>, Gabriella Solomon<sup>1</sup>, Maya Leventer<sup>2</sup>

*1 Clalit Health services, IL*

*2 Clalit Research Institute, IL*

**Background:** In 2015, Clalit Health Services identified members with pre-diabetes and determined their five-year risk for developing type 2 diabetes mellitus (T2DM) via a predictive model. High-risk individuals were flagged for preventive services and monitoring.

**Study Question:** Among members flagged as high risk for T2DM, was there a change in preventive health care utilization and clinical markers post-intervention?

**Methods:** Members identified as having pre-diabetes for the first time between 1.1.2015 - 1.7.2016 were stratified into three risk groups (low, medium and high). We examined the percentage of those receiving intervention-related preventive care (glucose monitoring, lifestyle-management, and anti-diabetes medications) within the intervention period (12-months after being flagged). Differences in health outcomes between the 12-month baseline and the follow-up 12 and 24-months post-intervention period were tested for significance.

**Results:** There were 139,359 individuals with pre-diabetes of whom 61%, 19%, and 20% were low, medium, and high risk, respectively. The mean age was 59.42 (3.45) the mean body mass index was 28.88 kg/m<sup>2</sup> (5.51), and 38% were of low socioeconomic status. During the 12-month intervention period, a higher percentage of those at high-risk group received preventive care (lifestyle change: 30% vs. 27% at medium and 22% at low risk; purchase of medication: 15% vs. 5% at medium and 2% at low risk). Among the high-risk sub-group that utilized lifestyle interventions and pharmaceutical treatments, there was an average decrease in HbA1c by 0.8% (6.18 to 6.13; p=0.008) and glucose by 1.7 mg/dL (122.15 to 120.44; p<0.001), respectively. Furthermore, the high-risk group that did not receive preventive care had increased glucose.

**Conclusions:** This preliminary evidence suggests that risk stratification of high-risk individuals may be an effective intervention to encourage the use of T2DM-related preventive care, which is effective at improving clinical outcomes.

**Health Policy Implications:** Being placed on the pre-diabetic list can promote the health of pre-diabetic patients with high risk for diabetes.

## INITIAL SOURCE OF SAFETY SIGNALS LEADING TO FOOD AND DRUG ADMINISTRATION DRUG SAFETY COMMUNICATIONS: A COHORT STUDY

Daniel Shepshelovich<sup>1</sup>, Noam Tau<sup>2</sup>

*1 Rabin Medical Center, Beilinson Campus, IL*

*2 Chaim Sheba Medical Center, IL*

**Background:** Drug safety communications (DSC) are the primary tool used by the Food and Drug Administrations (FDA) for conveying important new safety information to patients and healthcare professionals. The sources of initial safety signals triggering DSCs have not been previously described.

**Study Question:** What are the sources of the initial safety signals leading to DSCs?

**Methods:** The study cohort comprised of all DSCs posted on the FDA website between January 2010 and December 2018. Associations between sources of initial safety signals and initial approval regulatory pathways, time between initial approval and DSC posting, number, design and sample size of clinical studies included in the most recent drug labels prior to DSC publication, subsequent safety-related changes to drug labels and FDA requirement for Risk Evaluation and Mitigation Strategy were explored using Fisher's exact test for categorical variables and T-test for continuous variables. The trend for the number of DSCs published each year was assessed using Pearson's correlation.

**Results:** 259 DSCs were included. The median time from initial approval to DSC posting was 14.2 years (interquartile range 5.3-27.2). The most frequent sources of initial safety signals were the FDA's Adverse Event Reporting System (FAERS) (n=110, 42%) and post-marketing randomized controlled trials (RCTs) (n=82, 32%). The most frequent subsequent drug label change was additional warnings and precautions (n=116, 45%) and boxed warnings (n=43, 17%). There were no statistically significant associations between potential predictors and DSC source or subsequent label changes. The number of DSCs decreased in recent years (correlation - 0.78, p=0.01).

**Conclusions:** These data highlight the importance of post-marketing RCTs for the identification of previously unrecognized safety issues and the potential to improve the identification of emerging toxicities through increased awareness and reporting of AEs to pharmacovigilance programs.

**Health Policy Implications:** Strengthening post-approval toxicity monitoring is warranted to expedite post-marketing identification of safety issues.

## "DEMENTIA FRIENDS": A LONGITUDINAL EVALUATION RESEARCH

Shiri Shinan-Altman<sup>1</sup>, Perla Werner<sup>2</sup>

*1 Bar-Ilan University, IL*

*2 University of Haifa, IL*

**Background:** With no cure and few effective treatments for dementia, policy developments increasingly emphasize the importance of 'living well' with the condition within supportive families and friendly communities. As in other countries worldwide, the Israeli "Dementia friends" program operated by EMDA and funded by Joint-Israel-Eshel and the Ministry of Health as part of the National Program to Address Alzheimer's Disease and Other Dementias is aimed at increasing knowledge about dementia and decreasing stigma. The program provides training about dementia to volunteers in order to increase awareness of dementia in their communities.

**Study Question:** Is the Israeli "Dementia friends" program increases knowledge about dementia and decreases stigma associated with dementia?

**Methods:** A total of 120 participants (80.4% female, mean age = 61.87, range = 18-92) completed a structured questionnaire prior to dementia training and 3 months thereafter. Measures included objective and subjective knowledge about dementia, the stigma associated with dementia, and demographic characteristics.

**Results:** A significant positive effect was found on recognizing more symptoms of dementia, willingness to help and on compassion for a person with dementia. Yet, fear, ridicule and willingness to distance persons with dementia did not change after training.

**Conclusions:** The Israeli "Dementia friends" program is effective in producing significant improvements in knowledge and in decreasing stigma associated with dementia. However, the program does not seem to be sufficient to bring about change in all parameters of knowledge about dementia and stigma associated with dementia.

**Health Policy Implications:** "Dementia friends" program is a policy mechanism that enables improvements in knowledge about dementia and decreasing stigma associated with dementia.

## LONG-TERM OUTCOMES OF APPENDECTOMY VERSUS ANTIBIOTICS-ONLY TREATMENT FOR ACUTE APPENDICITIS

Gali Shlichkov, Ethel-Sherry Gordon, Ziona Haklai

*Ministry of Health, IL*

**Background:** Appendectomy has always been the standard treatment for appendicitis. Recently, antibiotics-only therapy has become acknowledged as a feasible treatment in cases of uncomplicated acute appendicitis, potentially allowing patients to avoid surgery.

**Study Question:** To assess the rates of appendectomy among patients who received antibiotics-only therapy in their first acute appendicitis episode, within a 5-year follow-up period. To assess mortality rates of patients who received antibiotics-only therapy and those who had an appendectomy in their first acute appendicitis episode, within a 5-year follow-up period.

**Methods:** This research is based on the Israel National Hospital Discharge Register in the Ministry of Health. The research population includes patients hospitalized with acute appendicitis, who didn't have previous episodes of appendicitis 5 years before the start of the follow-up.

**Results:** The rate of patients admitted with acute appendicitis who didn't have an appendectomy increased from 6% in 2000 to 16% in 2017, indicating a rise in the implementation of antibiotics-only therapy.

About 30% of the patients who didn't have an appendectomy in their first appendicitis hospitalization eventually had an appendectomy within 5 years, most of them within the first year. The highest 5-year appendectomy rate is found among children aged 1-14.

About 7% of the patients who didn't have an appendectomy during their first appendicitis hospitalization died within 5 years, compared to 2% of those who had an appendectomy. The 5-year mortality rate in children aged 1-14 and ages 15-24 was particularly higher in those who were not operated in their first hospitalization compared to those operated.

**Conclusions:** The 5-year old appendectomy rate and 5-year old mortality rate among those not operated during their first appendicitis episode is high among children aged 1-14.

**Health Policy Implications:** We recommend examining the reasons for higher recurrence and mortality rates among children and possibly reviewing the criteria for application of antibiotics-only therapy.



## UTILIZATION AND PROVISION OF SECOND OPINIONS AS A FUNCTION OF THE PAYMENT METHOD

Liora Shmueli<sup>1</sup>, Tuvia Horev<sup>2</sup>, Igal Hekselman<sup>3</sup>, Ran D. Balicer<sup>4</sup>, Joseph S. Pliskin<sup>2</sup>

*1 Tel Aviv University, IL*

*2 Ben-Gurion University of the Negev, IL*

*3 Clalit Health Services, IL*

*4 Clalit Research Institute, IL*

**Background:** Second opinion (SO) is the main expenditure of the health-funds' supplementary insurance in Israel. It increases the utilization of private health services. New legislation has canceled the option of "reimbursement" for patients who paid for SO provided by independent surgeons and limits these services to surgeons who are under contract with the supplementary insurance by paying a "direct-co-payment". Analyzing and documenting the current situation will improve the ability to track the consequences of this policy.

**Study Question:** Which factors affect utilization and provision of SO by payment method: "reimbursement" and "direct-co-payment", and is there inequalities in accessibility by these payment methods?

**Methods:** An electronic medical records analysis (years of 2011–2017, 1.4 million patients each year).

**Results:** Although the direct-co-payment rate increased by 50% in the years of 2011–2016, there was an increase of 45% in the demand of patients for SO consultations via the supplementary insurance. Patients from the Arab sector, low socio-economic group, immigrants and from central geographical areas tended to seek SOs by paying a "direct-co-payment". Patients from periphery areas tended to seek SOs through the "reimbursement" method.

In 2011 as well as 2017 consultants with the academic title "professor", physicians in a managerial position at a hospital and specialists with seniority of 26 years and above tended to provide SOs by the reimbursement method.

**Conclusions:** Patients from periphery areas tended to seek SOs by reimbursement method, despite the high co-payment. This may hint on inequality in the supply of physicians in the arrangement.

**Health Policy Implications:** There is a need to improve access to SO consultants in periphery areas, in order to increase patients' freedom of choice among SO providers.

## THE MORE THINGS CHANGE, THE MORE THEY STAY THE SAME

Ada Shteiman, Ziona Haklai, Ethel-Sherry Gordon

*Ministry of Health, IL*

**Background:** General internal medicine departments are characterized by very high workloads and an average yearly occupancy rate that ranges between 97–107%. This burden has remained constant over the past two decades, worsening in the winter months. Many programs have been implemented to reduce the burden of hospitalizations.

**Study Question:** Analyze temporal trends in general internal medicine departments over the last decade.

**Methods:** This study focuses on general internal medicine wards. Data were collected from the national hospitalization database in the Israel Health Ministry. We show the distribution of annual cumulative hospital days per patient. A multivariate regression model characterizes those hospitalized more than two weeks during the year.

**Results:** In 2017 there were 192,000 patients hospitalized in medicine wards, utilizing 1.3 million hospital days. While the hospitalization rate in medicine wards decreased over the last decade, the median length of stay remained three days, the percent of patients with more than a total of 14 hospital days per year remained fairly constant at between 10% and 11%, and ten percent of patients utilized 45% of the bed days throughout the decade.

Unsurprisingly, the multivariate analysis showed that those with more than 14 hospital days per year tended to be the elderly with multiple comorbidities. There was variation between members of the different Health Funds, and no significant difference was found between the sexes.

**Conclusions:** Although we see a decrease in the rates of hospitalization over the past decade, the percent of “very sick” remained constant.

**Health Policy Implications:** Identifying successful alternative options for some of these patients could substantially reduce the burden of hospitalizations.

## HIERARCHY OF FEMALE HAIR LOSS STIGMA: MEDIA PORTRAYALS OF CANCER, ALOPECIA AREATA, AND CANCER IN ISRAELI NEWSPAPERS

*Shifra Shvarts, Daphna Yeshua-Katz, Dorit Segal-Engelchin*

*Ben-Gurion University of the Negev, IL*

**Background:** Over 300,000 people in Israel cope with temporary or permanent hair loss that results from diseases and medical treatments. For women, hair loss is a traumatic event that may lead to dire psychosocial consequences and severe health outcomes. Nevertheless, this phenomenon is primarily considered an aesthetic - rather than as a health-related issue - by health professionals.

**Study Question:** Given the important role that the media play in shaping health policies, we aim to: (1) identify the dominant frames;(2) examine the dominant media portrayals of patients; and (3) examine the salience of hair loss experiences related to ringworm, alopecia areata (AA), and cancer in Israeli newspapers.

**Methods:** Using framing and agenda-setting theories, we examine 407 articles about cancer, AA, and ringworm in Israeli newspapers in 1994-2016.

**Results:** Textual and visual analysis revealed the ways media marginalize hair loss. Cancer was framed in medical terms, and patients were portrayed as older Israeli-born people whose hair loss was absent from their experience. Ringworm was framed as a fear-inducing disease; patients were portrayed as faceless, unidentified immigrants coping with visible hair loss. Articles on AA provided the greatest focus on the patient's experience of hair loss, but patients were portrayed as young foreign women.

**Conclusions:** Our results revealed a hierarchy of stigmas against feminine hair loss, in which the media coverage marginalized this experience. The omission of feminine hair loss by the media may explain why health professionals often ignore the psychosocial needs of these patients. Health insurance funding of wigs is helpful but nevertheless insufficient solution to coping with feminine hair loss.

**Health Policy Implications:** Our findings may encourage media leaders to conduct planned media interventions to increase awareness about the unique challenges faced by women coping with hair loss and promote health policy-making aimed at the well-being of these women.

## THE IMPACT OF CHILD INJURY ON THE ISRAELI ECONOMY

Orly Silbinger, Naor Porat, Sharon Levi, Esti Golan, Natalie Nir

*Beterem - Safe Kids Israel, IL*

**Background:** Unintentional injuries of children and youth, from birth to age 17, constitute a heavy economic and health burden on Israeli society. Each year on average 116 children die, over 20,000 are hospitalized and over 200,000 visit emergency rooms due to unintentional injury. There are also long-term economic effects of injury and disability on the child, caregivers and community.

**Study Question:** Evaluate the impact of unintentional child injury on the Israeli economy and the distribution of the burden across different injury types and population groups.

**Methods:** Data on child fatalities, hospitalizations and emergency room visits were collected from national databases for 2008–2016. Data on disabilities was extracted from the Global Burden of Disease database.

Calculations include:

- ◆ Direct costs and indirect costs of injury, based on the Human Cost approach.
- ◆ Loss of productivity in economic terms related to mortalities and disabilities.
- ◆ Analysis by age group, gender, and injury mechanism.

**Results:** The total cost of injury was at least NIS 5.74 billion and NIS 7.46 billion according to the “more stringent” Human Cost approach. Thus, the burden of injury to the GNP for 2016 is 0.5%–0.6%, which includes loss of productivity due to deaths, costs of emergency visits and hospitalization, and loss of quality of life and productivity due to disabilities. Further detailed findings will be presented.

**Conclusions:** Child injury is a serious burden on the Israeli economy. Limitations in this study related to lack of or access to data, such as emergency care visits.

**Health Policy Implications:** This initial analysis is the first and necessary stage of cost-benefit analysis by which effective and focused intervention programs can be selected, priorities and resources allocated effectively, thereby reducing the burden of unintentional injury to children in Israel.

## PERSISTENCE OF ETHNIC INEQUALITIES IN OBESITY AMONG SOCIO-ECONOMICALLY DISADVANTAGED ISRAELI MOTHERS AFTER ACCOUNTING FOR SOCIO-ECONOMIC, PSYCHOSOCIAL, LIFESTYLE AND COMMUNITY FACTORS

Varda Soskolne<sup>1</sup>, Michal Cohen-Dar<sup>2</sup>, Samira Obeid<sup>3</sup>, Nitza Cohen<sup>2</sup>, Mary Rudolf<sup>1</sup>

*1 Bar-Ilan University, IL*

*2 Ministry of Health, IL*

*3 Max Stern Yezreel Valley College, IL*

**Background:** Ethnic inequalities in overweight and obesity are consistent among Israeli women; the rates are higher among Arab compared to Jewish women. Yet, little is known about explanatory factors of the inequality, particularly among low socio-economic status (SES) women. Guided by the psycho-social environment approach to explaining health inequalities, this study explored a combination of explanatory factors for ethnic inequalities in obesity among socio-economically disadvantaged Israeli women, mothers of young children.

**Study Question:** What are the contribution of SES, psychological, lifestyle behavior and community factors to explaining ethnic inequalities in overweight and obesity between Arab and Jewish mothers.

**Methods:** Data for this cross-sectional study (N=946, 371 Jewish, 575 Arab mothers) were collected by self-report questionnaire as part of a special 'Readiness for School' project for children aged 5-6 years from 20 Mother and Child Health clinics in towns and villages of lowest socio-economic ranking in northern Israel. Multinomial logistic regression models were conducted to assess the effect of SES, psychological (resilience, self-efficacy), behavioral (nutrition, physical activity) and community food-related practices on mediating the association of ethnicity with overweight and obesity, controlling for age and parity.

**Results:** Overweight and obesity were significantly higher among Arab mothers. The strength of the association of ethnicity with overweight (OR=1.80, 95%CI= 1.31, 2.47) or obesity (OR=2.14, 95%CI=1.44, 3.18) remained constant after SES and other variables were included in two steps.

**Conclusions:** The variables included in the analysis were not sufficient to explain inequalities in this disadvantaged population, so questioning current assumptions regarding SES as a major explanation of ethnic inequality in obesity.

**Health Policy Implications:** Newer, more comprehensive approaches to research are required to assess whether the findings are unique to this population and to gain a deeper understanding regarding the etiology of obesity in each population, with the potential of guiding innovative interventions to decrease inequalities.

## NURSING ASSISTANTS - INNOVATIVE INTERVENTION

Ahuva Spitz, Gali Weiss, Tzion Tsohar

*Shaare Zedek Medical Center, IL*

**Background:** The role of the non-nursing, health care assistant developed primarily to lower health care costs by undertaking perceived non-nursing duties under the supervision of registered nurses. While nursing assistants represent a substantial proportion of the health care workforce and often are the first responders in providing direct patient care, the growth of their role has taken place without proper preparation, or systematic education and training especially in communication skills. This has raised serious concerns, especially with regard to the quality of care.

**Study Question:** Examining an innovative intervention utilizing simulation to train health care assistants, providing them with tools to deal with challenging situations they encounter in delivering direct patient care.

**Methods:** During 2018, data was collected through focused groups with nursing assistants in addition to questionnaires that were filled by nurses and nursing assistants. The results demonstrated a need to address communication between the nurses and the assistants. 100 nursing assistants from the medical-surgical wards participated in simulations that were specially tailored for them. Prior to attending the simulation center, social workers met with the nursing assistants in small groups allowing them to speak their emotions through cards and guided imagery. The simulations challenged the nursing assistants with difficult patients or family members. At the end of each session, the actor reflected the nursing assistant how he had felt. Each training day concluded with a discussion presenting communication tools for the nursing assistants.

**Results:** The closing questionnaires demonstrate a high level of satisfaction with the intervention.

**Conclusions:** The next planned step is to follow the nursing assistants utilizing qualitative and quantitative analysis focusing on the quality of care through tasks that they perform.

**Health Policy Implications:** The policy will be to provide twice a year a simulation-based training refresher course in order to fully implement a culture of quality and safety amongst nursing assistants applying communication skills.

## BECOMING AN EQUITABLE HEALTH-CARE ORGANIZATION: THE CHALLENGE OF MOVING FROM VALUE TO ACTION

Sivan Spitzer-Shohat<sup>1</sup>, James Williams<sup>2</sup>, Jelena Todic<sup>3</sup>, Brenda Battle<sup>2</sup>, Scott Cook<sup>2</sup>, Marshall H. Chin<sup>2</sup>

*1 Bar-Ilan University, IL; University of Chicago, US*

*2 University of Chicago Medicine, US*

*3 University of Chicago Medicine; University of Texas at San Antonio College, US*

**Background:** Health care organizations strive to improve health equity, yet implementation remains challenging. In 2013, UChicago Medicine formed a strategic plan to implement an organization-wide equity initiative based on the National Culturally and Linguistically Appropriate Services Standards. It included forming a committee-based governance structure, stratifying patient and employee data, and in-house cultural competence training to not only build awareness to differential populations' needs but create change agents to drive equity implementation throughout the organization.

**Study Question:** We aimed to understand facilitators and barriers affecting perceptions and ability to implement the initiative.

**Methods:** Through Implementation Theory, we assessed Motivation for implementing equity; Capacity to drive change, and Capability to translate the intervention into everyday practices. Semi-structured key informant interviews were conducted (n=40), as well as surveys of the social network, organizational culture, and program innovation fit with both equity committee members (n=40) and mid-management (n=105).

**Results:** Cultural competency training strengthened motivation and buy-in from top management. Yet, the committee's low network density ( $x=1.227$ ,  $sd=1.5$ ), highlighted persistent organizational silos. The predominant organizational culture was identified as hierarchical and employee participation in planning and implementing equity was perceived to be moderate ( $x=2.91$  (1 [low] - 5 [high] scale),  $sd=1.05$ ). Mid-managers felt they still faced many implementation obstacles ( $x=2.68$  (1 [low] - 5 [high] scale),  $sd=0.83$ ) and lacked the knowledge to translate equity into practice, especially in areas not tied directly to patient care: "so what does it really look like? What should I be doing?"

**Conclusions:** The organization was successful in creating a shared value of equity and a willingness to act, but employees lacked guidance on the nuts and bolts of how to implement equity into their daily work processes.

**Health Policy Implications:** Practical training and resources are required to translate equity across organizational departments and levels into specific tasks. Major obstacles include changing the organizational culture and environment, translating equity from a value-laden concept into action, and implementing equity into existing organizational work.

## SOCIAL MEDIA TO PROMOTE WELLBEING OF CHRONICALLY ILL PATIENTS: WISDOM OF THE CROWD FOR PERSONALIZED RECOMMENDATIONS

Maya Stemmer, Gilad Ravid, Yisrael Parmet

*Ben-Gurion University of the Negev, IL*

**Background:** In recent years, social networking sites have served as an alternate information source for patients. Chronically ill patients increasingly use online environments to support daily self-management and exchange experiential knowledge about their disease.

**Study Question:** The aim of this research is to assess the feasibility of using social media data to promote the wellbeing of chronically ill patients, by deriving personalized recommendations based on the wisdom of the crowd. We shall demonstrate this approach using Twitter and Inflammatory Bowel Disease (IBD).

**Methods:** We started by building a classifier of Twitter users that distinguishes IBD patients from other entities who tweet about the disease. We can use it for identifying patients and learning from their personal experience. Next, we aim to characterize treatment options and determine the patients' sentiment towards them, which will serve a basis for building a recommender system of treatments.

**Results:** IBD patients openly tweet about their disease and form a supportive community by following one another on Twitter. They consult about treatments and recommend diets or physical activities. The user classifier showed encouraging classification results and demonstrated how IBD patients differ in the way they communicate on Twitter from other users who tweet about the disease.

**Conclusions:** The methods used in this research were applied to IBD but can also be helpful in the exploration of other medical conditions. The classifier can be adapted for the identification of other chronic patients. It can be used for collecting patients' tweets and learning from their personal experience. It provides a first step in the task of using social media data to promote the wellbeing of chronically ill patients.

**Health Policy Implications:** This research provides a complementary approach by utilizing the data gathered by patients outside the doctor's office. The crowdsourced recommendations it suggests can be addressed to the patients themselves but also to clinicians as a decision support system.



## CLINICAL DECISION MAKING IN A DATA-DRIVEN WORLD

Inbal Tal<sup>1</sup>, Orna Tal<sup>2</sup>

*1 Sheba Medical center; IL*

*2 Shamir Medical Center (Assaf Harofeh), IL*

**Background:** Medical decision making is based on clinical observation and investigation integrated with professional experience and evidence from the literature (EBM). Physicians are currently exposed to additional data resources: patient-reported outcomes (PROs), evidence from experts utilizing innovative technologies ('real-world-experience'- RWE) and the ocean of big data. The challenge is to prioritize and channel this data overload towards a wise patient-oriented clinical plan.

**Study Question:** To identify the willingness of physicians to integrate various data components leading to clinical decisions, and to compare opportunities to influence education during different stages of their professional track.

**Methods:** We conducted a survey targeted at ranking the importance of decision-components: clinical, economic, patient involvement, data consumption, information alignment, and utilization of IT systems.

**Results:** 123 medical students, 41 interns, 66 residents, 21 junior medical managers and 58 senior medical executives responded. Clinical components were ranked as most important by students (9.1), interns (8.7), residents (9.2), and all middle managers (9.3). Economic factors (effectiveness, cost-saving) were ranked 'beneficial' (7.3, 8.2, 7.8, 8.9 comparatively), while social elements (patient preferences, culture-orientation) were ranked lowest (4.4, 6.4, 7.4, 7.8).

Physicians ranked high expert opinion (RWE) (8.9) and patient commentary (PROs) (8.1) as valuable data sources for clinical decision-making, even more than EBM (7.4), while big data still remains a vague opportunity for data-mining (ranked 6.7). Accessibility to data by advanced IT systems was ranked 'essential' (9.3).

**Conclusions:** In the world of 'information-explosion' alongside lack of updated published 'evidence', physicians seek constructive charts and protocols. The trend to incorporate patient and colleague reporting to support clinical decision making is constantly increasing. Educating medical professionals toward data-driven decision-making at an early stage of their clinical exposure may improve clinical outcomes.

**Health Policy Implications:** Data-driven-decision-making is a decisive methodology to maintain quality of care. Its implementation is crucial to mold the professional footprint of caregivers.

## PHYSICIAN VALUES AND ETHICAL PERCEPTIONS - A NATIONAL SNAPSHOT

Orna Tal<sup>1</sup>, Tami Karni<sup>1</sup>, Baruch Velan<sup>2</sup>, Yaron Connelly<sup>1</sup>, Arnona Ziv<sup>2</sup>,  
Giora Kaplan<sup>2</sup>

*1 Shamir Medical Center (Assaf Harofeh), IL*

*2 The Gertner Institute of Epidemiology and Health Research, IL*

**Background:** The dynamic changes in healthcare together with evolving social trends lead to ongoing shifts in the traditional ethical concept. Thus, the "classic cannon" of ethics is constantly adapting itself to evolving realities and changing local norms.

**Study Question:** To draw an initial map of the current ethical perceptions among Israeli physicians and identify topics of agreement and disagreement.

**Methods:** A structured questionnaire examining attitudes to ethical dilemmas was sent online to all registered members of the Israeli-Medical-Association; 2,926 physicians responded.

**Results:** Respondents were asked to express opinions on 8 medical situations representing ethical dilemmas. High agreement was expressed in 4 cases: (1) objection to providing ineffective treatment upon patient's request, (2) objection to abandoning non-complying patients, (3) support for breaching patient confidentiality when public safety is at risk, (4) objection to compromise on quality of health services upon managerial instructions. Split opinions were expressed on supporting/objecting to (5) full disclosure of bad prognosis and on (6) assisting patients in life termination in hopeless situations. High levels of hesitancy (unwillingness to opt) were expressed on supporting/objecting to (7) expensive treatments to terminally ill patients, and (8) disclosing decline in colleague's skills.

**Conclusions:** A defined set of value-loaded queries can be used to portray the ethical profile of given medical societies at a given time. In Israel, physicians have firm attitudes on some topics, while others are unresolved.

**Health Policy Implications:** Looking into the future, the Israeli medical community is advised to carry on an innovative approach and further hold discussions on medical ethical dilemmas to maintain the alertness of practitioners to consider every medical condition as a dilemma, rather than resort to one-dimensional solutions. Specifically, disagreements on truth-telling, doctor-assisted death, and inter-collegial ethics should be examined.

## WHATSAPP-BASED TELE-DERMATOLOGY STUDY FOR EXPLORING PREVALENCE AND PATTERN OF SKIN DISEASES IN TRIBAL VILLAGES OF DAHOD, INDIA

**Kandarp Talati**<sup>1</sup>, **Rochit Singhal**<sup>2</sup>, **Bankim Gandhi**<sup>1</sup>, **Mayur Shinde**<sup>3</sup>, **Pragya Nair**<sup>2</sup>, **Ajay Phatak**<sup>2</sup>

*1 Foundation for Diffusion of Innovations, India*

*2 Pramukh Swami Medical College and Shree Krishna Hospital, Charutar Arogya Mandal, India*

*3 Central Research Services, Charutar Arogya Mandal, India*

**Background:** Pattern of skin diseases are influenced by the overall ecosystem of the region. There was dearth of research about prevalence, healthcare seeking, medication compliance and treatment outcome in skin diseases among scheduled tribes.

**Study Question:** Could smart-phones and WhatsApp be used as a pilot for supervised assessment of skin conditions in remote, under-served tribal villages?

**Methods:** A Community-based cross-sectional study was conducted in 10 randomly selected villages of Dahod and Jhalod blocks of Dahod district during June–August 2017. Household survey responses were captured on mobile-based MAGPI portal and images of skin conditions were captured on smartphones and de-identified images were transferred over WhatsApp. Descriptive statistics and chi-square test were performed using STATA.

**Results:** Total of 781 households were approached in 10 villages where 2,214 participants consented. Among them, 549 were identified with suspected skin diseases but 520 consented for a photograph. Most of them [402(77.3%)] developed the condition gradually, while only [247(47.5%)] have consulted a medical professional for the condition. Recurrence [188(76.11%)] and no improvement [34(13.76%)] were major causes for discontinuation of treatment. A dermatologist at medical college confirmed [441/2,214(20%)] had skin diseases, and Infections and Eczema were major conditions constituting two-thirds of all the skin diseases.

**Conclusions:** Pilot testing of new innovative avenues like tele dermatology and artificial intelligence (AI) are called for in the wake of the high prevalence of skin conditions among the remote tribal population, and limited availability of trained dermatologist or primary care physicians for identification and management of skin diseases.

**Health Policy Implications:** Real-time interactive, as well as Hybrid techniques of tele-dermatology, have been tested successfully in the past but these techniques need sophisticated interface and connectivity. Also advances in machine learning, neural networks and AI can be leveraged for point-of-care clinical diagnosis of skin diseases. Initial research has shown positive results about the accuracy of such applications in the diagnosis of common skin diseases.

## DEVELOPMENT OF A MODEL FOR ADMITTING PEDIATRIC TRAUMA CASUALTIES IN THE EMERGENCY DEPARTMENT

Raya Tashlizky Madar<sup>1</sup>, Avishay Goldberg<sup>2</sup>, Adini Bruria<sup>3</sup>

*1 Soroka Medical Center, IL*

*2 Ben-Gurion University of the Negev, IL*

*3 Tel Aviv University, IL*

**Background:** Pediatric trauma is one of the leading causes of child mortality and morbidity and is a major challenge for healthcare systems worldwide. Treatment of pediatric trauma requires special attention according to the unique needs of children, especially in children affected by severe trauma and requiring life-saving treatments. It is essential to examine the preparedness of Emergency Departments (EDs) for admitting and treating pediatric casualties.

**Study Question:** To develop a model for admitting and treating pediatric trauma casualties in E.Ds.

**Methods:** Seventeen health professionals were interviewed using a semi-structured qualitative tool. A quantitative questionnaire was distributed among general and pediatric E.Ds.' medical and nursing staff. Following the qualitative and quantitative findings another round of interviews was performed, to identify constraints, construct a "Current Reality Tree". and develop a model for admission and management of pediatric casualties in E.Ds.' The model was validated by the National Council for Trauma and Emergency Medicine.

**Results:** Lack of uniformity was found concerning age limit and levels of injury of pediatric patients. Most study participants believe that severe pediatric casualties should be concentrated in designated medical centers and that minor and major pediatric casualties should be treated in pediatric rather than general E.Ds. Pediatric emergency medicine specialists are preferred as case managers for pediatric casualties. Significant diversity in pediatric-care training was found. Based on the qualitative and quantitative findings, a model for the optimal admitting and managing of pediatric casualties was designed.

**Conclusions:** To provide the best care for pediatric casualties and regulate its key aspects, clear statutory guidelines should be formulated at national/local levels. The model developed in this study considers EDs' medical teams and policy leaders' perceptions, and hence its significant contribution. Implementation of the findings and their integration in pediatric trauma care in EDs can significantly improve pediatric emergency medical services.

**Health Policy Implications:** To regulate the key aspects of trauma care, clear statutory guidelines should be formulated at the national and local levels.

## INTERPERSONAL NURSING CARE CONTINUITY: IS IT ASSOCIATED WITH IN-HOSPITAL COGNITIVE DECLINE?

Orly Tonkikh, Anna Zisberg, Efrat Shadmi

*University of Haifa, IL*

**Background:** In-hospital cognitive decline affects up to 40% of hospitalized older adults and is associated with post-hospitalization worsening of medical and functional status. Studies pointed to the substantial role of the interpersonal relationship between older adults with cognitive impairment and the nurses who care for them.

**Study Question:** Is nursing interpersonal continuity related to better patient's cognitive outcomes?

**Methods:** A cohort of 559 patients age  $\geq 70$  admitted to internal units for non-disabling conditions. Cognitive decline was defined as at least one-point decline in the Short Portable Mental Status Questionnaire from at admission to discharge assessments. Nursing interpersonal continuity was measured using the continuity of care index (CoC). CoC assesses the extent of different nurses assigned to take care of each patient during the hospital stay (2 shifts per day) and ranges from 0 (none of the nurses is the same) to 0.4 (highest feasible score according to full-time standard shift plan and length of stay (LOS)). Information on pre-morbid activities of daily living (ADL), comorbidities, the severity of illness were assessed using the modified Barthel index, Charlson's comorbidity index and Acute Physiology and Chronic Health Evaluation, respectively.

**Results:** One third (n=193) of patients experienced cognitive decline. Most patients met the same nurse at least twice during the hospitalization. Only 6 patients (1.1%) achieved maximal CoC score. Multivariate logistic regression showed that achieving 25% of the highest feasible in-hospital nursing CoC was associated with lower odds of cognitive decline (OR=0.67, 95% CI=0.45-0.99), controlling for age, sex, premorbid ADL, at admission cognitive status, comorbidities, the severity of illness and LOS.

**Conclusions:** In-hospital nursing continuity is negatively associated with older adults' cognitive decline, even in low-continuity levels. Future studies should investigate in-hospital continuity patterns and interventions maintaining continuity in larger and more heterogenic samples.

**Health Policy Implications:** Nurse staffing policy should consider increasing nurse continuity in scheduling algorithms.

## CONFIDENTIALITY OF PERSONAL INFORMATION IN AN ERA OF BIG DATA - THE RIGHTS OF THE INDIVIDUAL VERSUS THE RIGHTS OF SOCIETY

Orly Toren<sup>1</sup>, Nurith Wagner<sup>2</sup>

*1 Hadassah Medical Organization, IL*

*2 Israeli Nurses Ethics Bureau, IL*

**Background:** In the era of big data, there is a tension between protecting the individual interest to privacy and using the information to promote medical knowledge for the benefit of society. Crucial ethical questions are raised regarding if and how we can balance between these two basic moral principles – confidentiality vs. societal interests.

**Study Question:** The purpose of the study is to present dilemmas and principles emerging from the need to balance privacy with the need to promote medical knowledge based on big data for the benefit of society.

**Methods:** This is a descriptive theoretical presentation.

**Results:** In the era of big data confidentiality can be easily violated in the process of creating big databases, intended mainly for research or registrars. The technology makes the process of collecting a vast amount of data, from various sources, and transferring it to numerous entities (commercial and others) without patient's awareness or consent, easy and available. The risk is that the benefits of advancing science, in light of these easy processes of retrieval and transfer of information, will be over-favored by the need to protect patients' rights to privacy and confidentiality. Examples from experience will be discussed.

**Conclusions:** To date, medical data are transferred for the purpose of research, for creating exclusive databases (registrars), and for quality indicators. Often such data transfers and kept identified, without the consent of the patient.

**Health Policy Implications:** The existing laws and procedures should be modified in light of these technological changes and define policies of using and sharing a large amount of data to promote medical knowledge and still maintain principles of patients' confidentiality.

## SOCIOECONOMIC POSITION AND CANCER SCREENING AMONG WOMEN IN ISRAEL

Luz Angela Torres López<sup>1</sup>, Yiska Loewenberg Weisband<sup>2</sup>, Orly Manor<sup>2</sup>,  
Ora Paltiel<sup>2</sup>, Yael Wolff Sagy<sup>2</sup>

*1 Cardioinfatil Foundation - Institute of Cardiology, Colombia*

*2 The Hebrew University of Jerusalem, IL*

**Background:** Screening can improve cancer survival rates, however, population participation in cancer screening is not uniform, with reported inequalities by socioeconomic position (SEP).

**Study Question:** We aimed to study the association between socioeconomic position and cancer screening among women in Israel, and to evaluate whether these associations differed by age and over time.

**Methods:** We used data from the National Program for Quality Indicators in Community Healthcare (QICH), based on electronic medical records from Israel's four health maintenance organizations (HMO), aggregated by SEP and year. The study population included all adult female Israeli residents whose ages corresponded to screening guidelines during 2002–2017 (N=1,529,233). A four-category area-based measure of SEP was used (ranging from 1 (lowest) to 4 (highest)), obtained from the Central Bureau of Statistics census data and further updated by Points Business Mapping Ltd. Data included screening for colorectal, cervical and breast cancer.

**Results:** Women in lower SEP were less likely to uptake any screening behavior. Greater inequalities were found for cervical cancer screening (OR (SEP 4 vs 1) 3.47, 99.9% CI 3.40 – 3.51) compared to colorectal cancer screening (OR (SEP 4 vs 1) 1.34, 99.9% CI 1.32 – 1.36) and breast cancer screening (OR (SEP 4 vs 1) 1.30, 99.9% CI 1.28 – 1.32). While overall inequalities for breast and colorectal cancer were modest, inequalities were more apparent among older women. Prevalence of breast cancer screening increased over time with a marked reduction in inequalities.

**Conclusions:** Substantial socioeconomic inequalities remain in screening behaviors among Israeli women for all three cancers we assessed but were most pronounced in cervical cancer screening, for which no program exists.

**Health Policy Implications:** While national screening programs exist for breast and colorectal cancer, including reminders and invitations, no such programs exist for cervical cancer. Initiating such programs may help reduce SEP inequalities. The use of large data sets such as the QICH program allows us to identify the need for policies that target improved access to screening for women in lower SEPs.

## THE RIGHT TO FOOD SECURITY AMONG PERSONS IN THE SECOND HALF OF THEIR LIVES

Aviad Tur-Sinai

*The Max Stern Yezreel Valley College, IL*

**Background:** Many developed countries face a problem of food insecurity. Such a situation may have health implications.

**Study Question:** The current study has five goals: (1) to investigate the extent of food insecurity in old age, (2) to produce a profile of persons aged 50+ who report that they suffer from food insecurity, parsed by a range of sociodemographic and economic factors, (3) to identify predictors of food insecurity among the older population, (4) to identify the relation between food insecurity and state of health, parsed by age groups and sociodemographic variables, and (5) to determine whether senior households' budget constraints force them to choose between private funding of healthcare services and regular consumption of food.

**Methods:** The study is based on data from the most recent wave of the SHARE-Israel.

**Results:** The likelihood that a household cannot afford for economic reasons to consume meat/vegetables or fruit at least three times a week increases in households less healthy and in the absence of access to services in the neighborhood. An increase in expenditure on health services out of the total revenue increases the likelihood that a household cannot afford to eat meat/vegetables or fruits more than 3 times a week.

**Conclusions:** Predictors indicate socio-economic disparities about food insecurity which are not fully explained by demographic factors. Accessibility neighborhood services, economic efficacy, health status and level of expenditure on health services are important factors for reducing food insecurity among the elderly population in Israel.

**Health Policy Implications:** There is a need to focus on plans to expand the basket of services that neighborhood is available for the elderly, plans to increase revenue disposable income available to them, as well as programs to reduce the burden of expenditure on health services that are required to pay the elderly - to preserve and promote the nutritional safety.



## "I WOULD FEEL THE SKY IS FALLING": REACTIONS OF PEOPLE WITH MILD COGNITIVE IMPAIRMENT AND FAMILY CAREGIVERS TO BIO-MARKERS BASED EARLY PREDICTIVE DIAGNOSIS OF DEMENTIA

Natalie Ulitsa<sup>1</sup>, Daphna Shefet<sup>2</sup>, Perla Werner<sup>2</sup>

*1 University of Haifa, IL*

*2 Tel Aviv University, IL*

**Background:** Recent medical innovations in the area of dementia will allow soon to predict the onset and course of dementia by biomarker tests, which are currently under examination and validation. However, uncertainty and lack of a cure raise moral and psycho-ethical challenges regarding this predictive diagnosis. Our study aimed to explore stakeholders' – people with a diagnosis of mild cognitive impairment (MCI) and family caregivers of persons with dementia – opinions and feelings towards early predictive diagnosis detected by biomarker tests.

**Study Question:** What are the attitudes and emotional reactions of persons with MCI and family caregivers towards bio-markers based early predictive diagnosis of dementia?

**Methods:** Seven focus groups (FGs) were conducted: 3 FGs with persons with MCI (n=16), and 4 FGs with family caregivers (n=28). The participants' attitudes and feelings regarding early predictive diagnosis were elicited using an interview guide and the presentation of vignettes. Thematic content analysis was used to extract key themes.

**Results:** According to the participants, the disclosure of biomarker-tests' results will cause mostly negative emotions such as fear, shock and even depression. Most of the participants stressed the futility of disclosing a diagnosis to the person himself/herself, but not to family members. Starting medications and making financial arrangements emerged as the only advantages of the tests. Compared to family caregivers, people with MCI emphasized the person's traits as relevant factors to be addressed in disclosing the predictive diagnosis.

**Conclusions:** The disclosure of biomarker-based early predictive diagnosis elicited mostly negative emotional reactions. The possible benefits did not outweigh the disadvantages.

**Health Policy Implications:** Careful consideration of all stakeholders' attitudes and psycho-ethical consequences is required before testing and disclosing a biomarker-based early predictive diagnosis of dementia.

## CLEAN AIR FOR BABIES: AN ORGANIZATIONAL STRATEGY TO REDUCE PERINATAL SMOKING

Liora Valinsky, Shosh Karni, Tzvia Kessel, Benny Chayen, Ahuva Birenbaum, Idit Vered, Ruth Eliezer

*Meuhedet Healthcare Services, IL*

**Background:** Female smoking, particularly in lower socioeconomic tiers, is increasing. Perinatal smoking significantly harms offspring throughout their lifespan. In Israel, 13% of women smoke throughout pregnancy. Prenatal smoking is not yet addressed successfully in Israel or elsewhere.

**Study Question:** Can we increase awareness, knowledge, and skills among healthcare providers, to make smoking cessation during pregnancy part of routine care in the community.

**Methods:** This program was funded by Global Bridges and was based on information technology, provider education, and innovative marketing. We built a "pregnant smoker" registry, using IBM Watson text recognition tools, based on a previously established pregnancy registry, using text documentation of smoking practices during obstetric and primary care visits. This registry is updated daily and used to offer cessation support in real time. We focused staff education on obstetricians, maternal health nurses, and maternal ultrasound technicians. We also used social media such as Facebook to market the program to potential participants, and created recruitment videos posted online.

**Results:** 1. Knowledge and self-efficacy of maternal health nurses and ultrasound technicians, as measured by a standardized Global Bridges tool, improved significantly.

2. The proportion of pregnant women with current smoking status in the medical records increased from 33% to 44% between 2016 and 2018, compared with 20.2% and 22.6% in the general population ( $p < 0.001$ ).

3. A pre and post-intervention survey of 500 pregnant women (each) showed a significant increase in women who reported being asked (45-62%), advised (15%-25%) and referred (23-29%) regarding smoking ( $p < 0.005$  for each).

**Conclusions:** We have started to change organizational culture regarding the challenge of perinatal smoking in spite of resistance and knowledge gaps among healthcare providers and patients. This is the first program to recruit ultrasonographers to smoke cessation practice.

**Health Policy Implications:** The combination of technology, education, and a broader team approach can enhance smoking cessation and other prevention interventions.

## BARRIERS TO COMPLETING COLONOSCOPY AFTER A POSITIVE FECAL OCCULT BLOOD TEST

Liora Valinsky<sup>1</sup>, Revital Azulay<sup>1</sup>, Einat Elran<sup>2</sup>, Fabienne Hershkowitz<sup>1</sup>,  
Natan Lederman<sup>1</sup>, Revital Kariv<sup>2</sup>, Anthony Heymann<sup>1</sup>

*1 Meuhedet Healthcare Services, IL*

*2 Maccabi Healthcare Services, IL*

**Background:** Colorectal cancer leads to significant morbidity and mortality. Early detection and treatment are essential. Screening using fecal occult blood tests (FOBT) has increased significantly, but adherence to colonoscopy follow-up is suboptimal worldwide. Recently published papers have emphasized the increased risk of abstaining from colonoscopy after a positive FOBT.

**Study Question:** What are the barriers to colonoscopy following a positive FOBT at the level of the patient, physician, organization, and policymakers.

**Methods:** This mixed methods study was conducted at two health care organizations in Israel. The study included retrospective analyses of 45,281 50-74-year-old members with positive FIT's from 2010-2014, and a survey of 772 patients with positive FIT during 2015, with and without follow-up. The qualitative part of the study included focus groups with primary physicians and gastroenterologists and in-depth interviews with opinion leaders in healthcare.

**Results:** Patient lack of comprehension regarding the test was the strongest predictor of non-adherence to follow-up. Older age, Arab ethnicity, and lower SES (socio-economic status) significantly reduced adherence. We found no correlation with gender, marital status, patient activation, waiting for time or distance from gastroenterology clinics. Primary care physicians underestimate non-adherence rates. They feel responsible, but lack the time and skills to ensure adherence. Gastroenterologists do not consider FIT an effective tool for CRC detection. Lack of agreement between screening recommendations and gastroenterologist opinion and lack of awareness among healthcare authority figures negatively impact the screening program.

**Conclusions:** Interventions to improve follow-up after a positive FOBT should be targeted at all levels within the health care system. Individually tailored patient interventions that are educationally and culturally appropriate prior to testing completion is essential. Strategies to support primary care physicians in the test and follow-up process, as well as improving communication between physicians, and finally, increasing awareness among healthcare leaders will all improve outcomes.

**Health Policy Implications:** We have clearly defined avenues to improve colorectal cancer screening outcomes at all levels of the system.

## MANAGING DRUG SHORTAGES - THE ISRAELI EXPERIENCE (2013-2018)

Alla Vishkautzan, Eli Marom, Einat Gorelik

*Ministry of Health, IL*

**Background:** The growing number of drug shortages (DS) is of worldwide concern. This problem presents challenges to healthcare professionals and regulatory authorities and may have a direct impact on public health.

Early notification regarding future shortage is essential in order to minimize the potential risks to patients and the health system.

The database of the pharmaceutical division in the Ministry of Health (MoH) was established in 2013, detailing the cause, duration of DS, and the availability of generic or therapeutic alternatives. Since 2017 more detailed causes of the DS are requested.

As from 2016, the MoH instructed the pharmaceutical industry to hold in any time stock of at least 1 month's supply of all registered drugs in Israel.

**Study Question:** Do the mandatory early notification and the obligation of maintaining at least one month's supply of a drug reduce the number of DS in Israel?

**Methods:** Using the database of the pharmaceutical division, between the years 2013–2018.

**Results:** According to the data collected by the MoH, between 2013 and 2018, 1,580 DS notifications were received. In each of these years there was an increase in the number of DS, along with a decline in permanent drug discontinuations, and in immediate notifications. Among the reasons for temporary DS, delay in the delivery of goods was a primary cause (25%).

**Conclusions:** Despite all the steps taken by the MoH and efforts to reduce the scope of DS and their impact on public health, their numbers continue to rise annually albeit with a decline of immediate notifications of permanent market withdrawals.

**Health Policy Implications:** Drug shortages pose a significant hazard to public health in Israel and worldwide. An open dialog between all stakeholders is required in order to minimize the impact of DS. More measures, including the legislation of deterrent measures, should be considered in order to minimize the frequency of DS.

## ASSESSING AND MONITORING THE IMPACT OF THE NATIONAL NEWBORN HEARING SCREENING PROGRAM IN ISRAEL - IN LIGHT OF DATA-DRIVEN ADVANCES IN THE ISRAELI HEALTH CARE SYSTEM

Janice Wasser<sup>1</sup>, Lisa Rubin<sup>1</sup>, Daphne Ari-Even Roth<sup>2</sup>, Orly Herzberg<sup>3</sup>, Liat Lerner-Geva<sup>4</sup>

*1 Ministry of Health, IL*

*2 Sheba Medical Centre; Tel Aviv University, IL*

*3 Ministry of Health; Tel Aviv University, IL*

*4 The Gertner Institute for Epidemiology and Health Policy; Tel Aviv University, IL*

**Background:** The Israeli Newborn Hearing Screening Program (NHSP) began operating nationally in January 2010. NHSP targets are the diagnosis of hearing impairment by age three months and initiation of habilitation by six months.

**Study Question:** Assess the performance of NHSP.

**Methods:** Three surveys to assess (1) screening coverage and referral rates; (2) age at diagnosis and initiation of habilitation pre- and post-implementation; and (3) compliance with a referral for failed screens and factors associated compliance.

**Results:** The NHSP coverage was 98.7% for approximately 179,000 live births per year for 2014–2016 and average referral rates were under 3%. Three years after program implementation, the median age at diagnosis was 3.7 months compared to 9.5 months prior to NHSP. The median age at initiation of habilitation after three years of NHSP was 9.4 months compared to 19.0 prior to NHSP. Compliance with referral to diagnosis was estimated at 80%. Parental reports of understanding the results and a heightened level of concern over the failed screen were associated with compliance and timely follow-up.

**Conclusions:** The findings indicate high screening coverage, a significant reduction in the ages of diagnosis and initiation of habilitation for hearing impaired infants. Evaluation of the NHSP has required multiple surveys of different aspects and populations. Implementing the newly mandated requirement for digital reporting of screening results and linking it to the computerized birth registry under development should improve the quality of the data as well as enable the timely transfer of information to ensure continuity of care.

**Health Policy Implications:** In order to streamline the NHSP, we propose adopting a uniform entrance to habilitation; improving communication among caregivers to parents to reduce anxiety; increasing efficiency in transferring information between service providers using advanced technology while ensuring continuum of care; and reducing wait time for follow-up testing in order to meet program objectives.

## URBANIZATION OF MENTAL HEALTH REFORMS - CHALLENGES AND OPPORTUNITIES

Orly Weinstein<sup>1</sup>, Racheli Magnezi<sup>2</sup>, Avital Alfandari<sup>3</sup>

*1 Ministry of Health, IL*

*2 Bar-Ilan University, IL*

*3 Sheba Medical Center, IL*

**Background:** Mental health (MH) disorders are common, affecting more than 25% of all people at some time during their lives. They are a leading cause of worldwide health-related disability. For the past 30 years, the main reasons for initiating mental health reforms in most countries has been to link MH with physical health and by doing so providing access, availability, quality and continuity of care.

Each country has slight variations in their reform process, but on a whole, most have focused on providing treatment for mental disorders within primary care; ensuring that psychotropic drugs are available; replacing large custodial mental hospitals by community care facilities backed by general hospital psychiatric beds; launching public awareness campaigns to overcome stigma and discrimination; establishing national policies, programmes and legislation.

**Study Question:** Our aim is to present different methods of MH reforms throughout the world according to organizational metrics.

**Methods:** A meta-analysis comparing 16 countries that have launched MH reforms in the past 30 years, including the MH reform in Israel.

**Results:** MH reforms can be divided into clusters; a number of countries can be linked into a cluster by similarities in their reasoning and process for MH reform. We will present strengths, weaknesses and opportunities in promoting MH reforms. A: legislation and policy's; B: establishment of networks of care (Spain, Belgium, Netherlands etc.); C: social and political reasoning for mental health reform (Germany, Russia, Brazil); D: deinstitutionalization (Italy, Greece, China); E: Health care system, Health care funding, Public and private health expenditure per capita.

**Conclusions:** MH is crucial to the overall well-being of individuals, societies and countries. Each mental health reform has created opportunities to promote an interface between hospitals, community care, physicians and patient care.

**Health Policy Implications:** Identify areas that need urgent attention. clusters may also help in enabling comparisons of strengths and weaknesses across countries.

## SOCIOECONOMIC DISPARITIES IN DIABETES PREVALENCE AND QUALITY OF CARE AMONG ISRAELI CHILDREN

Yiska Weisband, Ronit Calderon Margalit, Yael Wolff Sagy, Michal Krieger, Orly Manor

*The Israel National Program for Quality Indicators in Community Healthcare; The Hebrew University of Jerusalem, IL*

**Background:** Despite Israel's universal health coverage, disparities in health services provision may still exist.

**Study Question:** We aimed to assess socioeconomic disparities in diabetes prevalence and quality of care among Israeli children, and to assess whether these changed over time.

**Methods:** Repeated cross-sectional analyses in the setting of the National Program for Quality Indicators in Community Healthcare that receives data based on electronic medical records from Israel's four health maintenance organizations.

The study population included all Israeli children aged 2-19 years in 2011-2017 (for 2017: N=2,364,374, including 2,914 with diabetes). Socio-economic position (SEP) was measured using Central Bureau of Statistics data further updated by a private company (Points Business Mapping Ltd), and grouped into 4 categories, ranging from 1 (lowest) to 4 (highest). Using logistic regression, we assessed the association of SEP with diabetes prevalence, diabetes clinic visits, hemoglobin A1C (HbA1C) testing, and uncontrolled diabetes (HbA1C > 9%), and assessed whether these changed over time. Models were adjusted for age and sex.

**Results:** Diabetes prevalence increased with age and SEP. SEP was positively associated with visiting a specialized diabetes clinic (ORSEP 4 vs 1 2.53, 95% CI 1.72 - 3.70). Odds of HbA1C testing and odds of uncontrolled diabetes were negatively associated with SEP (ORSEP 4 vs 1 0.54, 95% CI 0.40 - 0.72 and ORSEP 4 vs. 1 0.25, 95% CI 0.18 - 0.34 respectively). Disparities were especially apparent among children aged 2-9 (4.6% uncontrolled diabetes in SEP 4 vs 40.8% in SEP 1). Uncontrolled diabetes decreased over time, from 44.0% in 2011 to 34.8% in 2017.

**Conclusions:** While rates of uncontrolled diabetes among children have improved, significant socioeconomic gaps remain.

**Health Policy Implications:** It is eminent to study the causes of these disparities and develop policies to improve the care provided to children in the lower SEP levels, to promote health equity.

## KNOWLEDGE, ATTITUDES AND COMPLETION OF ADVANCE CARE PLANNING: A CROSS-SECTIONAL STUDY AMONG HOSPITAL STAFF MEMBERS

Perla Werner<sup>1</sup>, Nasra Idilbi<sup>2</sup>, Galina Plotnikov<sup>3</sup>, Ron Ben Ithak<sup>4</sup>, David Yernitzki<sup>5</sup>, Tzvi Dwoletzki<sup>5</sup>

*1 University of Haifa, IL*

*2 Galilee Medical Center, IL*

*3 Shamir Medical Center (Assaf Harofeh), IL*

*4 Tel Aviv Medical Center, IL*

*5 Rambam Medical Center, IL*

**Background:** Although most people prefer to die at home, most deaths occur in hospitals and are frequently accompanied by aggressive treatments associated with poor end-of-life care. Advance care planning (ACP), defined as a process by which adult persons understand and communicate their personal values and preferences for end-of-life care, may help patients receive appropriate care. However, this does not usually occur, especially in the acute care hospital setting. The knowledge and attitudes of hospital staff regarding ACP may impact the planning of health care.

**Study Question:** To assess the knowledge and attitudes of hospital staff members regarding ACP and its correlates.

**Methods:** A total of 466 professionals (52.4% nurses, 26.0% physicians, and 21.4% paramedical professionals) working in four hospitals across Israel responded to a structured questionnaire.

**Results:** Despite high familiarity with the terms of advanced directives and medical power of attorney, and relatively positive attitudes towards ACP, objective knowledge regarding ACP was low, especially with regard to instrumental aspects. Levels of knowledge were higher among Jewish professionals and in those of greater seniority. The rates of completion of ACP on a personal level by professionals was very low.

**Conclusions:** Further education and training are needed to ensure that hospital professionals have adequate knowledge regarding ACP.

**Health Policy Implications:** The topic of ACP should be given priority in the acute care hospital setting. Clear policy measures should be defined by hospital administrators, and educational and training interventions should be provided to all professionals.



## HEALTH BEHAVIORS AMONG ISRAELI NURSES: DO NURSES PRACTICE WHAT THEY PREACH?

Rachel Wilf Miron<sup>1</sup>, Arnona Ziv<sup>1</sup>, Liora Valinsky<sup>2</sup>, Giora Kaplan<sup>1</sup>, Oren Asman<sup>3</sup>, Nili Tabak<sup>3</sup>, Ilya Kagan<sup>3</sup>

*1 The Gertner Institute for Epidemiology and Health Policy Research, IL*

*2 Meuhedet Healthcare Services, IL*

*3 Tel Aviv University, IL*

**Background:** Nurses comprise a significant part of the healthcare workforce. Health behaviors (HB) affect nurses' wellbeing, burnout, and their position as health educators and role models for patients.

**Study Question:** To describe health behaviors and burnout among nurses and to examine associations with the work environment, job satisfaction and quality of care.

**Methods:** This mixed methods, three-stage study design, consisted of a pilot survey among 171 nurses, two focus groups (n=37) to elucidate and validate the survey domains and items, and a cross-sectional multicenter survey. At the latter stage, an online questionnaire was disseminated to all nurses working in 17 healthcare organizations in Israel.

**Results:** Among 3,542 respondents, 64.2% did not achieve the physical activity target, 66.4% failed to perform screening tests as recommended, 65.7% slept less than 7 hours, 14.8% were current smokers and 47% felt considerable emotional stress at work. 35.0% of the sample scored low (0-4 out of 12) on a 12-item composite measure of HBs. Workplaces were rated low as health-promoting environments (M=2.2±.58; 1-5 scale). Community nurses reported higher HB score and lower emotional stress, compared with hospital nurses. Mean burnout score was 3.3, 3.4 and 3.6 among community nurses, hospital nurses who do not work night shifts and those working night shifts, respectively (p<0.0001). 67.9% of respondents were satisfied with their job, and 77.6% reported providing appropriate, patient-centered care.

**Conclusions:** Israeli nurses demonstrated unfavorable health behaviors and considerable burnout, which may negatively affect their health and wellbeing. The findings highlight a paradox - despite high burnout and emotional stress at work, nurses still report high job satisfaction and perceive the care they provide as responding to their patients' needs.

**Health Policy Implications:** Our study addresses the urgent need for the creation of a health-promoting work environment, which might improve nurses' wellbeing, nursing care, and public health.

## EXPLORING SOCIOECONOMIC DISPARITIES IN DIABETES QUALITY INDICATORS IN ISRAELI ADULTS

Yael Wolff Sagy, Michal Krieger, Orly Manor, Ronit Calderon Margalit

*The Israel National Program for Quality Indicators in Community Healthcare; The Hebrew University of Jerusalem, IL*

**Background:** Diabetes Mellitus (DM) is associated with micro- and macro-vascular complications, resulting in a high burden of morbidity and mortality. Populations of low socioeconomic position (SEP) in various countries were found to have increased prevalence of the disease, worse glycemic control, and increased complications.

**Study Question:** To explore socioeconomic disparities in diabetes quality indicators among Israeli adults.

**Methods:** The Israel National Program for Quality Indicators in Community Healthcare obtains data from electronic medical records from the four health plans, covering the entire civilian population. In 2017, 497,397 individuals aged >18 years were identified with DM. Diabetes prevalence, quality of care indicators, including process and intermediate outcomes were explored. SEP was determined on a scale of 1 (lowest) to 10 (highest) according to residential addresses, grouped and classified by the Israel Central Bureau of Statistics into geographical areas, and further refined by a commercial company (Points Business Mapping Ltd).

**Results:** The prevalence of DM in Israeli adults in 2017 was 9.7%, showing a strong SEP gradient, with higher prevalence in individuals of lower SEP when stratified by age-groups. No SEP disparities were observed in process indicators with overall rates of hemoglobin A1c (HbA1c) documentation of 90.9%, ophthalmologic examinations of 72.5%, and kidney function examinations of 92.5%. However, strong SEP disparities were observed in the prevalence rates of uncontrolled diabetes, where the overall rate of  $HbA1c \geq 9\%$  was 10.0%, and a 5.4-times higher rate was seen in diabetics of the lowest SES level (23.5%) compared with the highest SEP level (4.3%). Diabetes control had an overall rate of 69.7% and was 1.7-times higher in diabetics of the highest SEP level compared with the lowest SEP level.

**Conclusions:** These findings suggest that access to care does not explain SEP disparities in diabetes control in Israel.

**Health Policy Implications:** Current social benefits policy, compensating patients with uncontrolled diabetes may contribute to the observed gap.

## CLINICAL TRIALS IN ADVANCED THERAPIES - ISRAEL IS ON THE MAP

Shlomo Yaacobi, Miriam Cohen-Kandly, Catherine Ela, Eli Marom

*Ministry of Health; IL*

**Background:** Advanced therapies are breakthrough technologies in the medical world designed to treat unmet medical needs including cancer, neurodegenerative and hereditary diseases.

Nationally there is great medically and financially importance, in the development and implementation of innovative treatments.

**Study Question:** Does the Ministry of Health's policy enables developments in advanced therapies in Israel?

**Methods:** Due to the progress and complexity of these innovative experimental treatments, the MoH nominated specific committees to address necessary aspects, such as clinical safety data, scientific integrity, product quality and ethical value. In 1999, a central committee for clinical trials utilizing cells and tissues medicinal products was established, and in 2007 a committee for gene therapy clinical trials was established. In 2012, committee activity became regulated according to annual schemes.

In 2015, the Ministry of Health created a computerized database of all clinical trials. The database includes trial documents, product classification, MoH processing time, applications status, safety and annual reports, etc.

The Department of Clinical Trials conveys MoH policy throughout conferences and working groups and one on one meetings with sponsors and institutional review boards.

**Results:** Summarizing the data from 2015-2018, we can identify an increase in the number of innovative experiments (6 in 2015 to 22 in 2018) in all phases.

The processing time is usually between 150 to 200 days. Over the years 2015-2017 MoH approved over 70% of applications.

MoH also approved compassionate use of these treatments for patients that could not be included in a trail.

**Conclusions:** The Ministry of Health's policy enables and promotes developments in advanced therapies in Israel.

**Health Policy Implications:** In order to further promote these innovative trials, the MoH acts to improve the approval process, minimize evaluation time, enable transparency, whilst at the same time guarantee the safety of the participant in the trial.

## THERAPEUTIC SEQUENCE IN THE TRANSFER FROM REHABILITATION DAY CARE CENTERS TO THE EDUCATION SYSTEM

Hadar Yardeni, Ornella Dakwar-Kawar, Batel Zmora, Lisa Sela, Ruth Ben-Harush, Lilian Hamzani

*Ministry of Health, IL*

**Background:** Israeli rehabilitative day care centers (RDCC) operate under the Law (2000) and Regulations (2008). The law aims to ensure a toddler with a disability a rehabilitation setting, adequate care and education. There are approximately 130 RDCC receiving infants from the age of 6 months to 3 years of age. At the age of 3 years, toddlers continue to various educational frameworks. Toddlers who still need developmental intervention can receive treatment at the HMO [health maintenance organization] in addition to their stay in the various educational settings. Follow-up of the treatment continuum is required, characterization of the population that finishes the RDCC and their needs in the future.

**Study Question:** Is the transition of toddlers from various RDCC to different educational frameworks, provides a good therapeutic sequence?

**Methods** From December 2018 to March 2019, a telephone survey was conducted involving 162 parents of toddlers from RDCC. The survey is from a sampling frame of 500 toddlers from RDCC who were willing to participate in the study.

**Results:** It seems that the therapeutic continuum has not been adequately maintained. About a tenth to a quarter of the toddlers does not receive any treatment they had previously received in the RDCC. In addition, even among those receiving treatment, the number of treatments received today is lower than the number of treatments received in the past. The parents' satisfaction with the treatments received in the current framework is moderate, and lower than the satisfaction of the RDCC.

**Conclusions:** This is the first study that examines the differences in consuming treatments for toddlers in the transition between the various frameworks belonging to the MOH and the Ministry of Education. Further testing is needed, to determine the continuity of treatment and collaboration between the two ministries.

**Health Policy Implications:** Keeping the therapeutic sequence is a big medical challenge when dealing with weak populations.

## MACCABI RED - UBERIZATION OF MINOR TRAUMA AND SEMI URGENT MEDICAL CARE IN PRIMARY CARE SETTING

Ilan Yehoshua, Limor Boker Faran, Neomi Siegal, Miri Reuveni Mizrachi

*Maccabi Healthcare Services, IL*

**Background:** Minor trauma and semi-urgent conditions are a burden on the health system. In a year, in Maccabi alone, there are more than 50,000 cases. Many patients that seek urgent medical care are treated in the emergency department. The Maccabi health service has the medical personnel which is capable of delivering the same, if not better treatment, in the outpatient setting. This treatment is faster and cheaper. In order to facilitate the needs of the individual patient, we need a system that will connect the patients to the Doctors enrolled to program within the relevant area efficiently. It is very similar to the Uber system. We call this medical service innovation 'Maccabi red'. For example - a 3 years old child with a laceration who needs suturing; the 'Maccabi red' system can efficiently find the Doctor that can perform the suture. Thanks to this system the child and his family do not need to go to a busy emergency room thus reducing the burden of disease and health costs.

**Study Question:** (1) How efficient is this system in the management of minor trauma and semi-urgent conditions? (2) How does the project influence the satisfaction of Doctors and patients? (3) What are the changes in cost and health burden?

**Methods:** Since 12/2017, a pilot of 219 Doctors from different specialties and selected regions around the state was trained and enrolled. Each condition is referred to the system and directed accordingly to the suitable Doctor close by. Ongoing evaluation of the above questions is being performed.

**Results:** (1) Until February 2019, 2,065 referrals were made to the Maccabi Red. 78% were suitable for the definitions of the program. (2) Patients and Doctors' satisfaction were very high in qualitative questioners. (3) Financial benefit - still not enough data.

**Conclusions:** This is a useful process that needs ongoing adjustments to become a model for better utilization of medical resources.

**Health Policy Implications:** Maccabi Red could serve as a good example of how can 'Uberization' of the medical system succeed.

## INNOVATION IN CULTURAL ADAPTATION - MENOPAUSE IN ULTRA-ORTHODOX WOMEN

Yael Yiftach, Yehudit Sheeber, Alonit Tal, Shifra Herbert, Mina Zaidman

*Meuhedet Health Services, IL*

**Background:** In the innovation era, health information is provided via digital media, is widely available, and supports health promotion and preventive care. The Ultra-Orthodox community is at a significant disadvantage, as they do not have access to these media. Among women, cultural modesty requirements prevent them from actively seeking information and support. The perimenopausal period is particularly challenging, in a society where childbearing is a focal point.

**Study Question:** Does raising professional awareness to improve the quality of care in perimenopausal Ultra-Orthodox women?

**Methods:** We planned and implemented a pilot support group for middle-aged women in the city of Bnei Brak for empowerment and knowledge enhancement in the areas of female physiology, marital relations, self-esteem and coping with stress, and self-care in the perimenopausal period.

We used pre and post-intervention questionnaires to assess population needs and the effect of the group.

**Results:** Twenty women aged between 50 and 65 participated in the group. Their aim was to gain knowledge and "meet woman my age." A quarter stated their health was "not very good" 27.5% good, 30% very good and 17.5% excellent. The main issues that concerned them were sleep disorders (70%), hot flashes (65%) and concentration difficulties (65%).

Most of the women 85% rated the groups as very helpful and 90% stated the group met their needs. Participation in screening for breast cancer increased by 55% and screening for osteoporosis increased by 45%. 30% of participants reported regular physical activity.

Participants also stated "I have gained a lot", "I made a change" and "I got information that was missing".

**Conclusions:** We have made a decision to expand this service in other communities with limited access to digital information. We also developed a culturally relevant brochure and specific training for healthcare.

**Health Policy Implications:** In the era of digital innovation, special attention must be directed at cultural differences in the community.

## PATIENT NAVIGATION IN A VIRTUAL WORLD: USING ENGLISH SPEAKING IMMIGRANTS AS A MODEL FOR TELEHEALTH ADVOCACY

Aviva Yoselis, Gabriel Pransky

*The Shira Pransky Project, IL*

**Background:** Although there are no exact figures, there are approximately 300,000 Native English speakers living in Israel, and 5,000 more making Aliyah every year. Despite the demand of the Knesset to make healthcare accessible, both culturally and linguistically, to immigrants, English speaking services have been slow to come. This is due, in part, to the belief that all healthcare providers can converse in English (they cannot), and that English speakers making Aliyah navigate the healthcare system effectively (they do not). These discrepancies cause (1) decreased access to needed healthcare services, (2) increased levels of frustration, disempowerment and depression (3) decreased quality of life among English speaking immigrants dealing with healthcare issues. In addition, this immigrant population needs to overcome the cultural stigma of entitlement and the true lack of social capital that healthcare navigation operates through Israel.

**Study Question:** Can effective navigation and advocacy services be delivered to a varied and dispersed immigrant population, virtually, and have similar, if not better, outcomes than standard in-person services offered by the Ministry of Welfare, National Insurance Institute and the Ministry of Health?

**Methods:** An online system was developed that delivers health navigation and advocacy services based solely on online and ongoing telephone service, in conjunction with the information database of "Kol Zchut", All Rights Organization.

**Results:** Over a two-year period, over 2,000 English speakers have been served by this online system, and over 100,000 individuals have received accurate healthcare information in English through the collaboration between The Shira Pransky Project and the All Rights site. More importantly, over 400 immigrants in the periphery of the country, who have much less access to English speaking services have received services.

**Conclusions:** An organized informational and online-based system, with trained staff can deliver effective informational and advocacy services. A culturally diverse population spread out over a large geographic area can receive effective intervention services that can mitigate crises, increase access to benefits and suitable care.

**Health Policy Implications:** A system that generates empathy even if the platform is Telehealth (i.e. not in person), can be personal without being in person. Using trained staff and a specific rubric of service delivery and intake, services can be delivered effectively, efficiently and with minimal costs.

## FALL RISK ASSESSMENT, FEAR OF FALLING AND MOBILITY AMONG ACUTELY ILL HOSPITALIZED OLDER ADULTS

Dalit Zaguri-Greener<sup>1</sup>, Anna Zisberg<sup>2</sup>, Efrat Gil<sup>3</sup>, Nurit Gur-Yash<sup>4</sup>, Maayan Agmon<sup>2</sup>

*1 Beit-carmel, Nursing home Maagan Michael, IL*

*2 University of Haifa, IL*

*3 Clalit Health Services; Technion, IL*

*4 Oranim, Educational College, IL*

**Background:** Hospitals invest great efforts in fall prevention, mainly through the implementation of fall risk assessment. However, the contribution of this procedure to fear of falling (FOF) and mobility are yet to be determined.

**Study Question:** The main aim of the study was to examine the contribution of the estimated risk of falls to the fear of falls and how these predict the level of mobility among the older adults during hospitalization.

**Methods:** Data from 203 hospitalized medical patients (65+) independently ambulate on admission were recruited to examine the contribution their risk of falls to their fear of falling and mobility during hospitalization. Participants' FOF, cognitive and functional status were assessed 24 hours from admission. Self-reported mobility frequency, on daily basis, was collected for up to 3 days.

**Results:** Fall risk assessment on admission, length of stay, acute and chronic health status were retrieved from the electronic health record. Participants in the study reported increased fear of falling (78.5%), relatively low level of mobility (40% didn't walk outside the room) and more than half (59%) were classified by the staff at a high risk of falling. An increased risk of falling was positively associated with a higher level of fear of falling (OR=1.04, 95%CI: 1.00–1.07, p=0.027). The risk of falling was also negatively associated with the level of mobility ( $\beta = -0.253$ , p<0.01) after controlling for intervening variables (age, gender, fear of falling, the severity of illness, cognitive and functioning level, and the mobility level before the hospitalization).

**Conclusions:** Patients with increased risk of falling, according to hospital assessment on admission, reported a greater fear of falling and lower mobility level.

**Health Policy Implications:** These findings demonstrate the need to consider means of preventing falls in ways that will reduce inpatients fear of falling and increase the level of mobility during hospitalization.



## LONG TERM FOLLOW-UP AFTER BARIATRIC SURGERY

Orly Zelekha<sup>1</sup>, Nasser Sakran<sup>2</sup>, Tamy Shohat<sup>3</sup>, Itamar Raz<sup>4</sup>

*1 Israel Center for Disease Control, Ministry of Health, IL*

*2 Emek Medical Center, IL*

*3 Israel Center for Disease Control, Ministry of Health; Tel Aviv University, IL*

*4 National Diabetes Council, IL*

**Background:** Bariatric surgery (BS) is considering an effective treatment for morbid obesity.

Long-term follow-up after patients is essential for the success of the procedure and includes several aspects: medical monitoring and managing comorbid conditions, nutritional monitoring and deficiencies that may occur, assessment for surgical complications and monitoring of weight loss.

**Study Question:** To evaluate BS outcomes and follow-up rates three years after surgery.

**Methods:** Data on patients undergoing BS was extracted from the Israeli National Bariatric Surgery Registry (NBSR) Including: demographics, BMI, comorbidities, and type of BS. Follow-up data (blood tests, BMI, dietician visits) from the HMO's was reported six months, one-year, two years and three years after BS.

**Results:** During the study period 2014-2017 34,702 patients underwent BS, and were identified in the NBSR. 86.4% of whom were primary BS patients and 68.3% were females. The mean age and preoperative BMI were  $41.6 \pm 12.6$  years (range: 18.0-79.4 years) and  $42.0 \pm 5.4$  kg/m<sup>2</sup>, respectively. Most of the procedures were sleeve gastrectomy 67.2%. The vast majority performed laparoscopically (99.0%).

The mean excess weight loss three years after BS was 74.7% after primary BS and 52.9% after revisional BS.

After two years an improvement was observed in most of the blood test measures for assessing liver function, anemia, blood lipid levels, blood glucose test, HbA1c and renal function.

The rates of follow up after BS patients are, however, low and declining over time. After 3 years only 14.0% of the patients contacted a dietician, 47.1% performed a blood test and 36.7% measured their weight.

**Conclusions:** Based on the NBSR, bariatric surgery is an effective treatment for morbid obesity.

However, the low follow up rates do not allow for straight forward conclusions or for learning about the effectiveness of BS over time.

**Health Policy Implications:** It is necessary to improve the follow-up phase after bariatric surgery is performed to learn about the long-term impact of this procedure.

## VARIATION IN EMERGENCY DEPARTMENT USE: CAUSES AND CONSEQUENCES

Dan Zeltzer<sup>1</sup>, Avichai Chasid<sup>2</sup>, Liran Einav<sup>3</sup>, Ran Balicer<sup>4</sup>

*1 Tel Aviv University, IL*

*2 Clalit Research Institute, IL*

*3 Stanford University; NBER, US*

*4 Clalit Research Institute; Ben-Gurion University of the Negev, IL*

**Background:** Similar to the US, the Emergency Department (ED) use in Israel exhibits largely unexplained geographic variation. Variation can be due to either “demand-side” factors, such as patient health or “supply-side” factors, such as place-specific healthcare infrastructures.

**Study Question:** What part of the variation in ED use is supply-side driven, and what is the effect of ED use on patient healthcare spending and mortality?

**Methods:** To separate variation due to supply and demand factors, our empirical strategy exploits patient migration. We studied 150,000 members of Israel’s Clalit Health Services aged 25 and older who migrated between districts in 2011–2017. We modeled outcomes as a combination of a patient fixed effect, a district fixed effect, and a vector of time-varying controls, including indicators for year relative to move for migrants. This specification allows for the possibility that migrants have systematically different utilization levels and trends compared to non-migrants, that these levels are correlated with the migrant’s origin and destination districts. To study the impact of supply-induced ED visits, we use the origin–destination difference in average ED visit rates as an instrument for ED use.

**Results:** We observe a sharp change in the probability of an ED visit following a move, equal to 50 percent of the destination–origin difference in average ED utilization rate, all concentrated in visits that did not result in admission to the hospital. Using migration to a high-ED-use area as an instrument for ED use, the data suggests, without formally assessing causality, that a supply-side induced visit to the ED is associated with a 5% ( $p=0.06$ ) decreased total spending, and with 1.3 percent decreased mortality compared to non-visitors during the visit calendar year ( $p<0.001$ ).

**Conclusions:** Findings suggest that at least half of the overall geographic variation in ED use is attributable to supply-side factors.

**Health Policy Implications:** Results also imply that on the margin, it is possible that these additional ED visits may be beneficial for some patients with urgent non-emergent conditions. Therefore, they suggest further research to assess causality and potential interventions within selected clinical pathways.

## IN THE AGE OF INNOVATION, DO NOT FORGET HUMAN COMMUNICATION: THE CASE NEWBORN DISCHARGE FOLLOW UP INSTRUCTIONS

Deena Zimmerman, Michael Kaplan, Hanna Shoob, Chen Stein-Zamir

*Jerusalem District Health Office, IL*

**Background:** The neonatal bilirubin peak generally takes place 2-3 days after current newborn discharge times. In 2008, the Israel Neonatal Society recommended that all newborns be clinically evaluated 2-3 days post-discharge to detect jaundice. However, the compliance rate with this instruction is unknown.

**Study Question:** What percentage of parents of newborns arrive for post-hospitalization follow-up within 72 hours and what factors impact on those who do not?

### **Methods:**

1. Structured interview with parents of infants <3 months old brought to routine Jerusalem District Maternal Child Health Center visits. Items included first postpartum visit timing and oral discharge follow-up instructions received.
2. Sample standard hospital discharge forms from 26/29 Israeli obstetric units were examined for post-discharge follow-up instructions.

**Results:** Most parents (92%) recalled being given oral follow-up instructions but gave a range of follow-up timing; < 50% complied. Among non-compliers, 91% were aware of instructions, but 30% did not see the necessity, 20% believed sufficient to wait for immunizations and only 17.5% cited technical difficulties. In contrast, almost all (98%) parents who have explained a specific need for a bilirubin laboratory test jaundice adhered to this instruction.

Discharge instructions review showed all hospitals had instructions; 27% gave no timeframe, 15% gave a timeframe greater than 72 hours, and only 54% mentioned the purpose of jaundice screening.

**Conclusions:** Newborn follow up within the professionally recommended timeframe is low in the Jerusalem district, and likely other areas as well. Being given to specific recommendations leads to almost universal adherence. This may indicate that communication of specific instructions and the reason behind them is most likely to lead to parental follow through.

**Health Policy Implications:** In this light, written discharge instructions need to be uniform and consistent with those instructions given orally. Studies of other health advice topics should take into consideration the communication methods as well as the message.

## SUBGROUPING HOSPITALIZED OLDER ADULTS BASED ON SYMPTOMS EXPERIENCED AND ITS RELATIONSHIP TO CHARACTERISTICS AND OUTCOMES

Anna Zisberg<sup>1</sup>, Ksenya Shulyaev<sup>1</sup>, Nurit Gur-Yaish<sup>2</sup>, Maayan Agmon<sup>1</sup>,  
Anat Liberty<sup>3</sup>, Dorit Pud<sup>1</sup>

*1 University of Haifa, IL*

*2 Oranim, Academic College of Education, IL*

*3 HaEmek Medical Center; Clalit Health Services, IL*

**Background:** Experiencing multiple symptoms is common among hospitalized older adults. It is well established that an increase in symptom burden leads to functional decline in community patients. However, associations between symptoms of older adults admitted to hospitals and functional outcomes are rarely studied.

**Study Question:** The aims of this study were to identify subgroups of acutely ill hospitalized older adults based on their experience of multiple symptoms and to explore if these subgroups differed on health-related characteristics on admission, and on functional outcomes one-month post-discharge.

**Methods:** The study included 331 older adults (mean age 75.5±7.1), hospitalized in internal medicine units. Demographic, functional, cognitive, psychological factors and symptoms' disturbance were assessed within 24-hours from admission and one month following discharge.

**Results:** Cluster analysis identified three distinct subgroups based on patients' experiences with five highly prevalent symptoms (tiredness, dyspnea, dizziness, sleep disturbance and pain): Low or high levels of all five symptoms (70%, 14%, respectively), and moderate levels of four symptoms with high dyspnea (14%). "All high" cluster was characterized by the worst cognitive and instrumental function and highest anxiety and depression levels. The "moderate with high dyspnea" subgroup expressed the highest comorbidity score and elevated depression and anxiety. Multivariate Logistic regression showed that the odds of decline in instrumental function one-month post-discharge was 3.28 (95% CI 3.21-3.25, p=.021) for "all high" and 2.35 (95% CI 2.33-2.36, p=.043) for "all low" compared to "medium with high dyspnea" symptom-subgroup adjusted for pre-morbid function, objective health conditions and demographic characteristics. No significant differences were found in basic functional outcomes across symptom-subgroups.

**Conclusions:** Belonging to certain symptom-subgroup is an important risk factor in predicting negative consequences of hospitalization.

**Health Policy Implications:** These findings emphasize the importance of evaluating and subgrouping broad range of symptoms among hospitalized older adults.

## GESTATIONAL DIABETES: PREVALENCE, SCREENING AND POSTPARTUM GLUCOSE MONITORING

Inbar Zucker, Miri Lutski, Mor Saban, Debbie Novick, Itamar Raz

*Israel Center for Disease Control, Ministry of Health, IL*

**Background:** Gestational diabetes mellitus (GDM) affects approximately 4–10% of pregnancies. Data is lacking regarding its prevalence in Israel.

**Study Question:** To evaluate the compliance with GDM screening, to estimate the prevalence of GDM, and to evaluate postpartum glucose monitoring.

**Methods:** Population-based data for all pregnant women, who delivered during 2016, were obtained from two health maintenance organizations (HMOs) in Israel. Data included age, socioeconomic status, results of 50-g 1-h oral glucose challenge test (OGCT) and 100-g 3-h oral glucose tolerance test (OGTT), child weight, gestation week and HbA1c during the first year after delivery.

**Results:** 105,127 pregnant women without known DM were recorded. Out of them, 15.7% (n=16,567) did not perform any GDM screening. Out of the women who performed 50-g OGCT (n=82,476), 76.5% had <130 mg/dL plasma glucose level 1-h after the load, 7.9% had 130–139 mg/dL, 15% had 140–199 mg/dL and 0.6% had  $\geq 200$  mg/dL. Only 88.7% of the women with glucose levels 140–199 mg/dL performed 100-g OGTT. Overall GDM prevalence, based on the recommended OGTTs thresholds, was 3.8% (n=3,997), however for 17.1% (n=17,958) pregnant women GDM status was unknown. The rates of GDM increased with age, from 1.5% among women aged  $\leq 24$  years women to 8.5% among women aged 40 years and above. Out of the 3,997 women with GDM, only 23.5% performed HbA1c test during the first year after delivery, which was in the diabetic range in 2.8% (n=26) and in the pre-diabetes range in 26.6% (n=249).

**Conclusions:** According to our findings, a high proportion of women does not perform any GDM screening.

**Health Policy Implications:** Among women with GDM, compliance with postpartum glucose follow-up is especially low. This can have a major health impact given the importance of prevention of diabetes and its complications.

## ORAL HEALTH PRACTICES AMONG ISRAELI ADOLESCENTS, 2015-2016 COMPARED TO 2003-2004

Shlomo Paul Zusman<sup>1</sup>, Efrat Aflalo<sup>2</sup>, Michal Bromberg<sup>1,3,4</sup>, Rita Dichtiar<sup>1,3,4</sup>, Tal Shimoni<sup>1,3,4</sup>, Lital Keinan Boker<sup>1,3,5</sup>

*1 Ministry of Health, IL*

*2 Hadassah and The Hebrew University Dental Medicine, IL*

*3 Israel Center of Disease Control, IL*

*4 Tel Aviv University, IL*

*5 Haifa University, IL*

**Background:** Inadequate oral health-related practices are associated with other negative health behaviors, such as lack of physical activity, implicating overall health. Many efforts are being made to improve oral health among children and adolescents in Israel.

**Study Question:** To examine oral health improvement among adolescents in the past decade and to characterize adolescents with inadequate oral health-related practices.

**Methods:** School-based representative National Health and Nutrition Surveys were conducted in Israel in 2003–04 and in 2015–16 among 6,135 and 4,869 7th–12th grade students, respectively. The students filled out a questionnaire including socio-demographic details, general health, dental health, eating habits, and health-related behaviors and were measured for height and weight. Two categorical variables of inadequate dental hygiene behavior were defined: tooth brushing <2 times/day and visiting a dentist <1 time/year. Students with inadequate dental hygiene behavior (having both inadequate teeth brushing and dentist visits) participating in the 2015–16 survey, were characterized according to socio-demographic details, health-related and nutritional behaviors using a logistic regression model. The differences in the frequencies of inadequate health behavior between the two surveys were measured.

**Results:** The percentage of students reporting tooth brushing  $\geq 2$  times/day and dental visit  $\geq 1$  time/year rose from 64.0% to 66.2% ( $p=0.014$ ) and from 53.1% to 64.2% ( $p<0.001$ ) between 2003–04 and 2015–16, respectively. Poor dental hygiene behavior was reported more frequently by males (OR=1.92), Israeli-Arabs (OR=1.74), religious (OR=1.37), from low socio-economic backgrounds (OR=1.67), overweight/obese students (OR=1.51), and those reported low general health status (OR=1.61), lack of physical activity (OR=1.59) and eating during screen viewing (OR=1.65) ( $p<0.02$ ).

**Conclusions:** Significantly more students reported adequate dental hygiene behavior in 2015–16 compared to 2003–04. Nevertheless, there are wide differences in oral health practices between different segments of the population.

**Health Policy Implications:** To reduce oral health inequalities in adolescents, oral health and prevention in the Health Services Basket should receive special attention by health policymakers.

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