

REVES@30

Past, Present, and Future Trends in Population Health

May 30 - June 1, 2018

Institute for Social Research
University of Michigan
Ann Arbor, Michigan USA

Hosted by the University of Michigan and TRENDS Network



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WELCOME TO THE REVES/TRENDS CONFERENCE

We are pleased to be hosting the 2018 REVES/TRENDS conference at the Institute for Social Research (ISR) at the University of Michigan. ISR is among the world's largest and oldest academic survey research organizations and is home to the Population Studies Center, the Michigan Center on the Demography of Aging (MiCDA), and the National Archive of Computerized Data on Aging (NACDA). The University of Michigan celebrated the 200th anniversary of its founding last year. We hope you will have a chance to walk around the campus and meet up with colleagues who you may already know or want to meet here.

Ann Arbor is a vibrant university town, with much to offer in the way of outdoor recreation, arts and culture, shopping and dining. The town is especially pleasant this time of year when most of the students are away for the summer and the trees and flowers are in bloom. We have provided some suggestions for things to do in/around town a bit later in this program.

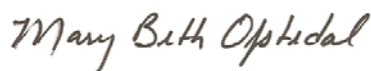
The conference is a joint meeting of the REVES and TRENDS research networks. Réseau Espérance de Vie en Santé (REVES) is an international network on health expectancy and the disability process. The REVES network was set up in 1989 by the French National Institute of Health and Medical Research (INSERM, Montpellier), the Social Affairs Council, Quebec, Canada, and the Center for Demographic Studies, Durham, North Carolina, United States. Jean-Marie Robine is a founding member and serves as coordinator for the network.

TRENDS is a network of international researchers working to accelerate scientific understanding of old-age disability and health trends. TRENDS was established by Bob Schoeni in 2005 and is supported by the National Institute on Aging through MiCDA.

This year's conference is the 30th annual meeting of the REVES network and the 14th meeting of the TRENDS network.

Many people have helped make this meeting possible. We would especially like to thank Carol Jagger at Newcastle University and Lois Verbrugge at the University of Michigan for serving on the Program Committee, and also Rachel Hilts and Brittney Roughan at Mount Saint Vincent University and Violet Elder, Amanda Houston, Anna Beattie-Massey, and Carolyn Batts at the University of Michigan for their support with administrative and logistical arrangements for the meeting.

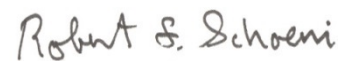
And thanks to you for attending! We hope you enjoy the conference and your time in Ann Arbor.



Mary Beth Ofstedal



Zachary Zimmer



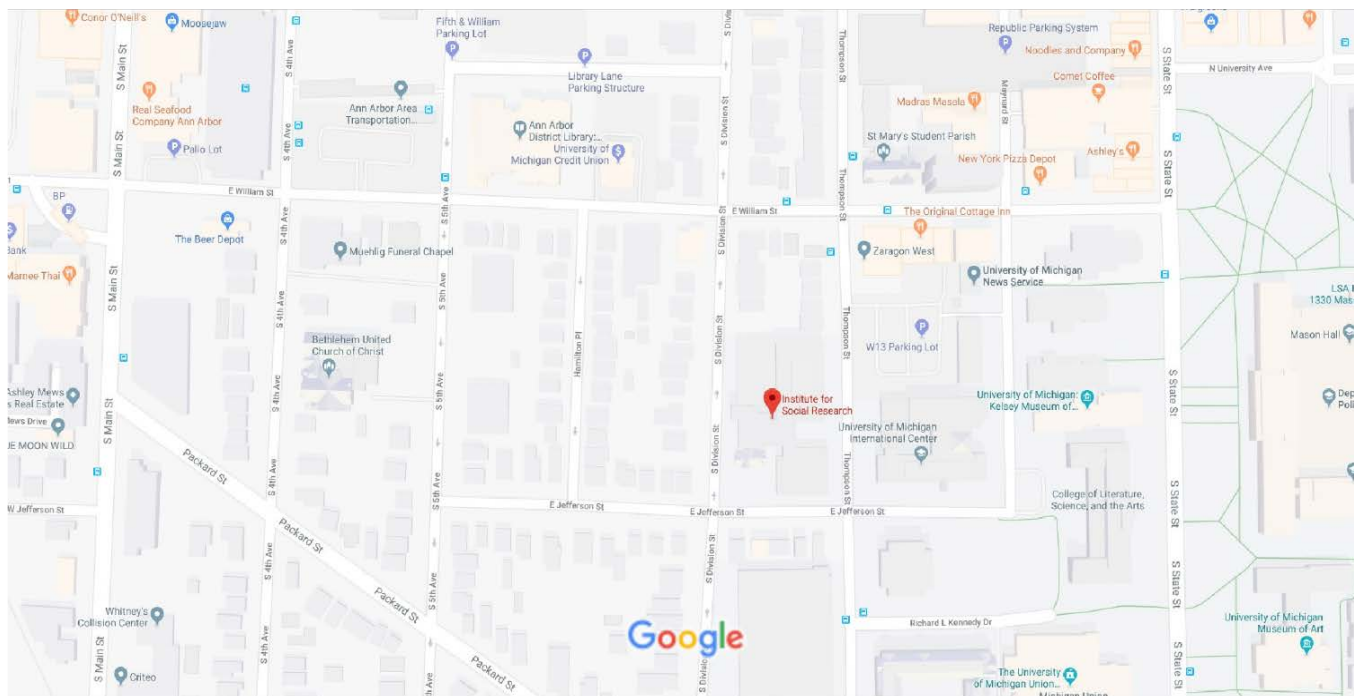
Bob Schoeni

Conference Organizers

USEFUL INFORMATION

CONFERENCE LOCATION

The 2018 REVES conference will be held at the Institute for Social Research (ISR) at the University of Michigan in Ann Arbor, in Room 1430 on the ground-level floor.



Map data ©2018 Google 50 m

Address:

Institute for Social Research
University of Michigan
426 Thompson Street
Ann Arbor, MI 48106-1248

CONFERENCE DINNER LOCATION AND POSTER SESSION

A strolling dinner and poster session will be held at the University of Michigan Museum of Art on Wednesday evening, May 30th, 6:30-8:00pm. The art museum is 2 blocks from ISR.

Museum galleries will be open for viewing by conference attendees from 6-8pm. Visit <http://umma.umich.edu/> to find out what exhibits will be on display.

Address:

525 South State Street
Ann Arbor, MI

TRANSPORTATION FROM AIRPORT

The 'Michigan Flyer' travels between the Detroit Metro Airport and Ann Arbor, leaving from the ground transportation garage (Stall #1 and Stall #5), departing roughly every 60 to 90 minutes from 6AM to 10:30PM. It will drop passengers off at the Blake Transit Center – 328. S Fifth Ave, Ann Arbor. From there it is a 6 -10 minute walk or a 3-5 minute car ride to the Institute for Social Research, or about 5 more minutes' walk to the main University of Michigan Campus. The current fare one way is \$12, with slight discounts for round trip and advance purchases.

There is a taxi company that operates out of the Detroit Airport. It is called Metro Cars and the current fare is \$55 (without tip) to Ann Arbor.

WHAT TO DO IN ANN ARBOR

- Take in nature at the Matthaei Botanical Gardens and Nichols Arboretum, summer hours begin on May 26th and they are open 7 days a week.
- Visit the historic Kerrytown Neighborhood. Check out the events listing on the webpage for local celebrations and festivals. Kerrytown is home to a farmer's market (Wednesdays and Saturdays) and other shopping, restaurants, specialty food stores, arts, entertainment, and more!
- Enjoy a show at the Michigan Theater, one of Michigan's most historic theaters in downtown Ann Arbor. Cinetopia Film Festival is hosted at the theater and runs from May 31-June 10 this year.
- Check out the unique galleries and gift shops in downtown Ann Arbor (Main Street area). Or if you are in search of a good book, check out Literati, Aunt Agatha's, or the Westside Book Shop.
- For University of Michigan apparel or souvenirs, shop at the MDen (stores located on State Street and at Briarwood Mall) or the University of Michigan Bookstore (Michigan Union).
- Visit the University Of Michigan Museum Of Art, considered to be among the best university art museums in the United States, which hosts a variety of art genres, including an especially good collection of Asian art.
- Whether with kids or on your own, the Michigan Museum of Paleontology has something interesting for all ages.
- If with family, visit the Ann Arbor Hands-On Museum.
- Enjoy a canoe ride down the Huron River or paddle-boating or kayaking at Gallup Park in Ann Arbor.
- Ann Arbor is approximately 1 hour west of Detroit and 1 hour southeast of Lansing, the capital of Michigan, making either an easy afternoon or day trip.
- Take in a Detroit Tigers major league baseball game in downtown Detroit. They have home games every day between May 25-June 3.
- Take a trip to see one of the great lakes – Lake Eerie is about 1 hour outside of Ann Arbor.
- For more to do, the [Ann Arbor Observer](#) regularly posts events happening in the area.

PRECONFERENCE ANALYSIS WORKSHOP

Pre-REVES meeting workshop on software to compute health expectancy: IMaCh & SPACE

Date: May 29, 2018

Time: 9:30am - 5:00pm

Venue: Institute for Social Research, University of Michigan, Room 1450

Cost: \$50 USD

Registration for both the conference and the workshop will open in early March. If you are interested in securing a spot in the analysis workshop, please email Mary Beth Ofstedal at mbo@umich.edu with the subject "REVES Analysis Workshop".

Instructors: Nicolas Brouard (INED, France), Chi-Tsun Chiu (Academia Sinica, Taiwan) and Yasuhiko Saito (Nihon University, Japan)

There are few software packages available to compute health expectancy based on a multistate life table method using longitudinal survey data. In the workshop we introduce two such software packages:

IMaCh 0.99 (Maximum Likelihood Computer Program using **I**nterpolation of **M**arkov **C**hains) developed by Prof. Nicolas Brouard and his colleagues at INED, France. We will distribute necessary files to participants beforehand and install the software at the beginning of the workshop together.

<http://euroreves.ined.fr/imach/>

SPACE (**S**tochastic **P**opulation **A**nalysis for **C**omplex **E**vents) developed initially by Dr. Liming Cai, National Center for Health Statistics at the time and colleagues, and now maintained by Dr. Chi-Tsun Chiu at Academia Sinica, Taiwan). SPACE is a collection of SAS programs to compute multistate life tables via microsimulation, with bootstrapped inference. Therefore, we need participants to install SAS in their PC before they come to the workshop. Necessary products to be installed are BASE, STAT and IML. <http://sites.utexas.edu/space/>

We will compute health expectancy using these two software packages and the same longitudinal survey data. Then, we will discuss differences in the two.

Schedule:

9:30 - 10:30	Introduction to IMaCh
10:30 - 10:40	Short break
10:40 - 12:10	Running IMaCh
12:10 - 1:10	Lunch
1:10 - 2:10	Introduction to SPACE
2:10 - 2:20	Short break
2:20 - 3:50	Running SPACE
3:50 - 4:00	Short break
4:00 - 5:00	Discussion

CONFERENCE PROGRAM

Early Registration, Tuesday, May 29th, 4:00-6:00pm, ISR Atrium

DAY 1 – WEDNESDAY MAY 30TH

Registration begins 8:30 – coffee provided

9:30-9:45 - Welcome and Introduction

Mary Beth Ofstedal, Conference Organizer

Vicki Freedman, Director of MiCDA and TRENDS network member

Jean-Marie Robine, Coordinator of REVES network

9:45-11:15 – Session 1. Past, present and future trends in population health, part 1

Chair: Linda Martin

1. Eileen Crimmins “Changing disease, onset and mortality in two cohorts from the Health and Retirement Study”
2. Jona Schellekens “Explaining trends in disability in the United States, 1963-2013”
3. Judith Lefebvre “Trends in the health status of Canadians aged 45 and over, 1994-2014”
4. Tim Riffe “Healthy lives: Delayed onset, improved recovery, or mortality change?”

11:15-12:00 – Session 2. A global look at risk factors

Chair: Roberto Ham-Chande

1. Henrik Brønnum-Hansen “The impact of smoking on expected lifetime without and with chronic disease among Palestinian men in the West Bank: a cross-sectional study”
2. Andrew Kingston “Impact of obesity on disability-free life expectancies in older Australians”

12:00-12:15 Group photo

12:15-1:30 Lunch on site

1:30-3:00 Session 3. Developments in measures and methods, part 1

This is a special session dedicated to the memory of longstanding REVES member Jan Barendregt

Chair: Kyriakos Markides

1. Dorly Deeg “Self-rated health: when and how to use it in studies among older people?”
2. Marc Luy “Could the actual decrease in life expectancy be caused by “Tempo Effects”?”
3. Yasuhiko Saito “Validation of the Global Activity Limitation Indicator in an Asian setting”
4. Nicolas Brouard “The new Interpolated Markov Chain software (IMaCh 0.99) - backward prevalence from Italian SILC and French HID surveys - time varying covariates from the American HRS survey”

3:00-3:30 Coffee Break

3:30-5:00 Session 4. Exploring social inequalities in health

This is a special session dedicated to the memory of longstanding REVES member Marti Parker

Chair: Dorly Deeg

1. Emmanuelle Cambois “A long-term harm of unskilled first jobs, episodes of inactivity and no promotion”
2. Morgan Peele “Later-life health trajectories in China: The role of childhood, adult, and current community socioeconomic conditions”
3. Etienne Duim “Inequalities in trajectories of functioning in dwelling-living older adults in two developing countries: Brazil and Chile”
4. Aïda Solé-Auró “Inequalities in longevity by education level in Spain: A life satisfaction approach”

6:30-8:00 Dinner and Poster Session. University of Michigan Museum of Art

Poster Presentations:

Chair: Zachary Zimmer and Mary Beth Ofstedal

1. Carol Jagger "To what degree do religiosity and spirituality explain healthy life expectancy gaps across Europe?"
2. Bussarawan Puk Teerawichitchainan "Sensory impairments among older persons in Myanmar, Vietnam, and Thailand: Implications for functioning and health"
3. Amanda Sonnega "Running to rest: Physical activity and sleep problems over 10 years in a national sample of older adults"
4. Mohamed Eldigire Hamid Ahmed "Healthy life expectancy and the correlates of self-rated health in Central Sudan. A Cross sectional study"
5. Kristine A. Mulhorn "Functional decline and all-cause mortality based on respondents in US nursing home survey (2004-2006)"
6. Haena Lee "Childhood family environment and cognitive functioning in later life: Evidence from the HRS Life History Mail Survey"
7. Yi Yang "Can regular fruit consumption reduce the risks of cognitive impairment? -- Evidences from a large-scale social survey"
8. Toshiyuki Ojima "Life expectancy without institutionalization as an operational measurement of age and dementia friendly communities"
9. John Knodel "Childlessness and aging alone: Comparative perspectives from East and Southeast Asia"
10. Patrick Lazarevic "Self-rated health as generic health measurement? Identifying the health information used and the role of gender, age, and country"
11. Vineet Raichur "Longitudinal analysis of changing consumption patterns in aging households in the US"
12. Yasuhiko Saito "Validating the Global Activity Limitation Indicator in Taiwan"

DAY 2 – THURSDAY MAY 31ST

9:00-10:30 – Session 5. Life and health in comparative perspective

Chair: Emmanuelle Cambois

1. Wilma Nusselder “A comparative study of inequalities in Unhealthy Life Years”
2. Joshua R. Ehrlich “Vision impairment among older adults in low and middle income countries”
3. Anthony R. Bardo “U.S. regional differences in cognitive and happy life expectancy”
4. Jennifer B. Dowd “Trends in mid-life mortality: Is the US an anomaly? Evidence from the UK and Canada”

10:30-11:00 Coffee Break

11:00-12:30 Session 6. Contemporary themes around health and mortality

Chair: Henrik Brønnum-Hansen

1. Xiaochun Qiao “Changing of mortality and morbidity of Chinese elderly”
2. Vanessa di Lego “Vanguards of longevity: The case of Brazilian Air Force military”
3. Natalia S. Gavrilova “New trend of the U.S. mortality: Gompertzialization of mortality trajectory”
4. Michael Wolfson “On unjust health inequalities”

12:30-1:30 Lunch on Site

1:30-3:00 Session 7. Past, present and future trends in population health, part 2

Chair: Al Hermalin

1. Vicki A. Freedman “Recent changes in active life expectancy in the US: An introduction to NHATS (National Health and Aging Trends Study)”
2. Mukesh C. Parmar “Regional analysis of compression of mortality and morbidity in India: 1995-2014”
3. Anna Zajacova “The rising pain prevalence among US and Canadian adults: A comparative study”

3:00-3:30 Coffee Break

3:30- 4:40 George Myers Lecture

Chair: Jean-Marie Robine

Carol Jagger “What can past trends in health expectancies tell us about the future?”

Steering Committee Meeting following lecture

DAY 3 – FRIDAY JUNE 1ST

9:00-10:30 – Session 8. Developments in Measures and Methods, Part 2

Chair: Mark Hayward

1. Julie D. Weeks “Future directions of Functioning Measures in the U.S. National Health Interview Survey (NHIS)”
2. Douglas Wolf “Heterogeneity in active life expectancy: A finite-mixture model”
3. Vid Bijelic and Michael Wolfson “Unobserved heterogeneity and the robustness of estimates of the effects of income on life expectancy – an illustrative and hypothetical example”
4. Herman Van Oyen “The use of the Global Activity Limitation Indicator (GALI) and Healthy Life Years by Member States and the European Commission”

10:30-11:00 Coffee Break

11:00-12:30 Session 9. Investigations pertaining to the older-old, the last years of life and frailty

Chair: Xiaochun Qiao

1. Emiel O. Hoogendijk “Sex differences in healthy life expectancy among nonagenarians: A multistate survival model using data from the Vitality 90+ study”
2. Jean-Marie Robine “Life expectancy in the state of frailty after age 70: Findings in the SIPAF Study”
3. Roberto Ham-Chande “Health status and out-of-pocket spending during the last year of life in Mexican Population 60+”
4. Rahul Malhotra “Years of life lived by elderly Singaporeans with and without frailty”

12:30-1:30 Lunch on Site

1:30-3:00 Session 10. Cognition and dementia research

Chair: Herman Van Oyen

1. Scott M. Lynch “Cognitive and happy life expectancy in the US: Implications of differential measurement of cognitive impairment and happiness for estimates of quality of life”
2. Mateo Farina “Race and education disparities in dementia-free life expectancy for older Americans”
3. Jennifer Ailshire “Regional variation in U.S. dementia trends and race/ethnic disparities in cognitive impairment and dementia”
4. Flavia Andrade “Educational differentials on life expectancy with and without cognitive impairment in Brazil”

3:00-3:30 Closing Remarks and Invitation to REVES 2019

Zachary Zimmer, Conference Organizer

Jean-Marie Robine, REVES Network Coordinator

Aïda Solé-Auró, 2019 Conference Organizer

Mary-Beth, Conference Organizer

ABSTRACTS

DAY 1 – WEDNESDAY MAY 30TH

SESSION 1 – PAST, PRESENT AND FUTURE TRENDS IN POPULATION HEALTH, PART 1

May 30th 9:45-11:15 AM

Chair: Linda Martin

1 CHANGING DISEASE, ONSET AND MORTALITY IN TWO COHORTS FROM THE HEALTH AND RETIREMENT STUDY

Morgan E. Levine, Yuan S. Zhang, Eileen M. Crimmins

Background: The literature on trends in diseases has been consistent in showing an increase over time in the proportion of people with major diseases. The incidence of disease, however, rather than the prevalence is a better indicator of how age-specific health is changing over time. In addition, a cohort rather than a period formulation is a better way to assess changes over time in the aging process.

Objective: We examine changes in disease onset and survival across two cohorts of the Health and Retirement Study. If disease onset is being eliminated or delayed to later ages, the later cohort should have longer survival without disease; decreased mortality with no change in onset would lead to more time with disease and higher disease prevalence.

Data: We use data from the 1931 to 1941 HRS birth cohorts who were first interviewed in 1992 when they were 51 to 61; the second cohort was born in 1943 through 1953 and interviewed at age 51 to 61 in 2004 and then followed until 2016. At the first interview, respondents report the presence of disease and the age at onset and from then on they report the onset of disease every two years.

Preliminary Results: There is less survival without cancer, no change in survival with heart disease, a small decrease in survival without stroke, and an increase in survival without myocardial infarction. Only the likelihood of having a heart attack is reduced or delayed in a fashion that might be considered improving health or compression of morbidity. We examine the age of onset of these conditions in the two cohorts and find the likelihood of having a heart attack at each age substantially reduced in the later cohort.

Conclusions: A reduction in the likelihood of heart disease onset is marked in the later cohort.

2 EXPLAINING TRENDS IN DISABILITY IN THE UNITED STATES, 1963-2013

Jona Schellekens

In order to improve our understanding of the determinants of long-term trends in health, this paper proposes to extend the analysis of trends in disability to the first National Health Interview Survey available for research, which was conducted in 1963. After discussing the many problems that arise when trying to harmonize and integrate all the surveys until 2013, I will present a multivariate analysis of trends which controls for major changes in the definition of disability in 1982 and 1997. The outcome variable is the report of any disability. The independent variables include individual-level education, a

cohort measure of early-life conditions and a period measure of medical advance. I use average adult height by year of birth as a proxy for the cumulative effects of adverse living conditions. Previous studies have already shown that education contributed to trends in disability, although they have not shown this for such a long period. However, previous studies did not find evidence for the contribution of height to trends in disability, perhaps because they did not include earlier cohorts. I use logistic regression to model the probability that the respondent reported any disability. Preliminary results are based on the analysis of 426,056 respondents aged 60-69. After controlling for two major changes in the definition of disability, the statistical model is able to predict major trends in disability, including the rise in the 1970s and the decline in the 1980s and 1990s. My results indicate that increased height and better education explain the decline in disability in the 1980s and 1990s, whereas medical advances explain the rise in disability in the 1970s.

3 TRENDS IN THE HEALTH STATUS OF CANADIANS AGED 45 AND OVER, 1994-2014

Judith Lefebvre, Yves Carrière

In response to the upward trend in life expectancy and financial pressures on the public pension system, some suggest raising the normal retirement age in Canada. However, before recommending such an increase, it is important to consider health status of older adults. This paper proposes to examine recent trends in the health status of Canadians aged 45 and over. Using the Sullivan method, trends in partial disability-free life expectancy (PDFLE) between the ages of 45 and 70 years are computed from 1994 to 2015. Considering that caregiving responsibilities to a parent or spouse with a loss of autonomy may have an impact on the labor market participation of older adults, trends in disability-free life expectancy (DFLE) at 70 years and over is also documented. Disability among adults aged 45 to 69 is estimated from the attributes of the Health Utility Index (HUI) correlated with the capacity to work. For seniors, it is defined according to the attributes of the HUI associated with the need for assistance. In both cases, disability status is looked at by level of severity. Data used to estimate the prevalence of disability are taken from the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS). Results reveal a decreasing PDFLE₄₅₋₆₉ since the mid-1990s, which do not confirm the compression scenario at the end of working life. Hence, this study brings no evidence in support of the postponement of the normal retirement age if this decision was solely based on gains in life expectancy.

4 HEALTHY LIVES: DELAYED ONSET, IMPROVED RECOVERY, OR MORTALITY CHANGE?

Tim Riffe, Neil Mehta, Daniel Schneider, Mikko Myrskylä

Background: Healthy life expectancy at older ages in the United States has steadily increased in recent decades. We do not know whether changes in disease onset, recovery, or mortality drive this trend. Objective: We aim to determine how much of the change in healthy and unhealthy life expectancy between 1995 and 2015 is due to changes in onset, recovery, and mortality. Data and Methods: We use the US Health and Retirement Study to estimate transition rates between health and mild and severe disability states, as well as state-specific death rates, for the years 1995, 2004, and 2014. We calculate remaining healthy, disabled, and total life expectancy at age 50 using incidence-based Markov matrix models. We decompose the difference between time points and population strata into 9 separate age-specific components for onset, recovery, and mortality using pseudo-continuous decomposition. Results: We describe preliminary results for males, all education groups combined. Perhaps counter to

intuition, most change in healthy life expectancy is due to mortality and not to onset of or recovery from disability. Most of the two year increase in healthy life expectancy since 1995 is due to decreased mortality of healthy people, whereas delayed onset and slowed recovery from disability offset each other. Expected years in mild disability increased by about 4 months over the two decades, mostly due to improved mortality of both healthy and mildly disabled people. Delayed onset of mild disability almost equally offset the effects of improved mortality among the mildly disabled. Expected years in severe disability increased by half a year, also mostly due to improved mortality in all health states. Conclusions: Healthy life expectancy at age 50 increased relatively faster than disabled life expectancy, both driven by mortality improvements. Years spent in disability have been pushed into higher ages, indicating a slight delay of onset.

SESSION 2 – A GLOBAL LOOK AT RISK FACTORS

May 30th 11:15 AM – 12:00 PM

Chair: Roberto Ham-Chande

1 THE IMPACT OF SMOKING ON EXPECTED LIFETIME WITHOUT AND WITH CHRONIC DISEASE AMONG PALESTINIAN MEN IN THE WEST BANK: A CROSS-SECTIONAL STUDY

Henrik Brønnum-Hansen

Background: The high smoking prevalence of 40 per cent among men living in the West Bank of the occupied Palestinian territory is a major challenge for the Palestinian health authorities. The purpose of the study was to estimate life expectancy and the average lifetime without and with chronic disease among West Bank male never smokers, ex-smokers, and smokers.

Methods: The study used a life table for the West Bank male population and Danish relative risk estimates for death for smokers and ex-smokers versus never smokers and utilized data from the Palestinian Family Survey 2010. Expected lifetime without and with chronic disease was estimated and the contributions from the mortality and morbidity effects to smoking related differences in average lifetime without and with chronic disease were assessed by decomposition.

Results: Life expectancy of 15-year-old Palestinian men who would never start smoking was 59.5 years, 41.1 (95% CI 40.3–41.9) of which were expected to be without chronic disease. Ex-smokers could expect 57.9 years of remaining lifetime, 37.7 years (CI 35.9–39.4) of which to be spent without disease. For lifelong heavy smokers (> 20 cigarettes per day), the expected lifetime was 52.6 years, of which 38.5 years (CI 37.3–39.7) were without chronic disease. Of the total loss of 6.9 years of life expectancy among heavy smokers, the mortality effect accounted for 2.5 years without and 4.4 years with disease, whereas the morbidity effect was negligible. The morbidity component of the decomposition accounted for 1.7 years with disease for moderate smokers (\leq 20 cigarettes per day) and 2.9 years without disease for ex-smokers.

Interpretation: The high prevalence of smoking causes a considerable loss of life years and lifetime without chronic disease. We recommend the Palestinian health authorities to enforce the anti-smoking law.

2 IMPACT OF OBESITY ON DISABILITY-FREE LIFE EXPECTANCIES IN OLDER AUSTRALIANS

Andrew Kingston, Julie Byles, Kaarin J. Anstey and Carol Jagger

Background: As many, if not all, lifestyle factors are risk factors for both disability and mortality, it is important to assess their impact on both outcomes together, in an indicator like disability-free life expectancy (DFLE). We can then judge whether promotion of a healthy lifestyle will ensure the extra years are healthy ones. The aim is to evaluate the impact of obesity on DFLE using a range of disability measures across the hierarchy. **Methods:** We used the Australian Dynamic Analyses to Optimise Ageing (DYNOPTA) dataset from Australian longitudinal studies of ageing. Three measures of disability were examined: mobility disability, IADL only, and IADL/ADL. Obesity was defined from BMI at baseline. DFLE was estimated from multi-state life tables adjusted for education (left school at age ≤ 14 years or > 14) and separately for men and women by the IMAcH software. **Results:** The analytic sample comprised 6142 individuals aged 50+ years of whom 48.9% were male. Total life expectancy at age 65 was significantly lower for the obese compared to the non-obese but only for low educated women. However, obesity reduced DFLE for every measure of disability, the greatest effect being observed for years free of mobility disability (mobDFLE) and for women than men. Obese men and women aged 65 with high education spent over 3 years fewer free of mobility disability (men: -3.33 years, se 0.97; women: -4.88 years, se 0.88), and over 2 years longer with mobility disability (men: 2.03 years, se 0.92; women: 2.95 years, se 0.98). Slightly greater reductions in mobDFLE were associated with obesity in the low educated. **Conclusions:** Our findings indicate that obesity is associated with lower DFLE and higher years with disability irrespective of educational attainment, and particularly for mobility disability which is early in the hierarchy of loss and therefore potentially remediable.

SESSION 3 – DEVELOPMENTS IN MEASURES AND METHODS, PART 1

THIS IS A SPECIAL SESSION DEDICATED TO THE MEMORY OF LONGSTANDING REVES MEMBER JAN BARENDREGT

May 30th 1:30PM - 3:00PM

Chair: Kyriakos Markides

1 SELF-RATED HEALTH: WHEN AND HOW TO USE IT IN STUDIES AMONG OLDER PEOPLE?

Dorly Deeg, Henrike Galenkamp, Arjan Braam, Martijn Huisman

Background. A simple and pragmatic tool to measure overall health status is self-rated health (SRH). This measure is included in many cross-sequential and multi-country surveys, and has also been recommended as an indicator for healthy life expectancy. However, several observations triggered a debate on the appropriateness of SRH as a measure of overall health: it is only weakly associated with age, and it shows cultural bias. There is a need for more specific recommendations regarding when and how SRH should be used, in particular in longitudinal and trend studies.

Method. Review of the literature, and our own empirical work **Results.** SRH measured at one point in time has the potential to reflect underlying health status, even in groups with high morbidity, such as nonagenarians. In longitudinal studies and clinical trials, however, over time an individual's standard of

good health may change, resulting in more stable health ratings than would be expected based on declines or improvements in other health indicators. Furthermore, individuals in different cultures and belonging to different generations may attach importance to other health aspects, for example to their level of functioning versus their chronic diseases. As a result, cultural differences may be underestimated, and the seeming stability of SRH in trend studies may hide changes in more objective indicators, such as the prevalence of chronic diseases and functional limitations.

Conclusions. The added value of including SRH in studies as a health measure depends on the specific aims and design of the study. SRH is valuable for deciding which population groups are at risk for negative health consequences such as mortality or institutionalisation. However, when studying changes in health in ageing individuals longitudinally or at the population level across countries or over time, one should include specific, more objective, indicators of morbidity, in addition to SRH.

2 COULD THE ACTUAL DECREASE IN LIFE EXPECTANCY BE CAUSED BY "TEMPO EFFECTS"?

Marc Luy, Markus Sauerberg

The United States and several European countries experienced a decrease in life expectancy between 2014 and 2015. This change led to alarming reports in the scientific community and the general public. The interpretation of a severe health crisis, however, might be premature. It is possible that the decrease in life expectancy originates from so-called "tempo effects". These can increase death rates for a particular year when the pace of mortality reductions is abating. We assessed the level of tempo effects in the United States and five European populations (Belgium, France, Germany, Portugal, Sweden) which experienced decreasing life expectancy between 2014 and 2015 using the "Total Mortality Rate" and adjusted the life expectancy indicator accordingly. Data was taken from the Human Mortality Database. The results show that the life expectancy values for both 2014 and 2015 are boosted upwards by tempo effects. These boosts are, above all in the European populations, to such an extent larger in 2014 compared to 2015 that they caused a decrease in conventional period life expectancy. By contrast, tempo-adjusted life expectancy increased steadily in all six populations. Thus, once period life expectancy is adjusted for tempo effects, we find no indication of any severe health crisis causing an increase in mortality. These findings suggest that the decrease in period life expectancy results to a large extent from a deceleration in prevailing mortality improvements. This leads to a very different interpretation of current life expectancy trends and should call for caution against making premature conclusions. Whether there is a really worrisome health crisis can only be assessed on the basis of future life expectancy developments.

3 VALIDATION OF THE GLOBAL ACTIVITY LIMITATION INDICATOR IN AN ASIAN SETTING

Choy Lye Chei, Yasuhiko Saito, Angelique Chan, Rahul Malhotra

This study replicates an earlier study (Berger et. al. 2015) and in the process it seeks to validate the Global Activity Limitation Indicator (GALI) within an Asian setting—Singapore. The GALI is a central measure for the European Healthy Life Years (HLY). It has also been shown to be a suitable measure of general activity limitations in European populations; however, care needs to be taken when making cross-national comparisons. The GALI has been introduced as a measure in the Singapore context via the 3rd wave of the Panel on Health and Ageing of Singaporean Elderly (PHASE). PHASE was a longitudinal panel survey that sought to track the changes in physical, social, and mental health of the resident

Singapore population (60 years and above). The longitudinal survey also collected anthropometric and performance measures. Wave 3 of PHASE will be utilised for this study. Wave 3 not only includes in-depth information on physical activity, it also includes detailed information on frailty. The sample used for this study n=1622. The main research question: Is GALI a valid measure of general activity limitations in an Asian setting?” In the initial study examining the validity of GALI in Europe, it was observed that there was strong association between GALI and Activities of Daily Living (ADL); moderate association with the Instrumental Activities of Daily Living (IADL); and weak association with functional limitations. For this study, it is hypothesised that similar patterns will be observed.

4 THE NEW INTERPOLATED MARKOV CHAIN SOFTWARE (IMaCh 0.99) - BACKWARD PREVALENCE FROM ITALIAN SILC AND FRENCH HID SURVEYS - TIME VARYING COVARIATES FROM THE AMERICAN HRS SURVEY

Nicolas Brouard, Yao-Chi Shi, Cristina Giudici

Back probabilities can be defined as probabilities conditioned by a future event: fertility rates by years to divorce or separation. Back prevalence by age, deduced from back probabilities, describe the history of older cohorts. If a probability, forward or backward, can easily be explained with an example on a simple Lexis diagram, the data provided by cross-longitudinal surveys are more complex because of attrition at certain waves only, smaller samples compared to cross-sectionals surveys, inequality in the space of interviews, competing risks etc. Therefore, only specific softwares or procedures can manage with such statistical analyses. That is the reason why we extended the IMaCh software to compute not only standard forward prevalences (version 0.98) but also back prevalences (version 0.99). Comparison of forward and backward prevalences of disability are presented using the Italian “Statistics on Income and Living Conditions” survey (EU-SILC 2010-2013) as well as the French “Handicap, Incapacité, Dépendance (HID)” surveys of 1998-99-00-01. Classical use of IMaCh software consists in models where degrees of disability are processed as different states of a Markov chain and age, education, marital status or living arrangements are covariates influencing the changes in disability. But the inverted causality could be studied: how the degree of disability can influence the changes in living arrangements. Fortunately, the Health and Retirement Study (HRS) provides high quality cross-longitudinal surveys with more than 8 waves and IMaCh version 0.99 lets us design multinomial logistics regressions with varying covariates, quantitative or dummies. We will show how the disability status is a key factor to move to institutions, in the US at least.

SESSION 4 – EXPLORING SOCIAL INEQUALITIES IN HEALTH

THIS IS A SPECIAL SESSION DEDICATED TO THE MEMORY OF REVES MEMBER MARTI PARKER

May 30th 3:30 PM – 5:00 PM

Chair: Dorly Deeg

1 A LONG-TERM HARM OF UNSKILLED FIRST JOBS, EPISODES OF INACTIVITY AND NO PROMOTION

Cambois Emmanuelle, Clémentine Garrouste, Arianne Pailhé

Due to the well-documented gender divide in occupational careers, related to the persistent sexual division of labor, key career characteristics are unevenly distributed in men and women: low-skilled first job, downward occupational trajectory, career's interruptions are overrepresented in women. In this study, we investigated whether these unequally distributed characteristics have an independent and long-lasting impact on men's and women's health trajectories, contributing to the gender health differences at older ages. We used the French population survey "Health and Occupational Trajectories" comprising 2 waves (2006 and 2010). We focused on the 45-74 year-old individuals who were present at both waves (n = 5,904). Multinomial logistic regressions assessed whether the impact of past careers characteristics on self-perceived health (SPH) reported in 2006 and 2010. We found that the unskilled first jobs, interrupted or downward careers prior to 2006 impacted the 2006-2010 SPH trajectories in women; downward and stationary trajectories, and shift from self-employed to employed occupations impacted men's health trajectories. The gender inequalities in first job opportunities and career discontinuity have long term health consequences for women. These results encourage further investigating how policies promoting equity in the labor force could help improving health and reducing the women's health disadvantage.

2 LATER-LIFE HEALTH TRAJECTORIES IN CHINA: THE ROLE OF CHILDHOOD, ADULT, AND CURRENT COMMUNITY SOCIOECONOMIC CONDITIONS

Morgan Peele

Background: Limited evidence exists regarding how multiple time points of socioeconomic status (SES), including childhood, adult, and current community SES, influence trajectories of health among middle-aged Chinese adults.

Objective: The relationships between childhood, adult, and current community SES and functional limitations and depressive symptoms were examined among adults ages 45 to 64.

Methods: Three waves (2011 to 2015) of data from the China Health and Retirement Longitudinal Study (CHARLS) were used (N=7,978), stratified by gender. Trajectories of depressive symptoms and functional limitations were modeled using growth curve models over age to examine the impact of the explanatory variables, as well as whether SES-disparities in health converged or diverged over age.

Results: Low childhood SES was associated with more depressive symptoms among men and women, while higher adult and current community SES were protective against depressive symptoms. Childhood and adult SES were associated with functional limitations, but current community SES was associated with functional limitations only for women. There is evidence of direct associations between childhood SES, but with adult and current community SES exerting additional influences on health. Multiplicative

interaction terms between SES measures and age were not statistically significant for either outcome, suggesting that SES-disparities neither diverge nor converge.

Conclusions: Childhood SES has lasting impacts on health trajectories among middle-aged adults in China, even after adjustment for adult and current community SES. Taken together, these results support the findings that both childhood, adult, and current community SES influence health outcomes at middle-ages in China.

Contribution: This study advances our understanding of how childhood, adult, and current community SES combine to influence trajectories of physical and psychological health in China. Studying this combination of life course SES is an important step towards understanding the potential future burden of health problems among China's aging population.

3 INEQUALITIES IN TRAJECTORIES OF FUNCTIONING IN DWELLING-LIVING OLDER ADULTS IN TWO DEVELOPING COUNTRIES: BRAZIL AND CHILE

Etienne Duim, Cecilia Albala, Yeda Duarte, Alejandra Fuentes-García, Jose Leopoldo Ferreira Antunes

Estimates and projections of elderly population highlight a process of demographic transition that is more accelerated in developing countries characterized by great social inequality that impact the conditions of aging. However, these processes may hold subtle differences even in developing countries such as Brazil and Chile. Among the social determinants that can affect health, education figure prominently, mainly for older adult population. Trajectories of functioning can present a broad view of the individual's health condition and can present important social inequalities. A longitudinal study using data from the 2000, 2005 and 2010 of Brazilian and Chilean elderly was carried out to determine the influence of education in the functional transitions in these older populations. Individuals were clustered according to functional transition during the period of the study. Logistic regression models were fitted to expose risk factor to being part of specific trajectory group. We assessed marginal probability for trajectory group according age and educational status and adjusted for demographic and health conditions covariates. There are some differences between aging process in Brazil and Chile. Chilean older adults showed lower prevalence of limitation at baseline (32.6% versus 41.7%) and higher prevalence of reported fall in the last year in relation with Brazilian. Almost half of Brazilian older adults had low educational level while just 25.6% of Chilean were classified in this group. Notwithstanding, regression models showed education as a risk factor for being part of a trajectory of vulnerable aging in Brazil and Chile and increase the odds for a trajectory of slow limitation process for both populations. Inequality regarding access to education has proved to be an important factor for the transitions of functioning of older adults living in developing countries, showing a gradient effect in Chile and presence/absence relation in Brazil.

4 INEQUALITIES IN LONGEVITY BY EDUCATION LEVEL IN SPAIN: A LIFE-SATISFACTION APPROACH

Aïda Solé-Auró, Mariona Lozano

Objectives: This paper assesses inequality in longevity by computing happiness-adjusted life expectancy at age 30 (LE30) and at age 65 (LE65) by gender and education in Spain 2012. Methods: Abridged and happiness-adjusted life tables are calculated using conventional life tables and Sullivan's method. Age-specific death rates by gender and education level are calculated from death and population figures from Spanish National Institute of Statistics' (INE) records. Happiness prevalence is estimated using the 2013 European Union Statistics on Income and Living Conditions (EU-SILC). Happiness is defined using a

single question about life satisfaction on a scale of 0-10. Results: Spanish women have a higher life expectancy, regardless of education, but the gap between male and females are larger among the highest educated. Highly educated women are expected to live 7,3 years more than men in the same category. Regarding the differences in happiness-adjusted life expectancy by gender and education, our results indicated that those with higher levels of schooling were the only ones who spent more years in a happy than unhappy state. In general, the higher the schooling level, the largest the happy life expectancy. By gender, the gap was larger among the highly educated. Women at 30 will live happily 7,5 years more than men, and 7,4 years at the age of 65. Conclusions: This is the first article using new data from Spain to compute subjective life expectancy by level of education and gender. Our findings point at the importance of education to build a happier and better life. Further research is needed to fully explain the interplay of factors that determine the patterns of gender differentials in subjective well-being, and in particular to fully address the role of contextual factors. National health policies should view happiness as an important determinant of health and wellbeing, especially among women.

DAY 2 – THURSDAY MAY 31ST

SESSION 5 – *LIFE AND HEALTH IN COMPARATIVE PERSPECTIVE*

May 31st 9:00 AM – 10:30 AM

Chair: Emmanuelle Cambois

1 A COMPARATIVE STUDY OF INEQUALITIES IN UNHEALTHY LIFE YEARS

Wilma J. Nusselder, Jose R. Rubio Valverde, Johan P. Mackenbach

Increasingly, targets are set to reduce health inequalities. We aimed to assess educational inequalities in life expectancy without and with disability in 10 European countries, and to disentangle the contributions of mortality and disability differences to these inequalities. We used mortality follow-up from census or registries and survey data on GALI disability (EU-SILC) for 10 countries and all countries combined (all10). We calculated life expectancy (LE), Healthy Life Years (HLY, the DFLE measure used across Europa) and Unhealthy Life Years (ULY) between age 35 and 80, using the Sullivan method. We used decomposition analyses to assess the contribution of differences in mortality and disability to educational inequalities in HLY and ULY. We found that educational differences in HLY were consistently larger than in LE, with largest inequalities for Estonia and Lithuania. Despite their lower LE, low educated spent more years with disability. Whereas for women educational differences in ULY were generally larger than in LE, for men the results differed between countries. In Estonia and Lithuania inequalities in ULY were smaller than in LE. Decomposition analyses showed opposite contributions of higher disability and higher mortality among low educated to educational inequalities in ULY. In men, in particular in Estonia and Lithuania, higher mortality of lower educated reduced the gap in ULY with more than 3 years, resulting in ULY inequalities smaller than in LE. In women, the contribution of disability differences was larger and of mortality differences smaller as compared to men. Low educated persons spent many years with disability, and more years than high educated persons. Nonetheless, current high excess mortality, particularly among men in some countries, reduced this number. As a side effect of

further reductions in mortality, when not accompanied with lower disability, low educated will spend more years with disability and educational inequalities in ULY may rise.

2 VISION IMPAIRMENT AMONG OLDER ADULTS IN LOW AND MIDDLE INCOME COUNTRIES

Joshua R. Ehrlich, Brian C. Stagg, Chris Andrews, David C. Musch

Objective: Vision impairment (VI) is common among older adults and is associated with activity limitations, loss of independence, decreased quality of life, disability and mortality. Nine out of ten individuals with VI live in low and middle income countries (LMICs). To understand the national/local context of age-related VI, we sought to determine the demographic, socioeconomic and health attributes associated with VI in a diverse group of LMICs.

Methods: The Study on Global AGEing and adult health (SAGE) is a nationally-representative study conducted by the World Health Organization on the health and well-being of adults in six LMICs: China, Ghana, India, Mexico, the Russian Federation, and South Africa. Trained examiners measured visual acuity and administered surveys. We examined cross-sectional data from SAGE Wave 1 (2007-2010) to identify individual and household-level factors that were associated with distance VI (visual acuity <6/18 in the better-seeing eye) among adults age 50 and older in each country.

Results: The prevalence of distance VI ranged from 9.9% in China to 17.9% in Russia. Female sex, being unmarried, having less formal education, receiving a diagnosis of cataracts, and having more chronic medical comorbidities was associated with a greater likelihood of VI in most countries ($p < 0.05$). Several other factors, including living in a rural location (China, Ghana), poor self-reported health (China, Ghana, India), and having received cataract surgery (India, South Africa) were not uniformly associated with VI ($p < 0.05$) across all six LMICs.

Conclusions: There are distinct and shared demographic, economic and health characteristics associated with VI among older adults in a diverse set of LMICs. Public health efforts to address avoidable and preventable VI and its concomitant disability could benefit from a more complete and local understanding of associations with VI in different populations of older adults.

3 U.S. REGIONAL DIFFERENCES IN COGNITIVE AND HAPPY LIFE EXPECTANCY

Anthony R. Bardo, Scott M. Lynch

Research over the past several decades has attempted to establish whether gains in life expectancy in the US have been accompanied by better quality of those additional years, often by examining years remaining to be lived in good physical health. Indeed, by many measures elders appear to be living longer and physically healthier lives than ever before. However, while there have been numerous advances in treating chronic diseases such as heart disease and some cancers, there have been far fewer advances in treating diseases that produce cognitive impairment, which potentially has greater importance for life quality than does physical impairment. In this paper, we investigate years to be lived with and without cognitive impairment and with high self-assessed quality of life (i.e., happiness), and we do so by combinations of region of birth and region of current residence in order to examine whether early life environment has a lasting impact on cognitive health and happiness. To answer these questions, we use newly expanded Bayesian multistate life table methods applied to eight waves of the Health and Retirement study. Findings include that happy life expectancy exceeds cognitive life expectancy substantially for persons in all birth and current region combinations, and that life-long

midwesterners and northeasterners live the greatest proportion of their remaining lives happy and cognitively unimpaired compared to persons from, and living in, other regions. Additional findings are discussed.

4 TRENDS IN MID-LIFE MORTALITY: IS THE U.S. AN ANOMALY? EVIDENCE FROM THE UK AND CANADA

Jennifer B. Dowd, Anna Zajacova

Decreases in overall life expectancy in the U.S. have continued for a 2nd year in a row. The social and economic environment of the US, especially "deaths of despair," have been heavily implicated in both scholarly and popular explanations for these trends. There is some evidence that LE may be leveling off in the UK and Canada, suggesting these mortality dynamics could reflect a more general rather than US-specific phenomenon. Little is known, however, about the trends in cause-specific mortality and mortality by subgroups in the UK and Canada to understand how these dynamics may be similar or different to what is happening in the US. Comparing trends in the U.S to other countries can help inform how the role of different social, political, and economic contexts may influence population mortality over time.

We will use vital statistics (Office for National Statistics-UK and Statistics Canada) and survey data (Health Survey of England linked to mortality) to describe mortality trends in these countries from 1990 to the present and compare these to trends in the US. We will analyze detailed causes of death by sex and within 5-year age groups to compare how trends in the contribution of external causes (overdose, suicide) vs. cardiovascular and metabolic conditions by age compares across countries. We focus especially on midlife where mortality increases have been most noticeable in the U.S. Where possible, we will examine trends by education and race/ethnicity for more direct comparison to the U.S. These comparisons will provide insight and generate hypotheses for the social and biological mechanisms underlying these trends in mortality.

SESSION 6 – *CONTEMPORARY THEMES AROUND HEALTH AND MORTALITY*

May 31st 11:00 AM – 12:30 PM

Chair: Henrik Brønnum-Hansen

1 CHANGING OF MORTALITY AND MORBIDITY OF CHINESE ELDERLY

Xiaochun Qiao, Jilei Wu, Xinchao Zhao

The purpose of this paper is to portray the overall changes of mortality and morbidity in terms of health expectancy in China since 1980s. The age specific mortality will be taken from all national population censuses and large sample population surveys. Health related variables, for both whole and elderly populations, such as disability, self-rated health, ADL, etc. will be used based on two national disability surveys, several national elderly surveys, some national population censuses and surveys, and other national social surveys. As data from different sources are not consistent, we will assess the quality of mortality and morbidity data first. All censuses in 1982, 1990, 2000 and 2010, as well as 1% population

surveys in 1987, 1995, 2005 and 2015 collected age-specific mortality data. The age-specific disability data were collected in the national disability surveys in 1987 and 2006, self-rated health was asked in all elderly surveys in 1986, 1992, 2000, 2006 and 2015, and also asked in 1995, 2005 and 2015 in 1% population surveys and in 2000 and 2010 censuses. Secondly, based on some techniques, we will make some adjustment to the original data in order to get relatively consistent results. Finally, we will then calculate health expectancies based on the Sullivan method at time when the morbidity data are available and valid. Then, we will analyze the change of health expectancies by sex and see which theories of health expectancies fit the transitions of health expectancies in China.

2 VANGUARDS OF LONGEVITY: THE CASE OF BRAZILIAN AIR FORCE MILITARY

Vanessa di Lego, Cássio M. Turra

In the demographic study of mortality, there has been growing attention to population subgroups that are more likely to first benefit from mortality progress or benefit more intensively than others. Some authors define these subgroups as “vanguard” populations (Evgueni et al. 2014; Caselli and Luy 2014). Focusing on mortality trajectories of vanguard populations can be instrumental to disentangling the pathways to longer lives and isolating specific risk factors (Evgueni et al. 2014; Caselli and Luy 2014). Hence, we use a novel longitudinal military dataset for Brazilian Air Force personnel (BAF), considering them as a vanguard population subgroup in Brazil to explore two main questions: 1. Given a highly selected (vanguard) population subgroup in a developing country, what is the degree of survival selection among its members and what are the factors associated to it? 2. Are there other possible candidates as vanguard groups in Brazil? What is the true advantage of the military compared to other low mortality subgroups? Our sample is composed of $N = 13,341$ individuals, comprised of $D = 3,084$ deaths (23.11% of total sample) and $S = 10,257$ survivors. We employ non-parametric (KM curves) and semi-parametric (Cox regression) approaches to address question number 1, and compute probabilities of death by single ages derived from the incidence rates to compare with other vanguard population groups in Brazil and address question number 2. We show that even in a selected setting place of birth and educational background are still important to explain mortality differentials, suggesting “scarring” effect among the BAF personnel.

3 NEW TREND OF THE U.S. MORTALITY: GOMPERTZIALIZATION OF MORTALITY TRAJECTORY

Natalia S. Gavrilova, Leonid A. Gavrilov

This study analyzes age trajectories of mortality in 1880-1900 U.S. single-year birth cohorts using mortality modeling with Kannisto, Weibull and Gompertz models according to goodness-of-fit. We analyze historical mortality trajectories at advanced ages using age-specific death rates for the U.S. birth cohorts available in the Human Mortality Database. We hypothesize that mortality deceleration vanishes in more recent birth cohorts, because of age reporting improvement over time. We run a weighted nonlinear regression model in the age interval 80-105 years for the U.S. data. We study models of mortality trajectories according to the Bayesian Information Criterion (BIC) for goodness-of-fit. The Kannisto model demonstrates better fit in the case of birth cohorts born before 1887 while the Gompertz model fits mortality better for more recent birth cohorts. The mortality modelling approach suggests a transition from mortality deceleration to the Gompertzian mortality pattern over time for both men and women. This historical change in the pattern of mortality trajectories from mortality deceleration to the Gompertz law occurs later for men compared to women. These results support the

hypothesis that mortality deceleration should vanish over time due to improvement in age reporting. Our results explain why previous studies found early-onset mortality deceleration and mortality leveling-off (Horiuchi, Wilmoth, 1998; Thatcher, 1999), while more recent studies did not confirm these initial findings (Gavrilov, Gavrilova, 2011). These results are consistent with the hypothesis about vanishing mortality deceleration over time due to improvement of age reporting. Overall, it appears that the onset of mortality deceleration occurs at much older ages than was reported earlier. These results demonstrate that there is no definite answer to the question about mortality pattern at extreme old ages, because this answer depends on the historical period of mortality analysis and on particular country.

4 ON UNJUST HEALTH INEQUALITIES

Michael Wolfson, Geoff Rowe, Vid Bijelic

There is a well-known and ubiquitous socio-economic gradient in health: e.g. higher income is associated with better health and greater longevity. There is also substantial evidence that causality runs primarily from socio-economic status to health. To the extent that higher incomes “buy” better health, even if these incomes are not spent on improving health, this might appear unjust. However, the web of causality connecting higher socio-economic status and better health involves numerous other factors. Thus, discriminating between just and unjust degrees of health inequality depends both on the philosophical framework used to assess what is just, and on the empirics of the determinants of health, especially differences in health amongst heterogeneous individuals. In this paper, we describe • first the statistical analysis of the longitudinal National Population Health Survey (NPHS) used to quantify the “web of causality” observed in Canada from 1994 to 2010; • then the tightly coupled (in design and use of the NPHS statistical results) HealthPaths microsimulation model; • next, by means of a series of counterfactual simulations, ascribe causal importance to a range of related factors; posited as determinants of health and hence sources of health inequalities; and • various philosophical approaches to the assessment of “just” health inequalities. We bring these elements together to assess the extent to which observed health inequalities can be considered unjust. Since not all sources of health inequalities will be judged as unjust, the norm for a just distribution of population health will be simulated as a counterfactual where only just sources are involved. We then explore various metrics for indicating the “distance” between the actual and just distributions. This task is challenging as the objects of analysis are at the least bivariate (income and health) joint distributions. We conclude with assessments of the roles of smoking, income and pain in generating health inequalities.

SESSION 7 – PAST, PRESENT AND FUTURE TRENDS IN POPULATION HEALTH, PART 2

May 31st 1:30 PM – 3:00 PM

Chair: Al Hermalin

1 RECENT CHANGES IN ACTIVE LIFE EXPECTANCY IN THE US: AN INTRODUCTION TO THE NHATS (NATIONAL HEALTH AND AGING TRENDS STUDY)

Vicki A. Freedman

Conceptualizations of late-life disablement have long recognized that activity limitations represent the intersection of individuals' underlying capability and the demands of the environment in which they live. More recently, attention has focused on the spectrum of behavioral adaptations that older adults who are not fully able to carry out their daily activities make (e.g. successful accommodation with devices, reduced frequency of activity, difficulty despite accommodation, use of help). Other studies have pointed to the growing array of residential care environments in which older adults now live (e.g. retirement communities, independent living, assisted living, and nursing home settings). In part because of data limitations, analyses of active life expectancy have not yet fully recognized these distinctions. This study uses the 2011 and 2015 US National Health and Aging Trends Study (NHATS) to characterize recent changes in expected years to be lived at age 65 by both stage of behavioral adaptation and residential care setting. Between 2011 and 2015, the expected number of years to be lived fully able to carry out self-care and mobility activities declined (from 5.7 to 5.3 years). During the same period, years expected to be lived successfully accommodating increased (from 4.7 to 5.3 years). There were no significant shifts in expected years lived in any of the other stages (reduced frequency, difficulty, help). No significant changes occurred in years lived with low physical capacity (5.5 vs. 5.4 years), poor vision (1.8 vs. 1.9 years), or poor cognitive capacity (2.1 vs. 2.0 years), but poor hearing declined (from 3.0 to 2.6 years). No significant changes were evident in years lived in any of the residential care settings, but years expected to be lived in traditional community settings increased (from 16.1 to 16.6 years). Discussion focuses on implications for meeting the care needs of older adults in the US.

2 REGIONAL ANALYSIS OF COMPRESSION OF MORTALITY AND MORBIDITY IN INDIA: 1995-2014

Mukesh C. Parmar, Nandita Saikia

Introduction: There has been little investigation done to study the composite phenomenon of compression/ expansion of mortality and morbidity in India and states.

Data and Methods: Two types of dataset is required for studying the compression/ expansion process of mortality and morbidity in India : (i) disability data taken from three rounds of NSS (National Sample Survey) viz. 52nd (1995-96), 60th (2004) and 71st (2014) and, (ii) age specific probability of deaths (qx) taken from five years abridged life table from SRS (Sample Registration System) for selected Indian States for the time period 1992-96, 2002-06 and 2009-13. Since SRS provides value of qx till age 70+, so the current life tables will be expanded to single years till age 110 using Heligman Pollard eight parameter model and smoothed out using Cubic Bessel Spline interpolation method. The newly constructed life table will be thus used to for analysing compression/ expansion of mortality and morbidity phenomenon. To investigate the process of compression/ expansion of mortality rectangularisation of Survival Curve is observed, and for compression/ expansion of morbidity Sullivan's method is applied to calculate disability free life expectancy (DFLE).

Result: Compression of mortality and morbidity phenomenon is taking place at pan India level following the survival curves and DFLE for three time periods 1995, 2004 and 2014. DFLE values are rising for all states from 1995 to 2014. At age 60+, Kerala has maximum life expectancy (18 for males & 21.5 for females in 2014) but Himachal Pradesh and Punjab (17.9 & 17.1 in 2014) recorded the maximum DFLE for males and Rajasthan and Himachal Pradesh (19.9 & 19.2 in 2014) recorded maximum DFLE for females which is more than India's average DFLE (15.2 for males & 17.2 for females in 2014). The result shows the improving health state in India.

3 THE RISING PAIN PREVALENCE AMONG US AND CANADIAN ADULTS: A COMPARATIVE STUDY

Anna Zajacova, Zachary Zimmer

Pain is a burdensome and costly health problem. The number of adults with chronic pain exceeds those affected by heart disease, cancer, and diabetes combined; the economic cost of pain surpasses \$600 billion annually in the US. Surprisingly little is known about population levels, trends and social correlates of pain. Limited studies have shown worrisome increases in pain among older Americans but the trends among midlife adults in the US or Canadian adults are unknown. The gap between the importance of this issue and lack of knowledge highlight the need for the present study. We focus on adults 40 and older, using data from the National Health Interview Survey 2002-2016 and the Canadian Community Health Survey 2001-2016. Both surveys are nationally-representative repeated cross-sections with consistent series of pain questions. We determine the prevalence of reported pain and magnitude of changes over time; identify subgroups that exhibit particularly notable trends, and examine key social, lifestyle, and health characteristics that explain the patterns. Preliminary results indicate extensive escalation in pain prevalence for both US and Canadian adults. For instance, among mid-life (age 40-64) US adults, reports of 'any pain' increased by nearly 20% between 2002 and 2016. Increases were particularly steep for black men (51% increase) and black women (36%) and for adults with lower education. Early analyses suggest that the correlates influence pain trends as a complex set of countervailing forces: changes in educational attainment suppress the upward pain trends while worsening economic circumstances and depressive symptoms predict pain increases. We will compare

the trends in both countries and explore the reasons for the trends, including differences in the social safety net and health-care systems. Given the urgent epidemic of pain medication (mis)use, it is imperative to better understand the social demography of pain in the two North American countries.

GEORGE MYERS LECTURE

Thursday May 31st 3:30 PM – 4:40PM

WHAT CAN PAST TRENDS IN HEALTH EXPECTANCIES TELL US ABOUT THE FUTURE?

Chair: Jean-Marie Robine

Presented by Carol Jagger, AXA Professor of Epidemiology of Ageing, Newcastle University

When the REVES network was initiated in 1989, trends in health expectancy were a core component, not least because a key aim of REVES was to provide evidence on whether the gains in life expectancy were healthy ones. Early on REVES acknowledged that the answer to this question, and how trends will play out in the future, are key not only for the provision of health and social care but also for pension policy. The joint meeting of REVES and the TRENDS network provides a good opportunity to draw upon the important and influential work produced by REVES members to look at why we need to monitor trends in health expectancy, the barriers and challenges, what the evidence on past trends in health expectancies tells us, and whether these trends are likely to continue in the future and if not, why not. Having reviewed the past history of the trends research in REVES, I will finish with some, perhaps controversial, thoughts on the future for the REVES network.

DAY 3 – FRIDAY JUNE 1ST

SESSION 8 – *DEVELOPMENTS IN MEASURES AND METHODS,* *PART 2*

June 1st 9:00 AM – 10:30 AM

Chair: Mark Hayward

1 FUTURE DIRECTIONS OF FUNCTIONING MEASURES IN THE U.S. NATIONAL HEALTH INTERVIEW SURVEY (NHIS)

Julie D. Weeks, Jennifer H. Madans

The National Health Interview Survey provides accurate and current statistical information on the amount, distribution, and effects of illness and disability in the United States. It is the source of nationally-representative health data and statistics for the U.S. Federal Statistical System. In 2019, the content and structure of the National Health Interview Survey (NHIS) will be updated to shorten the length of the questionnaire and harmonize overlapping content. One area where current content overlaps is disability. Since its inception in 1957, the NHIS has included measures of functioning, activity limitation, and disability in order to meet its original mandate. The measures have been added, over time, to reflect the evolving conceptualizations of functioning and disability. Maintaining the multiple measures in the questionnaire is untenable, in part because of rising administration costs and declining response rates associated with the lengthy interview. Moving forward, the NHIS will contain a much shorter set of functioning measures. Understanding the nature of the current multiple measures of disability, including to what degree they identify the same populations, is important for preparing for the 2019 changes. This presentation will cover the need for redesign in the NHIS, the changes in administration structure in the new design, and the specific functioning and disability content included in the new design. Also presented will be analytic work conducted to help researchers understand the extent of agreement between the multiple current measures and the impact of the redesign changes on trend analyses.

2 HETEROGENEITY IN ACTIVE LIFE EXPECTANCY: A FINITE-MIXTURE MODEL

Douglas Wolf, Jennifer Karas Montez

Calculations of active life expectancy (ALE) nearly always use one of two well-established methods, either the “Sullivan” method, based on cross-sectional data, or a “multistate” approach that demands individual-level panel data. Each approach has its strengths and weaknesses. We introduce a new approach, one that embraces the computational simplicity of the Sullivan method, but uses panel data. Our approach rests on a statistical model in which (1) individual-level disability trajectories, (2) survivorship/mortality, and—of particular relevance for panel-data sets—(3) sample retention/attrition are jointly determined. Our modeling framework allows for correlations across these three domains. We

also use a finite-mixture model (e.g., latent class trajectory modeling) as a way of incorporating a particular form of otherwise-unobserved heterogeneity in ALE. The framework can readily be generalized to account for observed sources of between-individual heterogeneity, such as that associated with early-life circumstances. In contrast to the widely-used multistate approach, which generally entails an assumption that disability dynamics are strongly (first-order) Markovian, our model does not impose any assumptions about the underlying dynamics of the disability measures. Moreover, we need not assume that there are any unobserved transitions in disability status. A preliminary version of this model, employing data from the National Health and Aging Trends Study, was presented at the 2017 meetings of the Population Association of America. For the 2018 TRENDS/REVES meeting we will illustrate the approach using data from the Health and Retirement Study.

3 UNOBSERVED HETEROGENEITY AND THE ROBUSTNESS OF ESTIMATES OF THE EFFECTS OF INCOME ON LIFE EXPECTANCY – AN ILLUSTRATIVE AND HYPOTHETICAL EXAMPLE

Vid Bijelic, Michael Wolfson

Inspired by Vaupel and Yashin's (1985) seminal paper on heterogeneous frailty, we have developed a method for inferring underlying survival curves under the assumption that the population is a mixture of two groups differing in unobserved frailty. On the assumption that there could well be differences in unobserved frailty associated with ethnicity, we have used Statistics Canada's 1991 census mortality, linked file to observe survival curves for three ethnicities. There are then sufficient degrees of freedom to infer two survival curves –for frail and robust individuals, as well as the proportions of each type in each of the three ethnic groups. (The analysis was also done separately for men and women.) By construction, life expectancy (LE) overall matches that for the inferred mixture of frail and robust individuals. It is then possible to “shock” these survival curves with a policy intervention. For example, given that income is observed (via Cox proportional hazard regression) to be positively associated with survival, a new set of plausible (i.e. assuming the observed association with income is indeed causal) survival curves can be constructed under the counter-factual assumption that everyone's income is higher by X%. We can then use the same method to infer revised survival curves for the unobserved frail and robust sub-populations using the new survival curves premised on everyone's higher incomes. However, in so doing, the proportions of frail and robust individuals will change. As a result, two estimates of LE are possible: one for the estimated counter factual survival curve, and another for the hypothetical mixture of the new frail and robust survival curves but using the originally estimated proportions. The difference between these two LE estimates is then an indication of bias associated with unobserved frailty, conditional on an assumption that frailty is dichotomous.

4 THE USE OF THE GLOBAL ACTIVITY LIMITATION INDICATOR (GALI) AND HEALTHY LIFE YEARS BY MEMBER STATES AND THE EUROPEAN COMMISSION

Herman Van Oyen, Jean-Marie Robine

Background: In 2005, the European Union (EU) started to use a disability free life expectancy, Healthy Life Years (HLY) to monitor progress in strategic European policies such as the 2000 Lisbon strategy. The Global Activity Limitation Indicator (GALI) is the underlying measure of HLY. 12 years after its implementation, this study aims to assess its current use. Methods: In March 2017, a questionnaire was sent to 28 Member states and the European Commission. The questionnaire inquired how GALI and HLY

are used to set policies, in which surveys the GALI has been introduced, how the GALI and HLY are presented, and HLY research capacity.

Results: The survey was answered by 22 Member States and by the Commission. HLY are often used to set targets and develop strategies in health such as national health and welfare plans. HLY analysis has led to policy change. In some countries, HLY has become the main indicator for health. More recently, the GALI and HLY have also been used for policy targets outside the health sector such as in the area of pension and retirement age or in the context of sustainable development. Regarding surveys, the GALI is mostly used in the EU-SILC, SHARE and EHIS, but is also increasingly introduced in national surveys.

National health reporting systems usually present HLY on their national statistics websites. Most countries have up to three specialists working on the GALI and HLY, which has been consistent through time. Others have increased their capacity distributed over various institutions.

Conclusion: HLY is an indicator that is systematically used to monitor health developments in most EU countries. SHARE, EU-SILC and EHIS data are commonly used to assess HLY through the GALI. The results are then described in reports and presented on national statistics websites and use in different policy settings.

SESSION 9 – INVESTIGATIONS PERTAINING TO THE OLDER-OLD, THE LAST YEARS OF LIFE AND FRAILITY

June 1st 11:00 AM – 12:30 PM

Chair: Xiaochun Qiao

1 SEX DIFFERENCES IN HEALTHY LIFE EXPECTANCY AMONG NONAGENARIANS: A MULTISTATE SURVIVAL MODEL USING DATA FROM THE VITALITY 90+ STUDY

Emiel O. Hoogendijk, Maaike van der Noordt, Bregje D. Onwuteaka-Philipsen, Dorly J.H. Deeg, Martijn Huisman, Linda Enroth, Marja Jylhä

Objectives: Studies on healthy life expectancy rarely include data from the oldest old, the fastest growing age group in the older population. Therefore, little is known about the extent to which sex differences in health continue to exist at very old age. This study examines sex differences in healthy and unhealthy life expectancy among nonagenarians.

Methods: Longitudinal data of 884 older adults aged 90 and over participating in the Vitality 90+ study (Tampere, Finland) were used. Data were collected through mailed questionnaires at 5 measurement waves between 2001 and 2014. Participants were included if they had at least one health state at baseline and one health or death state at follow-up available, resulting in a maximum of 2,501 observations. Using the MSM and ELECT packages in R, multistate survival models were performed to estimate the transition probabilities of older adults through the different health states and to calculate life expectancies. The analyses were done separately for two health indicators (disability and multimorbidity) to see whether life expectancy patterns were consistent.

Results: Sex and age were not associated with transitioning from a healthy state to an unhealthy state, but they were associated with transitioning from a healthy or unhealthy state to death. Women had higher total life expectancies than men (8 months at age 90, and 7 months at age 100), but also higher

unhealthy life expectancies. Men had a higher disability-free life expectancy between the age of 90 and 95. For multimorbidity, no sex differences in healthy life expectancy were found.

Conclusions: This study showed that sex differences in healthy and unhealthy life expectancy were present up to very high age. Women aged 90+ live longer than men, but spend more time in poor health.

2 LIFE EXPECTANCY IN THE STATE OF FRAILTY AFTER AGE 70: FINDINGS IN THE SIPAF STUDY

Marie Herr, Jean-Jacques Arvieu, Joël Ankri, Jean-Marie Robine

Background: Frailty is defined as an ageing-related state, resulting from a decrease in physiological reserves, which increases vulnerability to stressors. Screening for frailty can help to guide preventive actions to people at risk for poor health outcomes, including disability and death. As such, frailty has become a major issue in the prevention of functional decline and disability, as well as a major indicator of health in the elderly.

Objective: This study aimed to estimate the part of life expectancy (LE) in the state of frailty, in men and women aged 70 years and over, using the Sullivan method. Methods: Data used were the age and sex-specific prevalence of frailty found in SIPAF study (“Système d’Information sur la Perte d’Autonomie Fonctionnelle de la personne âgée”) and statistics of mortality from the Human Mortality Database. The SIPAF study included 2,350 individuals aged 70 and over and living in France. Participants were interviewed at home by trained nurses. Frailty was defined as impairment in three domains or more among nutrition, energy, physical activity, strength, and mobility. People requiring assistance in basic activities of daily living were considered in a separate category.

Results: Mean age of the study sample was 83.3+/-7.5 years, with 59.4% of women. Overall, the prevalence of pre-frailty, frailty and dependency was 39.1%, 17.0% and 15.4% respectively. LE at age 70 was 18.3 years for women of which 7.4 years (95%CI: 6.9-7.9) were pre-frail, 3.4 years (95%CI: 3.0-3.8) frail and 2.4 (95%CI: 2.1-2.7) with disability. In contrast LE for men at 70 was 14.8 years, of which pre-frail, frail and disabled years were 6.0 years (95%CI: 5.5-6.5), 1.2 years (95%CI: 1.0-1.5), and 1.2 (95%CI: 1.0-1.5) respectively.

Conclusion: Frailty is a transition state that is relatively limited in time compared to pre-frailty that may represent a larger time window for prevention.

3 HEALTH STATUS AND OUT-OF-POCKET SPENDING DURING THE LAST YEAR OF LIFE IN MEXICAN POPULATION 60+

Jesus-Daniel Zazueta-Barboa, Roberto Ham-Chande

Developed nations have shown that during the last years of life (LYL) of an elderly population, health conditions are worse and expenses undergo substantial increases. Less developed societies ought to have similarities. The case of Mexico as a middle-income country is analyzed in a longitudinal approach using the Mexican Health and Aging Study. Determinants of LYL health conditions and expenditures are examined through 2,124 deaths occurred between 2003 and 2015 from the sample baseline in 2001. Statistical analysis involves a set of ordinal probit zero-inflated regression to model the effects of main cause of death, sex, age, health conditions, impairments, and access to health systems. Marginal effects allow probability estimates of health expenditure increases by each factor and age group. Findings suggest that the main determinants for increasing health expenditures are related to types of affiliation

to the health system and especially where and how major health conditions are cared. Main cause of death, and functional impairment are also statistical significant as determinants. Age, number of chronic diseases and place of death are not significant as determinants of increases in health expenditures. These estimates and its trends will be useful in proposing practical applications for public policies and health programs concerning the expected rapid demographic aging. The amount, characteristics and requirements during the LYL in population 60 and over can be projected year by year for the next 60 years. It is just by mortality projections where each fatality imply a a LYL that can be imputed with variables in regard to age, sex, health, disabilities and socioeconomic status.

4 YEARS OF LIFE LIVED BY ELDERLY SINGAPOREANS WITH AND WITHOUT FRAILTY

Rahul Malhotra, Abhijit Visaria, Choy-Lye Chei, Chi-Tsun Chiu, John Carson Allen, Stefan Ma, Chek Hooi Wong, Angelique Chan, Yasuhiko Saito, Truls Østbye, David Bruce Matchar

Frailty among the elderly is highlighted by clinical professional bodies and health organizations as an important clinical state, calling for early detection. The policy importance of, and clinical screening utility for, frailty, however, depend on the duration of life an average elderly lives with frailty. Only a few European studies have estimated this duration, and then only using cross-sectional data. Utilizing longitudinal data from Singapore, we assess the years of life lived by elderly with and without frailty, overall and by sex. Data from 3 waves of the Panel on Health and Ageing among Singaporean Elderly (PHASE), a representative survey of 4990 elderly was used. At each wave, respondents were classified as being in one of five health states, (1) robust, (2) pre-frail, (3) frail, (4) activity of daily living (ADL) dependent, and (5) dead (an absorbing state), with classification into states (1) to (3) based on the “Singapore Assessment for Frailty in the Elderly” (SAFE). The Stochastic Population Analysis for Complex Events (SPACE) program was used to compute health expectancy. At age 60, estimated years of remaining life spent being robust, pre-frail, frail, and ADL dependent were 11.1 (48% of remaining life), 8.5 (37%), 1.0 (4%) and 2.5 (11%), respectively. Women, versus men, spent significantly more years being pre-frail (10.9 versus 5.9), frail (1.5 versus 0.4), and ADL dependent (3.4 versus 1.5) However, they had fewer years being robust (9.1 versus 12.9), despite their higher life expectancy (24.9 versus 20.8). Women’s disadvantage in health expectancy, often reported for disability, is also manifested in context of frailty. Our observation of the short absolute (~1 year) or relative (~4%) duration of remaining life at age 60 spent being frail, consistent with previous reports, questions the policy and clinical focusing on frailty, but suggests that increased attention should be placed on pre-frailty.

SESSION 10 – *COGNITION AND DEMENTIA RESEARCH*

June 1st 1:30 PM – 3:00 PM

Chair: Herman Van Oyen

1 COGNITIVE AND HAPPY LIFE EXPECTANCY IN THE US: IMPLICATIONS OF DIFFERENTIAL MEASUREMENT OF COGNITIVE IMPAIRMENT AND HAPPINESS FOR ESTIMATES OF QUALITY OF LIFE

Scott M. Lynch, Anthony R. Bardo

Although incidence of cognitive impairment is declining in the US, the population is aging, so that prevalence of cognitive impairment will increase over coming decades. As a consequence, a small but growing body of literature has begun investigating cognitive life expectancy—the number of years elders can expect to live cognitively unimpaired.. Thus far, we have made little progress in treating and reversing cognitive impairment, so a natural question is the extent to which cognitive impairment affects quality of life more broadly. In this research, we ask a simple question: How do cognitive impairment and happiness intersect? Using Bayesian multistate life table methods applied to data from the Health and Retirement Study, we estimate years of life older persons can expect spend both happy and cognitively unimpaired, happy but impaired, unhappy but unimpaired, and unhappy and impaired. A key difficulty with data on happiness and cognitive impairment is that these items are not asked of proxies, and elders with either cognitive impairment or significant physical health problems that may affect happiness are often replaced by proxies. Unfortunately, there are no clear standards for measuring either cognitive impairment or happiness when proxies are used, but simply dropping cases with such missing data is surely a bad strategy. Here, we generate life tables under different measurement strategies. Thus, our research has both a substantive and a methodological component. We find, first, that several alternative approaches to measuring cognitive impairment and happiness yield relatively small effects on estimates of cognitive and happy life expectancy. Second, we find that elders can expect to spend roughly two-thirds of their remaining years both happy and cognitively unimpaired. Further, happy life expectancy exceeds cognitive life expectancy by a considerable margin. Put another way, self-perceived quality of life is not necessarily contingent on lack of cognitive impairment.

2 RACE AND EDUCATION DISPARITIES IN DEMENTIA-FREE LIFE EXPECTANCY FOR OLDER AMERICANS

Mateo Farina, Mark Hayward, Eileen Crimmins, Jung Ki Kim

Although the overall prevalence of dementia in the older US population has decreased from 11.6% to 8.8% over the past 20 years, whether this pattern also characterizes black Americans is not clear. Recent estimates indicate that African Americans are three times more likely to have dementia than whites, but whether prevalence has grown or diminished has received little attention. One explanation for the overall dementia trend is that the prevalence of higher education has improved in the population. People with higher levels of education experience lower prevalence rates, more years of cognitively healthy life, and fewer years with dementia. Our analysis will clarify whether education provides the same cognitive health benefits for both blacks and whites, and whether this association has changed over time (2000-2012). Given the generally widening race gap in health as educational attainment increases, our initial hypothesis is that the race gap will be the largest among highly educated persons. It is less clear how the association might have changed over time. As part of this analysis, we also assess whether changes in the distributions of education for blacks and whites have contributed to overall race differences in the prevalence of dementia. Because mortality for older blacks and whites also changed over the period, we view these changes in the context of healthy life expectancy. Drawing on the Health and Retirement Survey, we will assess how mortality and dementia changes combined to differentially alter dementia and dementia-free life expectancy for blacks and whites within education groups. This research lays an important foundation in understanding the burden of dementia for individuals, families, and communities.

3 REGIONAL VARIATION IN U.S. DEMENTIA TRENDS AND RACE/ETHNIC DISPARITIES IN COGNITIVE IMPAIRMENT AND DEMENTIA

Jennifer Ailshire, Catherine Perez

Recent reports have shown a decline in dementia in the U.S. in the last decade. In addition, large racial and ethnic disparities in cognition and dementia have been found in the U.S. older adult population. But national-level statistics on trends and disparities can mask important regional variation. Using data from the Health and Retirement Study, we first examine trends in dementia prevalence in the older population by census region and division and second determine if there is regional variation in race/ethnic differences in cognitive decline and dementia prevalence. We find that the prevalence of dementia in 2000 varied from a low of 8.7% in the West to a high of 14.7% in the South. By 2012 dementia prevalence varied from 7.7% in the Midwest to 10.2% in the South. Dementia prevalence declined in all regions – 9% decline in the West, 22% in the Northeast, 25% in the Midwest, and 31% in the South. Additional variation was found within regions at the census division level. In the examination of regional variation in race/ethnic disparities we find that blacks had lower cognitive function than whites in all regions, but black-white differences were lowest in the West. Hispanics also tended to have lower cognitive function than whites, but in some divisions (e.g., New England and West North Central) differences were small and not statistically significant. Hispanics living the East South Central region had higher cognitive function. This difference was partially accounted for by education and nativity. Finally, black-white differences in dementia were smallest in the West and largest in the South, while Hispanic-white differences were smallest in the South and largest in the Northeast. These findings suggest trends and disparities in dementia-related outcomes are not uniform across the U.S. and that national-level estimates can mask significant regional variation.

4 EDUCATIONAL DIFFERENTIALS ON LIFE EXPECTANCY WITH AND WITHOUT COGNITIVE IMPAIRMENT IN BRAZIL

Flavia Andrade

Low educational levels have been linked to cognitive impairment in late life, however the impact of education on cognitive impairment free life expectancy (CIFLE) has not been previously estimated in Brazil. The aim of the present study is to investigate the differences in life expectancy with and without cognitive impairment by educational levels and gender in Brazil. The sample was drawn from the three waves (2000, 2006 and 2010) Health, Well-Being, and Aging Study (SABE) collected in Sao Paulo, Brazil. Participants for whom the Mini-Mental State Examination was available were included (n=2,101). Interpolation of Markov Chains method was used to estimate CIFLE and years spent with cognitive impairment (CILE) by education and gender. CIFLE at age 60 was 12.7 years among men with no education and 16.0 among their educated counterparts. On the other hand, CILE was higher among men with no education than those with education (3.2 and 1.6 years, respectively). Among 60-year old women without education, CIFLE reached 16.0 years, but it was considerably higher among educated women (20.1 years). CILE reached 4.4 years among women aged 60 with no education, versus 2.4 years women their educated counterparts. Older adults with no education live shorter lives and more years with cognitive impairment than those with education. Older women in Sao Paulo live longer lives, but they live a greater number of years with cognitive impairment.

POSTERS

Chair: Zachary Zimmer and Mary Beth Ofstedal

1 TO WHAT DEGREE DO RELIGIOSITY AND SPIRITUALITY EXPLAIN HEALTHY LIFE EXPECTANCY GAPS ACROSS EUROPE?

Gillian Libby, Zachary Zimmer, Chi-Tsun Chiu, Mary Beth Ofstedal, Yasuhiko Saito, Clove Haviva, Carol Jagger

Background: Research linking religiosity and spirituality has increased in recent years but has generally focussed on the United States, and outcomes of either morbidity or mortality but not both. This paper addresses the extent to which measures of religiosity and spirituality explain the variation in self-reported health (SRH) and healthy life expectancy (HLE) across Europe.

Methods: We used the 2008 wave of the European Values Survey. We examined the association between four dimensions of religiosity and spirituality: prayer, attendance, importance of religion, and belief in God, and SRH by ordinal logistic regression models, adjusted for age, sex and education. HLE was calculated by the Sullivan method, with life tables by country from the Human Mortality Database. Associations between religiosity and HLE at age 20 (HLE20) were examined by meta-regression, first unadjusted and then adjusted by country-level factors: % with low education, GDP, generalized index of inequality (GINI), and religious diversity measured using Simpson's Index.

Results: The analytic sample comprised 65303 individuals aged 20+ years in 43 countries; 44% were men, the main religious denomination was Roman Catholic, and religious diversity varied from 0.03 (Turkey) to 0.76 (Latvia). Countries varied considerably in terms of the relationship between religiosity and health; for 16 countries increasing attendance was significantly associated with reporting good or better health; only three countries had significantly positive associations between prayer and health whilst 12 were negatively related.

In unadjusted models, prayer, attendance and importance were associated with increasing HLE20 but only for women. Associations remained after adjustment for education, GINI and religious diversity, but were attenuated when adding GDP. No significant associations were found for any dimension and HLE20 for men. **Conclusions:** The relationship between different aspects of religiosity and health varied substantially across European countries. Longitudinal data are needed to explore this question at an individual level.

2 SENSORY IMPAIRMENTS AMONG OLDER PERSONS IN MYANMAR, VIETNAM, AND THAILAND: IMPLICATIONS FOR FUNCTIONING AND HEALTH

Bussarawan Puk Teerawichitchainan, Elke Loichinger

Rationales: Sensory impairments tend to increase with age. Research shows that hearing and vision problems in older ages are often overlooked and dismissed. Diminished vision and hearing loss are associated with decreased physical functioning, increased social isolation, depression, and lower quality of life. While the relationship between sensory disabilities and health conditions and activity limitations among older persons are well-documented in developed countries, relatively little is known about their counterparts in developing settings where healthcare systems remain underdeveloped and the affordability of corrective intervention such as eyeglasses and hearing aids is in question.

Objectives: We examine the prevalence of visual and hearing impairments among people aged 60 and older in three developing Southeast Asian countries (Myanmar, Vietnam, and Thailand). Specifically, we first calculate years lived with varying degrees of sensory disabilities for men and women. Furthermore, we investigate the extent to which sensory impairments are correlated with older persons' functional independence, psychological wellbeing, and social participation.

Data and methods: Our analyses are based on cross-sectional data from recent nationally representative surveys of older persons in the three countries. To calculate health expectancies, we use Sullivan's method which applies the age- and sex-specific prevalence of sensory disabilities to divide the number of person years lived in the given age interval (from a period life table) into years lived with and without the disability. To examine associations between sensory impairments and wellbeing indicators, we employ both descriptive and multivariate analyses.

Expected contributions: The mixture of commonalities and differences in levels of development, healthcare and political-welfare systems that characterizes Myanmar, Vietnam and Thailand render them a suitable case for comparative analysis. Cross-national comparisons permit an examination of the roles of social contexts in shaping the association between sensory impairments and older persons' health and functioning.

3 RUNNING TO REST: PHYSICAL ACTIVITY AND SLEEP PROBLEMS OVER 10 YEARS IN A NATIONAL SAMPLE OF OLDER ADULTS

Amanda Sonnega, Amanda Leggett, Renee Pepin, Shervin Assari

Health expectancy measures provide a means of dividing life expectancy into life spent in healthy and unhealthy states, through combining population morbidity and mortality. This study aims to estimate Healthy Life Expectancy HLE in the central region of Sudan and to identify the socioeconomic, demographic and health factors correlated with the Self Rated Health SRH in the region. Two types of data were gathered in the present study, secondary and primary data. The secondary data were obtained from the final tabulations of the Fifth population census in Sudan (2008), which provide data on population mortality distributed by age groups. The other type of data was a primary source, collected through a survey conducted in Gezira state in July (2014). The survey was covered all the localities of the state, the collected sample size was (778) households constituting (5113) individuals. The main question in the questionnaire was the individuals self-rating of their health used to divide population into healthy and unhealthy groups needed to calculate HLE. Using SPSS for windows and Excel software, different methods of analysis were conducted to analyze the data namely; life table and Sullivan methods, descriptive statistics, inferential statistics in terms of Chi Square test for association and binary logistic regression model. The results of primary data analysis show that, HLE at birth was (57.5) years for males and (52.5) years for females, representing (88.6%) and (80.3%) of total life expectancy in Gezira state for males and females respectively. Individuals with disabilities, diabetes and those who drinking alcohol were more likely to be unhealthy. The study recommended the need for adequate care for disabled persons, also, comprehensive and longitudinal surveys covering all aspects of disability and self-rating health at national and states levels is strongly recommended.

4 HEALTHY LIFE EXPECTANCY AND THE CORRELATES OF SELF RATED HEALTH IN CENTRAL SUDAN. A CROSS SECTIONAL STUDY

Mohamed Eldigire Hamid Ahmed

Health expectancy measures provide a means of dividing life expectancy into life spent in healthy and unhealthy states, through combining population morbidity and mortality. This study aims to estimate Healthy Life Expectancy HLE in the central region of Sudan and to identify the socioeconomic, demographic and health factors correlated with the Self Rated Health SRH in the region. Two types of data were gathered in the present study, secondary and primary data. The secondary data were obtained from the final tabulations of the Fifth population census in Sudan (2008), which provide data on population mortality distributed by age groups. The other type of data was a primary source, collected through a survey conducted in Gezira state in July (2014). The survey was covered all the localities of the state, the collected sample size was (778) households constituting (5113) individuals. The main question in the questionnaire was the individuals self-rating of their health used to divide population into healthy and unhealthy groups needed to calculate HLE. Using SPSS for windows and Excel software, different methods of analysis were conducted to analyze the data namely; life table and Sullivan methods, descriptive statistics, inferential statistics in terms of Chi Square test for association and binary logistic regression model. The results of primary data analysis show that, HLE at birth was (57.5) years for males and (52.5) years for females, representing (88.6%) and (80.3%) of total life expectancy in Gezira state for males and females respectively. Individuals with disabilities, diabetes and those who drinking alcohol were more likely to be unhealthy. The study recommended the need for adequate care for disabled persons, also, comprehensive and longitudinal surveys covering all aspects of disability and self-rating health at national and states levels is strongly recommended.

5 FUNCTIONAL DECLINE AND ALL-CAUSE MORTALITY BASED ON RESPONDENTS IN US NURSING HOME SURVEY (2004-2006)

Kristine A. Mulhorn, Jerome Dugan, Layla Booshehri

The National Nursing Home Survey provides a key resources for examining the link between disability and mortality. Like other large surveys produced by the National Center for Health Statistics (NCHS), the respondent identification codes are linked to the National Death Index (NDI), allowing the calculation of a prospective study. We will predict the role functioning has on mortality over two and four years. The hazards model allows us to measure the time to death, with functioning measures as independent variables (including measures of independence ranging from dependent to independent on various ADL items such as transferring and dressing) . The National Nursing Home Survey (NNHS) is a survey of nursing homes and related care facilities in the United States. During 2004, information regarding facility and financial characteristics was gathered from 1,174 facilities, along with current resident information for 13,507 residents. Two methodologies guide the project: 1) the NNHS includes various functioning measures and sociodemographic data of nursing home residents 65 years old and older, proportional hazards modeling demonstrates the extent of the relationship to two-year and four-year mortality correcting for various sociodemographic variables; and 2) we consider of the International Classification of Functioning, Disability and Health (ICF) as a guide for understanding functioning decline in the nursing home setting. The model includes measures of functioning for each component in ICF, i.e., impairment, activity and participation. SUDAAN PROC RLOGIST is applied to address NNHS sampling design effects.

6 THE LONG-TERM IMPACT OF CHILDHOOD FAMILY ENVIRONMENT ON COGNITIVE FUNCTIONING IN LATER LIFE

Haena Lee, Mary Beth Ofstedal, Jacqui Smith

Household structure in childhood have been considered a critical context that shapes early cognitive development and functioning in adulthood. Little research, however, examined their long-term impacts on cognitive change in later life. Using the nine waves of the Health and Retirement Study (HRS; 1998-2014) and the 2015 HRS Life History Mail Survey, we examine whether features of childhood family structure (household structure, size, and instability) are associated with cognitive change and if the association between early-life household conditions and cognition is explained by education and job complexity (high vs. middle vs. low skilled job) in adulthood. The total number of the immediate and delayed recall words is used as outcome. Results from growth curve model indicate that childhood household structure matters for cognitive functioning in later life, however, the effects varied by the types of structure. For instance, we found that respondents raised in single parent households with at least one grandparent had cognitive performance that is often better than the outcomes of respondents in two parent families. Respondents raised in single parent households and now parent households showed disadvantages in cognitive performance relative to those raised in two parent households. These effects by household structure persisted net of childhood SES, own education, job complexity, and health conditions. Findings suggest that childhood family environment had a measurable impact on cognitive performance among older adults. Future research may benefit from investigating the potential mediating pathways through which grandparent co-residence affects later-life cognitive health.

7 CAN REGULAR FRUIT CONSUMPTION REDUCE THE RISKS OF COGNITIVE IMPAIRMENT? -- EVIDENCES FROM A LARGE-SCALE SOCIAL SURVEY

Yi Yang

Fruit consumption has long been considered to be vital to sustaining a healthy body. This study uses the 2002 to 2014 waves of The Chinese Longitudinal Healthy Longevity Survey to examine the effect of fruits consumption on cognitive impairment. The baseline sample of 15,794 targets the old adults aged 60 and above. The frequency of fruit consumption is categorized into 'every day', 'quite often', 'occasionally', and 'rarely or never'. Cognitive functioning is measured by the Chinese version of Mini-Mental State Examination (MMSE). Weighted descriptive analysis indicates that the cognitive impairment rates were 23% for respondents who never consume any fruits, as compared to 7% for those who consume fruits every day in the baseline year of 2002. This pattern holds consistently over the five waves with cognitive impairment rates of 38% and 18% for respondents reporting no consumption and daily consumption respectively, in 2014. A fixed-effect regression model shows that after controlling for covariance in (i) demographic characteristics, (ii) income, (iii) social connectedness, (iv) access to medical services, and (v) physical and psychological well-being, the odds of being cognitively impaired were 59% higher for the elderly who never consume fruits in relation to their counterparts who consume fruits every day. Furthermore, this study uses a combination of inverse probability weighting which is a post sampling weighting approach, and propensity score matching to estimate the average treatment effect of the fresh fruits consumption on cognitive impairment. The results of these quasi-experimental approaches indicate that compared to respondents who reported daily fruit consumption, those who never consume fresh fruits shows a significantly higher likelihood of cognitive impairment. This effect is

substantial and consistent across the five waves. The results from this study emphasizes that consuming ample amounts of fresh fruits may significantly reduce the risk of cognitive impairment for the elderly Chinese.

8 LIFE EXPECTANCY WITHOUT INSTITUTIONALIZATION AS AN OPERATIONAL MEASUREMENT OF AGE AND DEMENTIA FRIENDLY COMMUNITIES

Toshiyuki Ojima, Rikuya Hosokawa, Satoko Horii, Yukari Yokoyama, Jun Aida, Masashige Saito, Naoki Kondo, Katsunori Kondo

Because of global ageing, it is important to promote Age and Dementia Friendly Communities. We are developing indicators to measure age and dementia friendliness. Though some people need facility care, one of the goals of such strategy is to live in community even if older people have disabilities including dementia. The aim of the study is to develop indicators for that strategy. Life expectancy (LE) without institutionalization for whole Japan was calculated using various national data including long-term care insurance. We also conducted mail survey for about 300 million older people living in about 40 municipalities in Japan. As the results, life expectancies without institutionalization, with institutionalization, receiving home care, and without long-term care at age 65 were 18.54 years, 1.01 years, 1.03 years, 17.52 years for males, and 23.76 years, 0.62 years, 3.74 years, 20.03 years for females, respectively. From the mail survey we find weak tendency that proportion of institutionalization was lower in communities where more older people think that they want to live in the communities even if they have dementia. We are following up the subjects of mail survey. The indicators we developed may helpful to assess age and dementia friendliness of communities.

9 CHILDLESSNESS AND AGING ALONE: COMPARATIVE PERSPECTIVES FROM EAST AND SOUTHEAST ASIA

Bussarawan Puk Teerawichitchainan, Jung-Hwa Ha, John Knodel

We examine the extent that childlessness contributes to older persons aging alone in East and Southeast Asia based on four recent nationally-representative surveys. We investigate prevalence and dimensions of childlessness, particularly distinguishing between actual childlessness (elderly without children) and de-facto childlessness (elderly whose all children migrated elsewhere). We assess how actual and de-facto childlessness are associated with three aspects of aging alone (solitary living-arrangement, social isolation, loneliness). The analysis focuses on gender and SES differentials. Importantly, we compare prevalence and consequences of childlessness and characteristics of aging alone cross-nationally. Asia is experiencing demographic shifts that pose significant challenges to the existing old-age support system in which adult children play predominant roles. Study countries are characterized by similarities and differences in demographic histories, economic development, political-welfare systems, and cultural underpinnings. Cross-national comparisons permit examination and interpretation of how social contexts shape the outcomes of childlessness and its association with aging alone.

10 SELF-RATED HEALTH AS GENERIC HEALTH MEASUREMENT? IDENTIFYING THE HEALTH INFORMATION USED AND THE ROLE OF GENDER, AGE, AND COUNTRY

Patrick Lazarevic, Martina Brandt

Background: Self-rated health (SRH) is arguably the most widely used generic health measurement in survey research. However, SRH remains a black box for researchers. In our paper, we want to gain a better understanding of SRH by identifying its determinants, quantifying the contribution of different health domains to explain SRH, and by exploring the role of gender, age-groups, and the country of residence. Method: Using data from 61,027 participants of the fifth wave of the Survey of Health, Ageing and Retirement in Europe (SHARE) living in fifteen European countries, we explain SRH via linear regression models. The independent variables are grouped into five health domains: functioning, diseases, pain, depression, and behavior. Via dominance analysis, we focus on their individual contribution to explaining SRH and compare these contributions across gender, three age-groups, and fifteen European countries. Results: Our model explains SRH rather well ($R^2 = 0.50$ for females/ 0.45 for males) with diseases contributing most to the appraisal (.16/.18). Functioning is the second most relevant factor (.16/.14) followed by pain (.09/.07) and depression (.06/.05). Behavior (.02/.01) is less relevant for health ratings. This ranking holds true for almost all countries with only little variance overall. A comparison of age-groups, however, indicates that the contribution of diseases and behavior to SRH decreases over the life-course while the contribution of functioning to R^2 increases. Conclusion: Our paper demonstrates that SRH is largely based on diverse health information with functioning and diseases being most important. However, there is still room for idiosyncrasies or even bias. Accordingly, one promising approach to use it as a generic health measure might be complementing or priming it with information on the typically most relevant health domains (i.e., functioning and diseases) as in the Minimum European Health Module (MEHM).

11 LONGITUDINAL ANALYSIS OF CHANGING CONSUMPTION PATTERNS IN AGING HOUSEHOLDS IN THE US

Vineet Raichur, Lindsay Ryan, Shannon T Mejia, Richard Gonzalez and Jacqui Smith

Composition of the products/services consumed within households is known to change as members of the household age. Analysis of such change in consumption is key to understanding how people allocate resources to maintain a desired quality of life, determine how demand for different products/services will be affected and how these changes in economic activities affect our environmental footprint. In this study we use longitudinal data from the Consumption and Activities Mail Survey (a sub-sample of the Health and Retirement Study) gathered between years 2005–2015 to analyze within-household change in consumption as members of the household age from middle to old age. Our work investigates spending changes (both longitudinally and in multiple cross-sections) in major categories of products/services consumed by older households in the US and explores its interpretation. We find that the analyses of change in spending on phone/cable/internet services using longitudinal and cross-sectional methods lead to contradictory conclusions.

12 VALIDATING THE GLOBAL ACTIVITY LIMITATION INDICATOR IN TAIWAN

Ru-Ling Hsiao, Yasuhiko Saito

Background: The Global Activity Limitation Indicator (GALI) is a single item measurement of functional decline widely used in Europe. However, the item has never been validated in an Asian population. This study aims to validate the GALI in an older Taiwanese sample and to explore if the GALI captured not only physical but also psychological limitations.

Methods: Data of 4,957 individuals aged 50 and over from a national representative refresh cohort of the 8th wave of Taiwan Longitudinal Survey on Aging (TLSA) was used. Logistic regression was used to examine the association among the GALI, the ADL, and the IADL, and to explore if depressive symptoms (measured by the CES-D) could be an indicator of reporting limitations on the GALI.

Results: The mean age of the sample was 62.4 ± 9.4 years old, 47.2% were male, and 21.7% reported limitations on the GALI. The results of the logistic regression showed that the GALI was associated with the ADL (OR= 35.72, 95%CI: 21.00, 60.76) and the IADL (OR=13.65, 95%CI: 10.39, 17.92), significantly. Furthermore, after adjusting for age, sex, and education, people with more depressive symptom had higher odds to report "limited" on the GALI. The ORs were 4.53 (95%CI: 3.50, 5.86) and 3.48 (95%CI: 2.60, 4.67) while included ADL and IADL difficulties, respectively.

Conclusion: The study provided evidence that the GALI is a valid tool to measure general limitation in an Asian population. Furthermore, the GALI might not only measure physical limitations but also captured part of psychological limitations. As the variations within European countries reported in other studies, there were also variations between Taiwan and the European countries. The reporting rate of the GALI in Taiwan population was comparatively lower than other European countries. These results emphasized the need to embrace cultural difference, and the need of discretion while comparing GALI between nations.

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