33rd REVES

Advances in International Research on Health and Life Expectancy in the Covid-19 era

September 21-23, 2022
Halifax, Nova Scotia Canada

Hosted by: The Global Aging and Community Initiative at Mount Saint Vincent University

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Note: COVID-19 MEASURES AT DALHOUSIE UNIVERSITY
Masks are mandatory at Dalhousie University and must be worn in all indoor classrooms and instructional spaces.

MEETING SCHEDULE

Wednesday, September 21
8:00 a.m. – 9:00 a.m.   Registration (coffee and snacks available)
9:00 a.m. – 9:20 a.m.   Welcoming remarks
9:20 a.m. – 10:50 a.m. Session A: Creative uses of health expectancy methods
    Chair: Emmanuel Cambois, Institut National D'études Démographiques, France
    Presentations:
1) "Impact of risk of social isolation on health expectancy of older adults: Findings from Singapore."
    Presenter: Rahul Malhotra, Duke-National University of Singapore, Singapore.
2) "Gender Disparities in Healthy Aging: A Cross-National Comparison." Presenter: Venessa di Lego, University of Vienna, Austria.
3) "Estimating HALE in Canada: past results, current status and future plans." Presenter: Tracey Bushnik, Statistics Canada, Canada.
4) "Socioeconomic Status and Working Life Expectancy in Sweden." Presenter: Holendro Singh Chungkham, Stockholm University, Sweden.

10:50 a.m. - 11:10 a.m. Break
11:10 a.m. – 12:20 p.m. Session B: Incorporating biological variables
    Chair: Michel Poulain, Tallinn University, Estonia
    Presentations:
5) "Comparing allostatic load and administrative frailty index in Canadian older adults: evidence from the Canadian Longitudinal Study on Aging." Presenter: Charlotte Nice, Dalhousie University, Canada.
6) "Increasing Educational Inequality in Biological Aging in the United States." Presenter: Mateo Farina, University of Southern California, USA.
7) "A comparison of diseased life expectancy among Older Colombians using measures of biomarkers and self-reported health for diabetes and hypertension." Presenter: Margarita Osuna, University of Southern California, USA.

12:20 p.m. - 12:40 p.m.Group photo time
12:40 p.m. – 1:40 p.m. Lunch
1:40 p.m. – 3:30 p.m. Session C: A deep dive into social determinants
    Chair: Sandra Reynolds, University of South Florida, USA.
    Presentations:
8) "Mismatches in health: A cross-country analysis on reporting bias in physical and cognitive limitation" Presenter: Venessa di Lego, University of Vienna, Austria.
9) "The Contribution of Childhood Adversity to the Socioeconomic Gradient in Premature Mortality in a Swedish Birth Cohort." Presenter: Alyson van Raalte, Max Planck Institute, Germany.
10) "Social support and health expectancy among older persons: The JAGES study." Presenter: Toshiyuki Ojima, Hamamatsu University, Japan.
11) "The impact of religiosity on health expectancy in Costa Rica." Presenter: Yasuhiko Saito, Nihon University, Japan.

12) "Does religiosity in early middle age reduce risk of mortality over five decades? A multidimensional consideration within a hazard modelling framework." Presenter: Maria T. Brown, Syracuse University, USA

3:30 p.m. - 3:50 p.m.   Break

3:50 p.m. – 5:00 p.m. Session D: The longer-living
Chair: Janice Keefe, Mount Saint Vincent University, Canada.
Presentations:
13) "A "Blue Zone" in the Netherlands; detection and personal and environmental characteristics." Presenter: Dorly Deeg, Amsterdam University, Netherlands.
14) "The survival of centenarians during the COVID 19 pandemic." Presenter: Anne Herm, Tallinn University, Estonia.
15) "Who reach 105 years and survive above?" Presenter: Michel Poulain, Tallinn University, Estonia.

5:00 p.m. - 5:10 p.m.   Wrap-up comments
6:30 p.m.   Dinner at the Waterfront Warehouse

Thursday, September 22
9:00 a.m. – 10:50 a.m. Session E: Mortality research: assorted perspectives
Chair: Marc Luy, Vienna Institute of Demography, Austria
Presentations:
16) "Geography, scale, and mortality patterns in the Indigenous populations of Canada." Presenter: Leora Courtney-Wolfman, University of Vienna, Austria.
17) "Average Years of Life Lost (YLL) due to COVID-19 in the US Across Time and States." Presenter: Scott M. Lynch, Duke University.
18) "The novocoronavirus pandemic impact on the mortality diversification by causes of death in Spain." Presenter: Julia Almeida Calazans, Universitat Autònoma de Barcelona, Spain.
19) "Linking Disability and Mortality across Different age groups in the U.S." Presenter: Kristine Mulhorn, Drexel University, USA.
20) "Social network effects on survival among middle-aged and older population." Presenter: Luule Sakkeus, Tallinn University, Estonia.

10:50 a.m. - 11:10 a.m. Break
11:10 a.m. – 12:40 p.m. Session F: Integrative approaches to studying health outcomes
Chair: Robin Högnäs, Stockholm University, Sweden
Presentations:
21) "The Impact of Frailty on Long-Term Outcomes of Cardiac Rehabilitation Patients." Presenter: Jack Quach, Dalhousie University, Canada.
22) "Obesity, Dementia and Mortality Among Older Americans: New Insights from Heterogenous Body Mass Index Trajectories After Incident Dementia." Presenter: Yuan S. Zhang, University of North Carolina USA.
23) "Hearing and Cognitively Impaired Life Expectancies in the U.S." Presenter: Scott M. Lynch, Duke University, USA.
24) "Socioeconomic disparities in diabetes concordant comorbidity: National Health Interview Survey, 1997-2018." Presenter: Jalal Uddin, Dalhousie University, Canada.

12:40 p.m. – 1:40 p.m. Lunch
1:40 p.m. – 3:20 p.m. Session G: Appreciating the contribution of Robert Schoeni
Chair: Christine Himes, Illinois Institute of Technology

Presentations:
25) "Compression or Expansion of Morbidity at Older Ages in Singapore?" Presenter: Abhijit Visaria, Duke-National University of Singapore, Singapore.
26) "How to explain the contained change in the use of care institution in the French ageing population between 2008 and 2015." Presenter: Emmanuel Cambois, Institut National D'études Démographiques, France
27) "Multistate analysis of disability-free life expectancy trends in Italy." Presenter: Margherita Moretti, Universita di Roma, Italy.
28) "Recent trends in adult mortality by education in Europe: a comparative analysis." Presenter: Wilma J. Nusselder, Erasumus University, Netherlands.

3:20 p.m. – 3:40 p.m. Break
3:40 p.m. – 4:50 p.m. Session H: The George Myers Lecture
   Chair: Jean-Marie Robine, Institut National de la Santé et de la Recherche Médicale, France.
   Presentations:
29) "Healthy life expectancy: On the co-evolution of data, methods, and insights." Presenter: Michael Wolfson, University of Ottawa, Canada.

4:50 p.m. – 5:00 p.m. Wrap-up comments
5:00 p.m.   Steering committee meeting and dinner

Friday, September 23
9:00 a.m. – 10:30 a.m. Session I: A diverse look at inequalities and disparities
   Chair: Rahul Malhotra, Duke-National University of Singapore, Singapore.
   Presentations:
30) "Life expectancy with and without pain across the rural-urban continuum." Presenter: Feinuo Sun, Mount Saint Vincent University, Canada.
31) "Healthy life expectancy by ethnicity in Chile." Presenter: Moises H. Sandoval, Universidad de Chile, Chile.
32) "Sex differences in cancer-free life expectancy: impact of smoking, obesity and physical inactivity." Presenter: Alessandro Feraldi, Universita di Roma, Italy.
33) "Functional limitation among older adults: Exploring differences between middle- and high-income countries." Presenter: Shane D. Burns, University of Southern California, USA.

10:30 a.m. - 10:50 a.m. Break
10:50 a.m. – 12:20 p.m. Session J: Studies of methodological interest
   Chair: Jennifer Ailshire, University of Southern California.
   Presentations:
34) "Understanding cause-of-death contributions to lifespan variation." Presenter: Serena Vigezzi, University of Southern Denmark, Denmark.
35) "The Necessity, Feasibility, and Utility of Using the Minimum European Health Module to Measure Generic Health." Presenter: Patrick Lazarevic, Vienna Institute of Demography, Austria.
36) "Are International Comparisons of Healthy Life Years Affected by Country-Specific Health Reporting?" Presenter: Marc Luy, Vienna Institute of Demography, Austria.
37) "Validity of the Global Activity Limitation Indicator (GALI) in Developing Countries in Asia." Presenter: Yasuhiko Saito, Nihon University.

12:20 p.m. - 12:40 p.m. Closing comments and looking forward to REVES 2023
LUNCH TO FOLLOW   - END OF MEETING-

ABSTRACTS:

Day 1: Wednesday, September 21

Session A: CREATIVE USES OF HEALTH EXPECTANCY METHODS

9:20 a.m. – 10:50 a.m.

Chair: Emmanuel Cambois

1. IMPACT OF RISK OF SOCIAL ISOLATION ON HEALTH EXPECTANCY OF OLDER ADULTS: FINDINGS FROM SINGAPORE

Rahul Malhotra, Abhijit Visaria, Yasuhiko Saito, Stefan Ma, Chi-Tsun Chiu, and Angelique Chan

The study of social determinants of health is increasingly focusing on the role of networks and resources in older persons environments and connections outside their household, particularly in societies where family sizes are decreasing. We examine the impact of risk of social isolation, measured through social networks outside the household, on healthy and unhealthy life expectancy (HLE and UHLE; based on excellent, very good, or good versus poor or fair self-rated health, respectively), and on active and inactive life expectancy (ALE and IALE; based on absence or presence of health-related difficulties in activities of daily living (ADLs) and instrumental ADLs). We use data from a national longitudinal study (3 waves: 2009, 2011-12, and 2015) of community-dwelling older adults, aged > 60 years, in Singapore. We use the SPACE programme in SAS for estimating health expectancy, controlling for sociodemographic, living arrangement, and health status variables. We find that those at risk of social isolation, compared to those not, have similar TLE but higher UHLE (for example, at age 60, by 2.4 years [95% CI: 1.3-3.5]), and higher IALE (at age 60, by 2.3 years [1.0-3.3]), and spend a higher proportion of their remaining life in self-rated poor or fair health (at age 60, 10% higher [95% CI: 5.8%-14.5%] and with ADL/IADL limitations (at age 60, 9.9% higher [5.1%-14.3%]). Our findings demonstrate the impact of risk of social isolation on health expectancy, an importance measure of population health, and reinforce the importance of supportive social connections among older adults beyond their households.

2. GENDER DISPARITIES IN HEALTHY AGING: A CROSS-NATIONAL COMPARISON

Vanessa di Lego, Marília R. Nepomuceno, and Cássio M. Turra

In this paper, we quantify the relative contribution of disability and some chronic diseases to explain the gender inequality in health and mortality across U.S., China, England, Korea, China, India and selected European countries for years 2014/2017-2019 and at ages 50 and over. Our work takes advantage of the harmonized versions of data from the international aging and retirement studies developed by the USC Program on Global Aging, Health, and Policy, which allow for a unique opportunity to perform comparisons among identically defined variables across countries. We focus on harmonized HRS (U.S.), ELSA (England), KLoSA (South Korea), CHARLS (China), LASI (India), and SHARE (EU Countries) due to their unique epidemiological and mortality trajectories coupled with country-specific gender roles, which enable us to investigate gender inequality in health and mortality in different settings. We estimate disability- and chronic disease-free life expectancies (DFLE and CDFLE) for ages 50 and over using the

Sullivan Method. For disability, we use the harmonized dummy variable constructed from a 5-item list of activities of daily living (ADLs), which include bathing, dressing, eating, getting in and out of bed, and using the toilet. For chronic diseases, we use the harmonized variables on specific chronic conditions diagnosed by a physician, which include diabetes, arthritis, cancer, and cardiovascular diseases.

3. ESTIMATING HALE IN CANADA: PAST RESULTS, CURRENT STATUS AND FTURE PLANS

Tracey Bushnik, Michael Tjepkema, and Laurent Martel

The COVID-19 pandemic has unquestionably underscored the importance of monitoring population health, including indicators of quality of life. Health adjusted life expectancy (HALE) is one such indicator. As a composite measure that incorporates both morbidity and mortality, estimating HALE in the current and post-pandemic context poses a challenge. Not only have both of these health indicators been significantly impacted by COVID-19, there are issues with data availability and timeliness. This presentation will be organized in three parts. First, it will provide an overview of two studies that contain the most recent pre-pandemic information we have about HALE in Canada. The first study examined trends over time in life expectancy (LE) and HALE for the combined household and institutional population every four years from 1994/1995 to 2015. The second study examined socioeconomic disparities (e.g., income and education levels) in LE and HALE among the household population using the 1996 and 2011 Canadian Census Health and Environment Cohorts (CanCHECs). Next, the presentation will provide an overview of what is currently known about the impact of the pandemic on life expectancy and health status in Canada. Lastly, we will discuss our future plans in estimating HALE, and the challenges in doing so within the context of the COVID-19 pandemic.

4. SOCIOECONOMIC STATUS AND WORKING LIFE EXPECTANCY IN SWEDEN

Holendro Singh Chungkham, Robin S. Högnäs, and Hugo Westerlund

Longer life expectancy and fertility decline have increased concerns about the security of old-age pensions. Raising retirement ages is one strategy to offset rising costs, though the option to retire varies considerably by socioeconomic status (SES) and sex. In terms of SES, the level of variation may depend the measure used. Also, many workers now transition into retirement slowly, e.g., move from full- to part-time work. Thus, retirement age may not sufficiently capture how long people work. Working life expectancy (WLE) the expected average number of years worked "better measures total working life. We use data from the Swedish Longitudinal Occupational Survey of Health (SLOSH) from 2008 to 2020 (n=4,940 people age 50+ and n=74,093 person-observations) to examine WLE by education and occupation. We estimate a three-state multistate model (i.e., working, not working, dead) and a four-state model (working part-time, working full-time, not working, and dead); both assume a continuous-time first-order Markov process. We estimate two sex-stratified models, cross-classified by: 1) occupation; and 2) education. We find that professionals work full-time 1 year more than routine workers, regardless of sex. The low educated work full-time 1 year less than the highly educated. In our weighted three-state model, where part-time work contributed Â½ of full-time work, the difference increased to 1.14 and 1.05 years, respectively. Our unweighted three-state model showed slightly larger education differences. Findings suggest that WLE differs by SES, regardless of sex, and the differences are greater by education than occupation. This has implications for extending working life policies.

SESSION B: INCORPORATING BIOLOGICAL VARIABLES

Sept 21 11:10 a.m. – 12:20 p.m.

Chair: Michel Poulain

5. COMPARING ALLOSTATIC LOAD AND ADMINISTRATIVE FRAILTY INDEX IN CANADIAN OLDER ADULTS: EVIDENCE FROM THE CANADIAN LONGITUDINAL STUDY ON AGING

Charlotte Nice, Luke Duignan, and Daniel Dutton

Administrative data facilitates the use of frailty constructs, which are a useful way to estimate biological age in large surveys. Frailty indices are typically constructed from the data available, and such indices have been published for use in the Canadian Longitudinal Study on Aging. Less commonly used, and not necessarily limited to older adults, is the concept of allostatic load: briefly, a collection of biomarkers that can be used to identify the physiological wear-and-tear (stress on individuals. Statistics Canada has recently put forward estimates of this concept and shown that it aligns with general measures of health and wellbeing. The Canadian Longitudinal Study on Aging is a unique survey that allows us to directly compare these two constructs. Using measures of physical and mental health and wellbeing from the survey, biomarkers to measure allostatic load, and the published frailty index, we will compare the two measures in terms of variation in the sample, correlation with health outcomes, and correlation with social determinants of health. This project will contribute to a growing literature on health throughout the lifecycle; allostatic load is a concept applied to individuals of all ages and shows promise as a marker for lives lived in unfavourable socio-economic conditions. Thus, alignment with frailty means that allostatic load could be link late in life deficits to earlier living conditions.

6. INCREASING EDUCATIONAL INEQUALITY IN BIOLOGICAL AGING IN THE UNITED STATES

Mateo P Farina, Jung Ki Kim, and Eileen M Crimmins

Since the 1990s, health inequality across education groups has grown in the United States. A substantial amount of research has focused on mortality: adults without a college degree have increased mortality, while mortality risk has decreased among adults with a college degree. To a large extent, increased educational inequality has been found for other health outcomes (i.e., disability, diabetes, and other chronic conditions). While mortality literature has emphasized the role of drug overdoses, suicide, and accidents, educational differences in age-related chronic conditions provides some evidence that health inequality may also be accompanied by physiological changes. Recent work has shown continued improvement in biological aging among older adults 50+. However, studies have not evaluated growing inequality in biological aging across education groups. In this study, we use NHANES data from 1988-1994 and from 2014-2017 to evaluate growing inequality in biological aging among adults 50+. We also assess the role of health behaviors (smoking, drinking, and BMI) and medication management (cholesterol and hypertension). We found that educational inequality in biological aging increased from the early 1990s to the late 2010s. Increased inequality in biological aging was primarily driven by substantial improvements among adults with a bachelor's degree. While all education groups were biologically younger in the latter period, adults with a bachelor's degree experienced the greatest improvements. We did not find that these improvements in biological aging were impacted by health behaviors or medication management (in fact, worse health profiles among well-educated adults may be considered countervailing trends). This study provides further evidence of the growing divergence in health in the US.

7. A COMPARISON OF DISEASED LIFE EXPECTANCY AMONG OLDER COLOMBIANS USING MEASURES OF BIOMARKERS

Margarita Osuna, Eileen Crimmins, and Jennifer Ailshire

As one of the world's most rapidly aging countries, it's important to understand how many years older adults in Colombia will live with and without major diseases such as hypertension and diabetes. Disease prevalence is often estimated from self-reported medical diagnoses, but health literacy may be lower among older Colombians and provide inaccurate estimates of diseased life expectancy. We use data from the 2015 health and wellbeing survey of older adults in Colombia (SABE-Col), a nationally representative survey of Colombians ages 60+, that collected information on hypertension and diabetes both from reported diagnoses, biomarker and anthropometric data. Respondents reported whether they had ever been told by a doctor if they had either diabetes or hypertension. Using clinical cut-points we determined which respondents had blood glucose levels consistent with diabetes and blood pressure readings consistent with hypertension. We used the Sullivan method to estimate life lived with and without disease. Using information only from self-reported diagnosis results in lower diseased life expectancy than using information from both reported and measured disease status. At age 60, women have a total life expectancy of 20.56. Based on self-reports, women have higher DLE with hypertension (12.66 years) than diabetes (4.18 years). In contrast, when we include measured health state, at the same age, DLE increases for hypertension (13.24 years) and diabetes (4.28 years). Men, at age 60, have a total life expectancy of 18.04. Based on self-reports, they have higher DLE with hypertension (8.78 years) than diabetes (2.98 years). DLE increases if we use the high-risk clinical measures for both hypertension (9.61) and diabetes (3.04). Our findings highlight important gender differences in life with disease and increase in estimated DLE with clinical measures.

SESSION C: A DEEP DIVE INTO SOCIAL DETERMINANTS

Sept 21 1:40 p.m. – 3:30 p.m.

Chair: Sandra Reynolds

8. MISMATCHS IN HEATLH: A CROSS-COUNTRY ANALYSIS ON REPORTING BIAS IN PHYSICAL AND COGNITIVE LIMITATION

Vanessa di Lego, Sonja Spitzer, and Patrick Lazarevic

This paper uses harmonized data from the Gateway of Global Ageing in order to analyse reporting bias in functional mobility and cognition across different countries. Previous evidence has shown that misreporting of physical and cognitive health differs substantially between countries and age groups, as people may over- or underestimate their own health. This work compares self-reported and tested health in the harmonized SHARE (Europe and Israel), ELSA (England), CHARLS (China), MHAS (Mexico), LASI (India), TILDA (Ireland, only for cognition) and HRS (USA). We match subjective reports on difficulty of getting up from a chair, walking, and cognition with the objective tests of chair stand, walking speed and memory performance. The concordance is evaluated by age, gender and educational level. Among SHARE countries, we show how country rankings may differ when misreporting is taken into account. Finally, we evaluate to what extent misreporting can affect disability-free life expectancy (DFLE) estimates. Our main contribution is to place reporting bias in perspective by performing a cross-

national comparison. Different countries not only have specific health and mortality trajectories which are defined by their epidemiological transition and welfare state systems, but also cultural and societal characteristics that may affect health reporting. By performing this analysis across different countries, we shed light into how a mismatch between perceived and actual health may differ across different cultures and how in turn this affects the sensitivity of some heath indicators.

9. THE CONTRIBUTION OF CHILDHOOD ADVERSITY TO THE SOCIOECONOMIC GRADIENT IN PREMATURE MORTALITY IN A SWEDISH BIRTH COHORT

Josephine Jackisch, and Alyson van Raalte

Objective: This study seeks to quantify how much of the socioeconomic gradient in adult life expectancy is associated with childhood adversity, throwing light on factors at play before socio-economic positions become established in adulthood.
Data: The data come from the 1953 Stockholm Birth Cohort (n=14,210, covering virtually everyone born in Stockholm and its surrounding semi-rural regions in 1953), linked to various Swedish administrative registers. Childhood adversity was operationalized using contact with child welfare involvement (around 1/5 of this cohort).
Methods: We compared inequalities in adult mortality within the full cohort to a counterfactual scenario where individuals who experienced childhood adversity were given the mortality risks of those achieving the same adult socioeconomic status, but with no experience of childhood adversity. The socioeconomic gradient was measured by the slope index of inequality of temporary life expectancy (ages 30-68) across income quintiles and education groups.
Results and Conclusions: The counterfactual scenario attenuated the income gradient by 48% for men and 44% for women. Similarly, inequalities by attained education were reduced in the counterfactual scenario by 40% for men and 54% for women. Further analyses will investigate the type of contact (any contact vs. out-of-home care) as well as cause of death (accidental or other).
These results contribute to our understanding of the aetiology of social inequalities in mortality. Prevention of both childhood adversity and adverse health after childhood adversity is paramount to achieving progress towards health equity.

10. SOCIAL SUPPORT AND HEALTH EXPECTANCY AMONG OLDER PERSONS: THE JAGES STUDY

Toshiyuki Ojima, Rikuya Hosokawa, Tomoya Myojin, Jun Aida, Katsunori Kondo, and Naoki Kondo

Both receiving and providing social support might be beneficial for life especially in older age. The aim of the study is to revel the relationship between receiving/providing social support and health expectancy. The study design is cohort study as a part of the Japan Gerontological Evaluation Study (JAGES). The self-administered baseline mail survey including activity limitation and receiving/providing social support was conducted in 2013 for older people aged 65+ years who were not certified as requiring long-term care from 19 municipalities in Japan. We also conducted follow-up mail survey in 2019 as well as following up death and incidence of certification of long-term care needs. We classified social support status as 4 groups considering receiving and providing status. Health expectancy was calculated from the multistate life table method using SAS stochastic population analysis for complex events (SPACE). In the current analysis, the Markov transition model for disability activity limitation and death consisted of three states: two non-absorbing states (without and with activity limitation) and one absorbing state (death). About 9,000 participants were included in the analyses. The transition in the status is based on changes from 2013 at

baseline to 2019 at follow-up. Based on this estimated transition rate, we calculated health expectancy at the age of 65 years for men and women.

11. THE IMPACT OF RELIGIOSITY ON HEALTH EXPECTANCY IN COSTA RICA

Md. Ismail Tareque, Chi-Tsun Chiu, Zachary Zimmer, William H. Dow, Luis Rosero-Bixby, Carol Jagger, Mary Beth Ofstedal, and Yasuhiko Saito

Background: Previous studies examined the effect of religiosity on mortality or a variety of health states separately. There is no study in Latin America examining the effect of religiosity on both aspects of health simultaneously.
Objective: We examined and quantified the effect of religiosity by health expectancy in Costa Rica.
Methods: Data came from three waves of a nationally representative longitudinal survey, which interviewed 2827 community dwelling older adults aged > 60 years at Wave 1. An individual attending religious services daily/weekly was considered religious, otherwise non-religious. An individual reporting at least one difficulty with basic or instrumental activities of daily living was considered functionally inactive. The multistate life table method was utilized.
Results: At age 60, religious older adults could expect to live around 4 years longer (3.7 years for men [95% Confidence Interval: 1.5-7.4] and 4.7 years for women [1.5-7.4]) than their non-religious counterparts, and to enjoy almost 3 more active years (2.8 years for men [1.0-4.6] and 2.9 years for women [1.0-4.6]).
Conclusions: The overall findings show the significant positive effects of religiosity on length of total and active life in Coast Rica. However, both religiosity and health status can be measured differently, and further research on the relationship among them is warranted.
Contribution: We advanced the scant literature by looking at the relationship between religiosity and health expectancy through unadjusted and adjusted (adjusted for a wide range of covariates) estimates in Costa Rica, where religious practices are relatively different from previously studied countries - Taiwan and the US.

12. DOES RELIGIOSITY IN EARLY MIDDLE AGE REDUCE RISK OF MORTALITY OVER FIVE DECADES? A MULTIDIMENSIONAL CONSIDERATION WITHIN A HAZARD MODELLING FRAMEWORK

Maria Teresa Brown, Wencheng Zhang, Woosang Hwang, and Merril Silverstein

Objective: Religiosity has long been considered to have positive impacts on health and longevity, although most studies examine limited measures of religiosity that are often restricted to religious behaviors such as prayer and service attendance. We developed a multidimensional typology of religiosity and employed it as a predictor of mortality outcomes.
Method: We used data from the 1971 wave of the Longitudinal Study of Generations, focusing on members of the early middle-aged generation when they averaged 44 years of age. We performed a latent class analysis to construct a typology of religiosity and included these results in a Cox proportional hazard models predicting age-related mortality risk between 1978 and 2020 using data from the National Death Index. Control variables included age, sex, education, self-rated health, and psychological well-being.
Results: The best fitting model revealed four religiosity classes: strongly religious, weakly religious, privately religious, and liberally religious. Individuals in the weakly (b=.65, p<.05), privately (b=.65, p<.01), and liberally (b=.78, p<.05) religious classes had higher risk of subsequent death compared with the strongly religious. Excellent self-rated health (b=.12, p<.001) partially explained these differences.

Implications: The influence of religion on mortality risk and longevity may derive from various sources such as social integration, meaning in life, and a sense of coherence. That respondents were assessed in early middle age made it less likely that health factors inhibited religious participation. Future analyses should account for unobserved "frailty" by controlling for same-gender parent's age of death and risk dependencies with a random effect for family clusters.

SESSION D: THE LONGER-LIVING

Sept 21   3:50 p.m. – 5:00 p.m.

Chair: Janice Keefe

13. A "BLUE ZONE" IN THE NETHERLANDS; DETECTION AND PERSONAL AND ENVIRONMENTAL CHARACTERISTICS

Dorly J.H. Deeg, Arjan W. Braam, Najada Stringa, Theo G. van Tilburg, and Erik J. Timmermans

Background: A Blue Zones (BZs) are, mostly remote, regions with an exceptionally high number of centenarians. The BZ concept is increasingly popular, because BZs are considered to provide clues to healthy ageing. The supposedly high longevity in BZs has been attributed to healthy lifestyles, but the evidence generally does not meet scientific quality criteria. In this study, we aim to characterise a municipality in the Netherlands that satisfies three criteria: a relatively high number of centenarians, a relatively high life expectancy, and a relatively stable population.
Methods: We use the population-based Longitudinal Aging Study Amsterdam (LASA), which is ongoing since 1992 in 11 municipalities, including cities and towns, located in three socio-geographically different regions. Its data span 27 years and yield the cumulative number of centenarians across the study period. The three-yearly data collection includes a wide range of behavioural, social, health-related, and environmental data.
Results: We found one municipality that satisfies the three BZ criteria. In comparison with inhabitants of other municipalities in the same province and other provinces in the Netherlands, BZ inhabitants consume less alcohol and smoke less, but walk fewer minutes/day and less often practice sports; they do paid work more often; they practice singing more often and attach higher importance to religion and prayer; they deem their environment as more highly liveable. However, their physical and mental health did not differ from the comparison groups.
Conclusion: These findings suggest that BZs are not necessarily linked to healthy lifestyles and good health in old age.

14. THE SURVIVAL OF CENTENARIANS DURING THE COVID 19 PANDEMIC

Anne Herm, Dany Chambre, and Michel Poulain

Background: The mortality among the oldest-olds due to COVID-19 is little known except a higher mortality risk for the aggregated group of 85+ and especially in nursing homes.
Data: During the COVID-19 pandemic, from March 2020 until February 2021, we examine the mortality of 85+ in Belgium and more in detail the centenarians whose birth fell on the years around the end the First World War and the outbreak of the H1N1 "Spanish flu" pandemic.
Findings: The older people have been the most affected by the pandemic but the excess mortality is smaller at very high ages. Among centenarians it becomes minimum with no remarkable difference by sex. The

COVID-19 mortality of the centenarians born before August, 1918 was significantly lower compared with those centenarians born later. This discriminating cut-off point corresponds to the time when the first victims of the Spanish flu pandemic were reported in Belgium.

Interpretation: To date, there is no considerable explanation for the better survival of centenarians during the COVID-19 pandemic. We are limited to hypothesising that selection effects during their early lives have impact. Early childhood of centenarians born before August 1918 included last years of the First WW, characterised by restricted resources, and exposure to the Spanish flu virus. It might be that the lifetime persistence of cross-reactive immune mechanisms exposed to the Spanish flu has enabled these centenarians to better overcome the threat of COVID-19 a century later.

15. WHO REACH 105 YEARS AND SURVIVE ABOVE?

Michele Poulain, Dany Chambre, and Anne Herm

Centenarians becoming SSC (105) are rare. Using surveys but for SSC surveys have strong limitations so that little is known about them except age and sex. Considering a possible mortality plateau and reduced improvement in mortality among the oldest olds, more analysis of the survival to and above 105 is needed.

Questions: Which individual characteristics are associated with survival up to 105 years and with survival above 105 years?

Data: All persons born in Belgium in 1885-1915, who died in Belgium after 1991 or still survive in Belgium on 1/1/2022. Such data collection includes 1261 SSC and among these 40 are surviving. For each individual, 14 dichotomised characteristics are derived from the population register system and past censuses.

Method: The proportions to reach 105 by each characteristic are compared; Kaplan-Meier method is used to compute the mean number of days survived above age 105; the p-values corresponding to differences of proportions and means are computed and confronted.

Some preliminary results: Among men born in 1885-1915 and alive in 1991, 0.42 per thousand reached age 105 compared to 2.41 for women. Differently, men survived in average 438 days above age 105 and women 541. P-values for two proportions and the two means are respectively 0,0153 and 0,0000 showing that the impact of gender is even stronger in survival at very old age.

Discussion: Factors associated with longevity will be discussed, some of these with increasing impact at older age while other show less.

Day 2: Thursday, September 22

SESSION E: MORTALITY RESEACH: ASSORTED PERSPECTIVES

9:00 a.m. – 10:50 a.m.

Chair: Marc Luy

16. GEOGRAPHY, SCALE, AND MORTALITY PATTERNS IN THE INDIGENOUS POPULATIONS OF CANADA

Leora Courtney-Wolfman

Canada's Indigenous populations are recognised as having poorer aggregate mortality outcomes than the country's total population, especially from premature and potentially avoidable causes of death. Nevertheless, data access and scarcity typically limit Indigenous-specific demography to the national scale, while attempts at smaller units of analysis are often hindered by missing or omitted data. To overcome the resulting knowledge gap, this project uses hierarchical cluster analysis from principal components (HCPC) to derive four non-contiguous, geographical "demographic clusters of Canadian Census Subdivisions (CSDs, N = 4585). The clusters are based on CSD-level collinearities in sociodemographic and socioeconomic characteristics, as well as remoteness, using data from the Census of Canada. Individual-level mortality data accessed through data Statistics Canada's Microdata Access programme is then analysed at different scales (cluster or sub-cluster) and stratified for age, sex, cause of death, and Indigenous status (First Nations, Metis, Inuit).

Initial results demonstrated a good face validity of the clusters in uncovering nuanced mortality patterns between and within Indigenous and non-Indigenous Canadians at different geographical scales. The results will be compared to existing national and provincial/territorial-level data and aim provide a critical view of how different scales and approaches to operationalisation shape demographic output on small, understudied groups. In light of the COVID-19 pandemic, these findings will be particularly relevant to public health for identifying potential hotspots and developing suitable preventative approaches and responses to future large-scale crises. Detailed results will be available in time for the REVES conference.

17. AVERAGE YEARS OF LIFE LOST (YLL) DUE TO COVID-19 IN THE US ACROSS TIME AND STATES

Scott M. Lynch, and Christina Kamis

Although deaths in the US from COVID-19 have surpassed those attributable to the 1918 flu pandemic and continue to mount, a significant minority still refuse to vaccinate, mask, and social distance partly because of a lack of perceived seriousness of the virus. Demographers have shown that COVID has reduced US life expectancy at birth far more than the so-called deaths of despair, but change in life expectancy at birth is a difficult metric for lay persons to interpret at the individual level. Building on others work, we develop several methods for calculating years of life lost (YLL) due to COVID, apply them to state and month level data, and discuss their limitations. Results show that the average person who dies from COVID loses approximately 15-20 years of potential life, while those who die from all other

causes lose only a few years more than that, indicating that COVID does not simply cull the oldest from the population. Importantly, there has been considerable change in YLL across the pandemic, reflecting the changing age structure of deaths under different variants. Perhaps more importantly, YLL varies substantially across the US, with states with the weakest public health policies" southern states including Texas and Florida" faring far worse than states with the most stringent policies. This pattern was not clear early in the pandemic, but became quite clear as the virus spread from the northeast and west throughout the rest of the country.

18. THE NOVOCORONAVIRUS PANDEMIC IMPACT ON THE MORTALITY DIVERSIFICATION BY CAUSES OF DEATH IN SPAIN

Júlia Almeida Calazans, Iñaki Permanyer, and Sergi Trias-Llimós

OBJECTIVE: To analyze the changes in mortality diversification by cause of death in Spain from the novocoronavrus pandemic context. DATA AND METHODS: Mortality information was made available by the Instituto Nacional de stadisticas for Spain and its autonomous communities from 2000 to 2020. The Fractionalization index measures mortality diversification by cause. To analyze whether the diversification variation in 2020 is statistically different from the temporal trend, the observed value is compared to the value predicted by a time series model. PRELIMINARY RESULTS: There is an increase in mortality diversification by cause in Spain and its autonomous communities over time. This trend varies along with the age structure. Among the 0-14 age group, the Fractionalization index remains stable over time, while for the 15-59 age group, diversification is reduced. There is an increase in diversification for the age groups 60 to 84 and 85 and older. There is an overall increase in mortality diversification in all autonomous communities with the pandemic, regardless of the coronavirus mortality level. The gains are most remarkable for the oldest age groups, most affected by the pandemic. However, this increase is not statistically significant since the observed values are within the predicted interval. CONCLUSIVE NOTES: Over the last decades, Spain has shown a rise in mortality diversification by cause due to a reduction in cardiovascular diseases mortality and an increase in the participation of other causes of death, such as senescence diseases. The novocoronavirus pandemic accelerates this process, imposing new challenges to the health system.

19. LINKING DISABILITY AND MORTALITY ACROSS DIFFERENT AGE GROUPS IN THE U.S.

Kristine A. Mulhorn, Edwin McCulley, and Stephen Samendinger

The National Health Interview Survey (NHIS) provides key resources for examining the link between disability and all-cause mortality, as the respondent identification codes are linked to the National Death Index (NDI). This project takes advantage of the Washington Group on Disability Statistics Short Set of questions and data linkages to the NDI. For this project, the 2013 NHIS (n=108,131) and the 2013 NHIS Annual Functioning and Disability (n=17,326) samples were linked to the 2015 NDI to estimate mortality risk using proportional hazards models. We aimed to explore how differences in age, education, race/ethnicity, and marital status affect survival, and to examine the relationship between disability status (none versus at least 1 disability) and all-cause mortality. The model includes measures of functioning for each component in the International Classification of Functioning, Disability, and Health (i.e., activity and participation). For the overall sample, log-rank tests indicated significant differences (p<0.05) in survival during at least one point in time by age group (i.e., ages 18-64, ages 65+), race/ethnicity, education, marital status, and disability status. When stratified by age, we observed a significant difference in survival for both age groups. At any point during the study period, adults ages 18-64 reporting at least 1 disability were 2.75 times as likely to die than adults reporting no disability

(HR= 2.75, 95% CI= 1.79-4.24). An association of similar magnitude was also observed among the ages 65+ group (HR=2.82, 95% CI=1.90-4.18). Our results suggest higher rates of all-cause mortality among individuals living with at least 1 disability.

20. SOCIAL NETWORK EFFECTS ON SURIVAL AMONG MIDDLE-AGED AND OLDER POPULATION

Liili Abuladze, and Luule Sakkeus

Confidants form part of the social environment that may alleviate or exacerbate disablement and survival in middle and older age through provision of emotional support. By conceptualising demographic and confidant network characteristics separately, we are better equipped to estimate the main and buffering effects of confidant networks on survival. The main effects model assumes a general beneficial effect on survival for everyone; the buffering effect assumes that networks mediate the effect of chronic health strain on survival. We analysed the role of confidants in survival by disability status of the Estonian population aged 50+ in 2010-2020 using SHARE data, cross-checked with the data on deaths from the population registry. We analyse network effects for six characteristics mapped in 2010-2011: network size, contact frequency with family members, number of children reported in the network, having a spouse in the network, having friends in the network, and emotional closeness level with network members. Disability (GALI), employment, partnership, and exchange of support were constructed as time-varying variables. Men and women were analysed separately using Gompertz hazard models. The analytical sample size included 6,726 people (2,736 men; 3,990 women), of whom 22.2% (28.1% of men; 18.1% of women) died during the observation period. We find that social network size protects everyone, irrespective of their health status, from dying earlier among both men and women. Additionally, emotional closeness with networks shows a protective effect from dying earlier among all men, with as well as without everyday activity limitations.

SESSION F: INTEGRATIVE APPROACHES TO STUDYING HEALTH OUTCOMES

Sept 22 11:10 a.m. – 12:40 p.m.

Chair: Robin Högnäs

21. THE IMPACT OF FRAILTY ON LONG-TERM OUTCOMES OF CARDIAC REHABILITATION PATIENTS

Jack Quach, Olga Theou, Wanda Firth, Caitlin McArthur, Nicholas Giacomantonio, and Dustin Scott Kehler

Purpose: Determine whether frailty status during cardiac rehabilitation (CR) are associated with 5-year all-cause and cardiovascular disease (CVD) mortality, hospitalization, and all-cause emergency department (ED) visits.
Methods: We analyzed data from patients admitted to CR in Halifax, Nova Scotia from May 2005 to April 2015 (N=3,371). The CR program included group-based exercise and education performed twice weekly for 12 weeks. A 25-item frailty index (FI) estimated frailty levels at CR admission and discharge. FI improvements were determined by calculating the difference between admission and discharge FI. CR data were linked to administrative health data to examine 5-year outcomes (all-cause and CVD mortality and

hospitalization, and all-cause ED visits). Cox regression and Fine-Gray models were used to determine the association between FI and outcomes. Hazard ratios and confidence intervals correspond to a 1% change in the FI.

Results: The mean (SD) age of the patients were 62 (11) years old; 74% were male. Mean admission FI scores were 0.34 (0.13). On average, FI improved by 0.07 (0.09) from CR admission to discharge. All-cause and CVD mortality rates were 6.9% and 2.8%, respectively. Admission FI was associated with time to mortality (all-cause=1.02[1.01,1.04]; CVD=1.03[1.02,1.05]), hospitalization (all-cause=1.02[1.01,1.02]; CVD=1.02[1.01,1.02]), and ED visit (all-cause=1.01[1.00,1.01]). FI improvements during CR had a protective effect regarding time to all-cause hospitalization (0.99[0.98,0.99]), but was not associated with other outcomes.

Conclusion: Frailty status at CR admission was related to long-term adverse outcomes. Frailty improvements during CR was associated with delayed all-cause hospitalization.

22. OBESITY, DEMENTIA AND MORTALITY AMONG OLDER AMERICANS: NEW INSIGHTS FROM HETEROGENOUS BODY MASS INDEX TRAJECTORIES AFTER INCIDENT DEMENTIA

Yuan S. Zhang, Hui Zheng, and Virginia Chang

Background: The pathophysiological processes that underlie dementia can lead to weight loss and have consequences for mortality. Prior research has documented an obesity paradox in mortality among individuals with dementia. This study investigated how heterogenous body mass index (BMI) change after incident dementia affects mortality to understand the mortality consequences of BMI among individuals with dementia.

Methods: Using data from the Health and Retirement Study (1995-2016), we first examined the association between BMI at incident dementia and mortality. We then employed a latent class group-based trajectory model to identify heterogenous BMI trajectories after incident dementia and associated these BMI trajectories with subsequent mortality using Cox regressions.

Results: We found an inverse relationship between BMI at incident dementia and mortality, for BMIs of up 40. Five latent BMI trajectories after incident dementia were identified, all exhibiting a downward trend: normal weight downward, overweight-normal weight, obese-overweight, class II obese downward, and class III obese downward. Individuals with higher BMI levels at incident dementia have earlier dementia onset. Compared to the normal weight downward group, the overweight-normal weight and obese-overweight groups have lower mortality risk, and the class II/III obese groups show excess mortality risk.

Conclusion: Individuals experience weight loss along with the progression of dementia. Heterogeneity in the BMI trajectory after incident dementia is associated with differential mortality risks. This study helps clarify the complex dynamics of weight change, dementia, and mortality and suggests that the lower mortality risk of overweight and low levels of obesity may be due to mortality selection.

23. HEARING AND COGNITIVELY IMPAIRED LIFE EXPECTANCIES IN THE U.S.

Jessica S. West, and Scott M. Lynch

Research has increasingly examined the role of hearing loss in cognitive decline, but almost none has translated this relationship into years of life individuals can expect to live with both impairments, nor examined how hearing loss affects years to be lived with cognitive impairment. To address this gap, we apply Bayesian multistate life table methods to Health and Retirement Study data to estimate years of life to be spent (1) with/without hearing and cognitive impairment, and (2) with/without cognitive

impairment, conditional on having versus not having hearing loss. Preliminary results reveal that, at age 50, individuals will live 18.9 years healthy, 4.3 years hearing impaired but cognitively intact, 4.2 years hearing unimpaired but cognitively impaired, and 2.3 years with both impairments. Women will spend more years healthy, hearing unimpaired but cognitively impaired, or with both impairments; men will spend more years hearing impaired but cognitively intact. People with more education will spend more years hearing impaired but cognitively intact; people with less education will spend more years hearing unimpaired but cognitively impaired or with both impairments. Importantly, those who are hearing unimpaired can expect to spend 82% of their remaining life cognitively unimpaired, but those with hearing impairment can expect to spend only 65% of their remaining life cognitively unimpaired. These results suggest that timely identification of, and compensation for, hearing loss may be important for reducing declines in cognitive function; however, the causal direction of the relationship between these two impairments is discussed.

24. SOCIOECONOMIC DISPARITIES IN DIABETES CONCORDANT COMORBIDITY: NATIONAL HEALTH INTERVIEW SURVEY, 1997-2018

Jalal Uddin, Zakir Hossin, and Susan Kirkland

Introduction: Although a socioeconomic gradient in diabetes related morbidity and mortality is widely reported, little is known whether the diabetic patients with disadvantaged socioeconomic circumstances experience greater burden of comorbidities. This study examines the association of multiple indicators of socioeconomic status (SES) with diabetes concordant comorbidities (DCCs) among the diabetic population in the US.

Methods: This study used data from the National Health Interview Survey (NHIS) 1997-2018 and included 56,192 diabetic patients aged 30 or above. SES was measured by education, poverty income ratio, employment, and home ownership. The outcome DCC was defined as whether participants self-reported the following conditions: hypertension, coronary heart disease, congenital heart disease, other non-congenital heart conditions, heart attack, angina, other heart conditions, stroke, kidney disease, and obesity. The DCC was categorized into 3 groups: 0 DCC, 1 DCC, 2 DCC, and 3 or more DCC. Multinomial logistic regression was used to estimate odds ratios and 95% confidence intervals to assess the associations between SES indicators and DCC in sex-stratified models. The analysis adjusted for age, survey year, ethnicity, marital status, and health insurance, and accounted for the sampling weights.

Results: Out of the 56,192 diabetic patients, 12 had no DCC, 28% had at one DCC, and 28 % had â‰¥3 DCCs. The multivariable adjusted analyses suggest that across all SES indicators and in both males and females, individuals with lower SES had greater odds of DCC compared to individuals with higher SES. The associations of SES indicators with DCC were found to be stronger among females than males.

Conclusions: Study findings suggest strong social status and gender patterns in DCC. Identifying population groups with poor social status and how social status is conditioned by sex may be useful for informing interventions aiming to improve chronic disease comorbidity at the population level.

SESSION G: APPRECIATING THE CONTRIBUTION OF ROBERT SCHOENI

Sept 22 1:40 p.m. – 3:20 p.m.

Chair: Christine Himes

25. COMPRESSION OR EXPANSION OF MORBIDITY AT OLDER AGES IN SINGAPORE?

Abhijit Visaria, Angelique Chan, Yasuhiko Saito, Chi-Tsun Chiu, Stefan Ma, and Rahul Malhotra

We study whether recent data in Singapore is indicative of expansion of morbidity compression of morbidity, or a state of dynamic equilibrium, using two representative longitudinal studies of community-dwelling older adults aged ¥60 years: PHASE in 2009, 2011, and 2015, and THE SIGNS Study, in 2016-2017 and 2019. Morbidity was defined as functional limitations (measured as any health-related difficulties in activities of daily living (ADL) or instrumental ADLs), vision impairment, and hearing impairment (both measured as self-rated fair, poor, or no vision/hearing, compared to good, very good or excellent vision/hearing). We used Stochastic Population Analysis for Complex Events to estimate and compare the percentage of life expectancy (LE) expected to be spent at older ages in each of the three morbidities between the two cohorts. We find compression of functional limitations (for example, % of LE at age 60 with functional limitations: 15.6% [95 CI: 13.3-17.9] in the later cohort compared to 19.2% [17.5-21.0] in the earlier cohort), but an expansion at age 60 of vision impairment (30.2% [27.7-32.8] compared to 25.3% [23.1-27.5]) and hearing impairment (23.8% [21.3-26.3] compared to 20.3% [18.5-22.0]). We also find differences by sex, ethnicity, and educational attainment. The findings suggest that Singapore may be experiencing dynamic equilibrium in the health of older adults. While the compression of functional limitations is a sign of improved population health, the expansion of vision and hearing impairment could suggest greater awareness of sensory impairment and be addressed by programmes for early detection and treatment.

26. HOW TO EXPLAIN THE CONTAINED CHANGE IN THE USE OF CARE INSTITUTION IN THE FRENCH AGEING POPULATION BETWEEN 2008 AND 2015

Amélie Carrère, Emmanuelle Cambois, and Roméo Fontaine

The ageing of the population challenges the care organisation as the number of people requiring assistance is expected to increase for several years. At the same time in France, the number of beds in care institutions has been slow to change, as has the number of services offering assistance in people's homes.
Overall, the probability of living in institutions remained quite stable over time meanwhile it was anticipated to raise. To date, it has not been clearly described whether this unexpected small change was related to a change in the care needs of older people, to changes in care provision at home, which was encouraged in recent years, or to change in preferences.

To answer this question, we analyzed the probability of living in institution vs home for people aged 70 and over who have a need of assistance (difficulty in ADLs) in France at two points in time. We used two large population surveys ran in 2008-2009 and in 2014-2015. We examined the sociodemographic factors and functional profiles that increased or decreased the probability of living in institution for each period. We then used a decomposition method to assess how much of the change in the institutionnalisation probability over the period was due to the change in the frequency of the determining factors and/or to the change in the association between these factors and the risk of institutionalisation.

Our analysis concludes that the population ageing, that increased the probability of living in institutions has been compensated by the change in the family composition that has increased the individuals' human resources to be helped and cared at home by their relatives. We also found a slight impact of the change in the functional profile of the population towards a decrease in the need of institution. Over this period, we did not find a significant contribution of the association between the factors and the probability of living in institutions. We did not found evidence in the changes of practices over the period to explain the contained use of institutions. The policy for ageing in place has not shown significant results so far.

27. MULTISTATE ANALYSIS OF DISABILITY-FREE LIFE EXPECTANCY TRENDS IN ITALY

Margherita Moretti, Timothy Riffe, and Angelo Lorenti

BACKGROUND: During the last decades, Italy experienced a substantial increase in life expectancy. There is an ongoing concern as to whether this improvement has been associated with compression of morbidity. Using health expectancy estimates, it is possible to account simultaneously for both mortality and morbidity risks in a synthetic indicator. Disability is one of the most important and consistently measured dimensions of health to be considered in ageing societies.

OBJECTIVES, DATA AND METHODS: We aim to understand the evolution over time of disability-free life expectancy (DFLE) using the longitudinal version of EU-SILC for Italy, which design is based on a four-year rotational panel. We use data covering the periods 2004-2007, 2008-2011, and 2012-2015 to estimate transition probabilities among disability-free, disability, and death states, using discrete-time event history models, and derive truncated DFLE and life expectancy with disability between ages 50 and 80, using incidence-based multistate life tables.

PRELIMINARY RESULTS: Over the period under study, DFLE increased from 15.4 to 16.1 years among women and remained stable at 16.6 years for men, while life expectancy with disability remained rather stable at around 11 years for women and increased from 8.3 to 9.3 for men. In relative terms, the share of healthy life years slightly increased for women (from 58% to 59%) but decreased for men (from 67% to 64%).

NEXT STEPS: Further analysis will include confidence intervals (using non-parametric bootstrap) and estimates by educational level, covering the period 2004-2019. We will also present a decomposition of the changes over time in the multistate estimates.

28. RECENT TRENDS IN ADULT MORTALITY BY EDUCATION IN EUROPE: A COMPARATIVE ANALYSIS

Wilma J. Nusselder

Continued increases in life expectancy cannot longer be taken for granted. Some countries including in Europe report stalling life expectancy and increased mortality at working ages. This started already before the covid-19 pandemic. At the same time European countries witnessed educational expansion an increasing proportion of higher educated and decreasing proportion of lower educated persons. Changes in

the educational distribution may be the driver for mortality decline. Yet national trends may mask (even) less favorable trends of educational groups.

Our study focusses on recent developments in life expectancy between age 35 and 70 by gender for three educational groups. We focus on changes between around 2007 and 2017 using data of 4 countries with recent mortality data by education (Belgium, Denmark, Switzerland, and Finland), collected and harmonized by Erasmus MC/CHAIN. Before the REVES conference, more countries including in Central/Eastern Europe will provide data. Decomposition analysis is used to show the contribution of different causes of death (and age groups) to changes in life expectancy. This allows us to unmask unfavorable mortality trends of specific cause-of-death groups if present, even if these were compensated by declines from other causes. Trends and contributions will be compared between educational groups, genders and countries.

Preliminary results do not show increasing mortality, but gains in life expectancy are generally small. Particularly lower educated women show small increases in life expectancy, due to limited mortality reductions from other causes (total-CVD-cancer-external causes) and cardiovascular diseases. Results based on more countries and additional analyses will be presented at the conference.

SESSION H: THE GEORGE MYERS LECTURE

Sept 22 3:40 p.m. – 4:50 p.m.

Chair: Jean-Marie Robine

29. HEALTH LIFE EXPECTANCY: ON THE CO-EVOLUTION OF DATA, METHODS AND INSIGHTS

Presenter: Michael Wolfson, University of Ottawa, Canada

In its third of a century, REVES has brought together an international group of researchers to develop and explore arguably the most fundamental measure of population health – healthy life expectancy or HLE.* One of its leading lights was George Myers, after whom this lecture is named. I am honoured to be invited to give this lecture in his name.

The development and applications of HLE measures has involved creative exploitation of data which often were not designed for the purpose, and innovations in statistical and analytical methods. These developments have been driven by fundamental research and policy questions, including whether the health of a society's population is improving, how future prospects of population health are likely to be affected by population aging, and which kinds of health problems are imposing the greatest burdens on a population.

Importantly, the developments with regard to data and methods have co-evolved in the light of the questions being addressed. As in other scientific fields, there is a back and forth between the development of new modes of observation and new methods of analysis and theorizing. However, unlike astronomy or high energy physics, where the evolution of major investments in observation via new kinds of telescopes and particle accelerators is tightly coupled with new modes of analysis and theories, the data needs and funding for the HLE field of analysis are too often given lower priority.

This lecture examines the co-evolution of the data, methods, and insights associated with HLE, and concludes with suggested priorities for future developments.

Day 3: Friday, September 23

SESSION I: A DIVERSE LOOK AT INEQUALITIES AND DISPARITIES

9:00 a.m. – 10:30 a.m.

Chair: Rahul Malhotra

30. LIFE EXPECTANCY WITH AND WITHOUT PAIN ACROSS THE RURAL-URBAN CONTINUUM

Feinuo Sun, Zachary Zimmer, and Nicolas Brouard

Abstract: Previous literature has suggested that rural people in the U.S. suffer more from pain compared to their urban counterparts, perhaps due to the higher percentages of older people and workers in labor-demand occupations, as well as the structural disadvantages (e.g., more economic distress and less availability of healthcare infrastructure) of living in rural neighborhoods and communities. However, cross-sectional studies fail to capture the complexity of aging dynamics and consider mortality selection. Addressing these two challenges, this paper is among the first examining the rural-urban pain disparities with respect to the life expectancies with and without pain. Based on the 2000-2018 Health and Retirement Study (HRS) 2000-2018 data, we use the Interpolative Markov Chain software to compute and compare the years of life without pain, with milder pain, and with severe pain for people live in rural, suburban, and urban areas and the remaining years of life for people with different pain states. The total sample contains 29,314 respondents who are 51 years and older. The results show that people living in rural areas live significantly shorter years of life without pain and similar years of life with milder or severe pain than people living in urban and suburban areas, and this finding is consistent for both females and males while the rural-urban disparities in life without pain are larger for males than females. In addition, people with pain expect fewer years than people without pain, and this is consistent for both females and males in all areas. However, the harm of pain in shortening the expected life is particular large for rural females than other groups.

31. HEALTH LIFE EXPECTANCY BY ETHNICITY IN CHILE

Moises H. Sandoval, Marcela Alvear Portaccio, and Cecilia Albala

Background: Differences in total, healthy and unhealthy life expectancy have been well established in Chile. This has been observed for the total population, by sex and by socio-economic status. However, the existence of ethnic differences in population longevity is unknown Objective: to estimate total, healthy and unhealthy life expectancy among Mapuche (largest indigenous group) and non-Mapuche older adults (≥60 years) in Chile.
Method: we constructed abbreviated mortality tables according to ethnicity by applying indirect demographic methods to census information (2017). Then, from the Demographic, Ageing and Health Survey (EDES) conducted in 885 subjects (430 Mapuche, 455 non-Mapuche) we obtained the prevalence of disability. Using Sullivan's method, we estimated healthy and unhealthy life expectancy by ethnicity. Disability was defined as the unhealthy state, evaluated through the methodology suggested by Albala et al. (2004).

Results: At 60y, the total life expectancy of non-Mapuche is 7 years longer compared to Mapuche (23.9 vs. 17.1 years respectively). The difference narrows to 1.7 years at age 85'. The proportion of disability-free life years is higher for non-Mapuche (2.2, 3.9 and 3.0 times higher at 70, 80 and 90 years respectively). In contrast, the percentage of life living with disability is higher for Mapuche (e.g., 84.3% vs. 61.4% at age 80).

Conclusion: This is the first study addressing inequities in healthy life expectancy between the Mapuche ethnic group and non Mapuche population, reflected in lower life expectancy, lower healthy life expectancy and higher disabled life expectancy in Mapuche when compared with no Mapuche population.

32. SEX DIFFERENCES IN CANCER-FREE LIFE EXPECTANCY: IMPACT OF SMOKING, OBESITY AND PHYSICAL INACTIVITY

Alessandro Feraldi, Cristina Giudici, and Nicolas Brouard

We measured sex-specific total life expectancy, cancer-free life expectancy, and years spent with cancer according to the (co-) occurrence of three behavioural risk factors, such as smoking, obesity and physical inactivity and we examined the differences between women and men in the United States. Data were from 16,452 individuals (6,835 men and 9,617 women) aged 50 and older from the US Health and Retirement Study from 2008 to 2018. Life expectancies were estimated by Interpolated Markov Chain (IMaCh) software for each combination of smoking (never or former vs current), obesity (body mass index <40 vs >40), and physical inactivity (vigorous physical activity for at least two days a week vs less than two), controlling for education. Risk factors were associated with shorter total and cancer-free life expectancy in both women and men and smoking had the largest effect on cancer-free life expectancy. People who were smokers at age 55 could expect to live less than people with no risk factors (-6.4 and -5.3 years for women and men, respectively) as well as obese people (-5.1 and -2.9 years for women and men, respectively) and physically inactive (-6.3 and -4.7 years for women and men, respectively). Compared to men aged 55 with one risk factor, women in the same group could expect to live between 1.8 and 3.2 years more without cancer. Sex differences decreased at older age. The (co-) occurrence of behavioural risk factors significantly reduces the total and cancer-free life expectancy advantage of women with respect to men.

33. FUNCTIONAL LIMITATION AMONG OLDER ADULTS: EXPLORING DIFFERENCES BETWEEN MIDDLE-AND-HIGH-INCOME COUNTRIES

Shane D. Burns, Jennifer A. Ailshire, and Eileen Crimmins

Functional limitation refers to bodily restrictions, while disability is difficulty participating in personal and social activities. Both are prevalent among older adults, especially women. Though close distinctions between functional limitation and disability can blur the line between these two phenomena. Unlike disability, global comparisons of functional limitation, particularly by gender, remain unclear. Such research can elucidate contextual differences that precede the environmental influence of disability. Using logistic regression with 2018 nationally representative data (n=159,573), we investigate odds of reporting functional limitation among older adults (ages 50-89) from eight middle- and high-income countries/regions: United States, India, China, Mexico, Northern Europe, Southern Europe, Eastern Europe, and Western Europe. Our findings suggest that, compared to respondents in the United States, reports of functional limitation were significantly lower in most countries/regions. However, the impact of gender differed by country/region; specifically, women in India, China, Mexico, and Northern Europe all reported significantly greater odds of functional limitation than men in the United States. These findings highlight that, much like disability, functional limitation differences among older adults are informed by national and gendered contexts.

SESSION J: STUDIES OF METHODOLOGICAL INTEREST

Sept 23 10:50 a.m. – 12:20 p.m.

Chair: Jennifer Ailshire

34. UNDERSTANDING CAUSE-OF-DEATH CONTRIBUTIONS TO LIFESPAN VARIATION

Iñaki Permanyer, and Serena Vigezzi

We present a new method to decomposes levels and changes in lifespan variation into additive cause-specific contributions. We further break down each contribution into three components for each cause of death: the Inequality component, i.e. the extent of inequality in the age-at-death distribution of the specific cause; the Prevalence component, i.e. the share of death attributable to the specific cause; the Mean component, i.e. the mean age at death associated with the specific cause. This Inequality-Prevalence-Mean (IPM) method provides an exact decomposition of the levels and changes in lifespan inequality. We use data from the HMD and WHO and apply the IPM decomposition to 19 European countries, considering variance levels in 2000 and 2010 and changes between these two years. We find that the most prevalent causes (e.g. circulatory diseases and neoplasms) contribute the most to the levels of lifespan variation, but that less prevalent causes (e.g. external deaths) also contribute significantly. Looking at changes between 2000 and 2010, we uncover considerable differences in the direction and magnitude of each IPM component by cause, sex and country, with the Mean component consistently explaining time changes the least. We will continue these analyses by extending our time frame back to the 1980s and after 2010. In this way, we hope to offer new insight, not just into the contributions of causes of death to the levels and trends of lifespan variation in European countries, but more specifically into the reasons behind these contributions.

35. THE NECESSITY, FEASIBILITY, AND UTILITY OF USING THE MINIMUM EUROPEAN HEALTH MODEULE TO MEASURE GENERIC HEALTH

Patrick Lazarevic

Health is a fundamental aspect of many scientific disciplines and its definition and measurement is the analytical core of many empirical studies. Comprehensive measures of health, however, are typically precluded in survey research due to financial and temporal restrictions. Self-rated health (SRH) as a single indicator of health, on the other hand, exhibits a lack of measurement invariance by age and is biased due to non-health influences. In the three-item Minimum European Health Module (MEHM), SRH is complemented with questions on chronic health conditions and activity limitations, thus providing a compromise between single indicators and comprehensive measures. Using data from the German Ageing Survey (2008 & 2014; n = 12,037), we investigated the feasibility to combine the MEHM into a generic health indicator and judged its utility in comparison to SRH as a benchmark. Additionally, we explored the option of an extended version of the MEHM by adding information on multimorbidity and the presence and intensity of chronic pain. Our analyses showed that both versions of the MEHM had a good internal consistency and each represented a single latent variable that can be computed using generalized structural equation modeling. The utility of this approach showed great promise as it significantly reduced age-specific reporting behavior and some non-health biases present in SRH, promising interesting applications for healthy life expectancy estimation. To further attenuate systematic response behavior, this approach could be extended by priming the meaning of health in SRH by changing the question order and the use of MG-MIMIC-modeling.

36. ARE INTERNATIONAL COMPARISONS OF HEALTHY LIFE YEARS AFFECTED BY COUNTRY-SPECIFIC HEALTH – strange code

Paola Di Giulio, Marc Luy, and Yuka Minagawa

A cross-national comparison of self-reported health outcomes might be biased by differences in health reporting styles across populations, known as differential item functioning (DIF). We test this issue by using the survey data on anchoring vignettes and re-estimating Healthy Life Years (HLY) at age 50, the European Union (EU)'s key indicator of the health of its aging population, for eight European countries. The global activity limitations indicator (GALI), the underling measurement of HLYs, is taken from the 2005 EU Statistics on Income and Living Conditions (EU-SILC). Vignettes are from the 2004 Survey of Health, Ageing and Retirement in Europe (SHARE), and period life tables come from the Human Mortality Database (HMD). Using the information of health vignettes, we first compute DIF-adjusted prevalence of activity limitations and then use it as the input into life tables. Results based on the Sullivan method reveal discrepancies in HLY with and without the adjustment for DIF. We found that DIF-adjusted HLY were lower than original HLY for Italy, the Netherlands, and Belgium, while the opposite was observed for Spain and Sweden, where DIF-adjusted HLY were higher. There was no change in HLY for Germany and France, and the results differed between men and women for Greece. Our results indicate that international comparisons of health outcomes may indeed be affected by DIF. The EU is tracking trends in HLY to monitor the progress of its public health programs, but more attention should be directed toward addressing the differences in health reporting behavior between countries.

37. VALIDITY OF THE GLOBAL ACTIVITY LIMITATION INDICATOR (GALI) IN DEVELOPING COUNTRIES IN ASIA

Choy-Lye Chei, Grace Cruz, Nguen Cong Vu, and Yasuhiko Saito

The Global Activity Limitation Indicator (GALI) is a single-item measure of functional decline, it is widely used in Europe but it has never been validated in developing countries in Asia. The aim of this study was to validate the GALI among older adults in the Philippines and Viet Nam. Data for the study are from the baseline survey of the Longitudinal Study of Ageing and Health In the Philippines (LSAHP) and the Longitudinal Study of Ageing and Health in Viet Nam (LSAHV). Both surveys are nationally representative samples of older adults aged 60 and over and conducted in 2018-2019. While LSAHP covered 5,985 older adults (response rate: 94%), LSAHV covered 6,050 older adults (response rate: 96%). In order to examine the validity of GALI, we will compare it with other measures of disability and health such as ADL, IADL, mobility difficulties. Logistic regression will be used to examine the association between GALI and other measure of disability and health. We will adjust for the effects of age (years) and sex. The probability of being classed as limited or not limited for GALI will be estimated for each category or value of the measures of interest. In the Philippines, 56.9% of older adults reported limitation in daily activities. In Viet Nam, 56.4% of older adults reported limitation. The prevalence of limitation in both countries were very high compared to the prevalence rates reported in other developed Asian countries.

END OF MEETING

PARTICIPANT INFORMATION

Last Name	First Name	Affiliation	Email
Ailshire	Jennifer	Center for Biodemography and Population Health and the Andrus Gerontology Center at the University of Southern California	ailshire@usc.edu
Almeida Calazans	Júlia	CED – Centre for Demographic Studies, Barcelona	juliaalmeidacalazans@gmail.com
Angos	Avelin	UdeM - CAnD3	avelin.peguy.angos@umontreal.ca
Brouard	Nicolas	French Institute for Demographic Studies (INED)	brouard@ined.fr
Brown	Maria	Syracuse University	mbrown08@syr.edu
Burns	Shane	School of Gerontology, Research Associate	shanebur@usc.edu
Bushnik	Tracey	Statistics Canada, Senior Research Analyst	tracey.bushnik@statcan.gc.ca
Cambois	Emmanuelle	French demographic institute INED	cambois@ined.fr
Chungkham	Holendro Singh	Applied and Official Statistics Unit at the Indian Statistical Institute, North-East Centre	holendro.chungkham@su.se
Courtney-Wolfman	Leora	Vienna Institute of Demography	leora.courtney@oeaw.ac.at
Deeg	Dorly	Amsterdam University Medical Centers	djh.deeg@amsterdamumc.nl
di Lego Goncalves	Vanessa Gabrielle	Austrian Academy of Sciences Vienna Institute of Demography Dr. Ignaz Seipel-Platz 2	Vanessa.DiLego@oeaw.ac.at
Dutton	Daniel	Dalhousie University, Department of Community Health and Epidemiology	daniel.dutton@dal.ca
Duynisveld	Amber	MSVU - CAnD3	Amber.Duynisveld@msvu.ca
Farina	Mateo	Andrus School of Gerontology, University of Southern California	mfarina@usc.edu
Feraldi	Alessandro	Via Alfonso Borreli 4, 90139, Palermo (Italy)	alessandro.feraldi@uniroma1.it
Herm	Anne	Tallinn University | TLU · Estonian Institute for Population Studies	anne.herm@tlu.ee
Himes	Christine	Illinois Institute of Technology	chimes@iit.edu
Högnäs	Robin	Stockholm University, Researcher	robin.hognas@su.se
Hopper	Shawna	SFU - CAnD3	shawna_hopper@sfu.ca
Keefe	Janice	Mount Saint Vincent University	Janice.Keefe@msvu.ca
Kumar	Amit	Unaffiliated	amit.kumar@nau.edu
Lazarevic	Patrick	Vienna Institute of Demography	Patrick.Lazarevic@oeaw.ac.at

Luy	Marc	Vienna Institute of Demography of the Austrian Academy of Sciences	mail@marcluy.eu
Lynch	Scott	Duke University, Departments of Sociology and Family Medicine and Community Health	sml2@duke.edu
Malhotra	Rahul	Duke-NUS Medical School	rahul.malhotra@duke-nus.edu.sg
Moretti	Margherita	Sapienza University of Rome, Rome	margherita.moretti@uniroma1.it
Mpinda	Isaac	UWO -CAnD3	impinda@uwo.ca
Muhammad	Ali	Geriatric Medicine Research, Nova Scotia Health Authority	dram1960@gmail.com
Mulhorn	Kristine	Drexel University | DU · Department of Health Administration	kam426@drexel.edu
Ngadande	Exaucé	UdeM -CAnD3	exauce.ngadande@umontreal.ca
Nice	Charlotte	Dalhousie University	ch897608@dal.ca
Nusselder	Wilma	Erasmus MC | Erasmus MC · Department of Public Health	w.nusselder@erasmusmc.nl
Ojima	Toshiyuki	Chair and Professor of Department of Community Health and Preventive Medicine, Hamamatsu University School of Medicine, Japan	ojima@hama-med.ac.jp
Osuna	Margarita	University of Southern California	margarmo@usc.edu
Poulain	Michel	Tallinn University | TLU · Estonian Institute for Population Studies	michel.poulain@uclouvain.be
Quach	Jack	Rehabilitation Research Supervisor, Dalhousie University, Geriatric Medicine Research	jq@dal.ca
Reynolds	Sandra	Unaffiliated	sandyhoney2003@yahoo.com
Robine	Jean-Marie	Institut National De La Sante Et De La Recherche Medicale	robinejm@gmail.com
Saito	Yasuhiko	Economics, Nihon University, Tokyo, Japan	saito.yasuhiko@nihon-u.ac.jp
Sakkeus	Luule	Estonian Institute for Population Studies, Tallinn University	luule.sakkeus@tlu.ee
Sandoval	Moisés H.	Unidad de Nutrición Pública, INTA - Universidad de Chile	msandoval@inta.uchile.cl
Sun	Feinuo	GACI	feinuo.sun@msvu.ca
Uddin	Jalal	Dalhousie University, PhD student	jalal.uddin@dal.ca
van Raalte	Alyson	Max Planck Institute for Demographic Research, Konrad-Zuse Str. 1A · 18057 Rostock	vanraalte@demogr.mpg.de

Vigezzi	Serena	Interdisciplinary Centre on Population Dynamics, PhD student	sevi@sam.sdu.dk
Visaria	Abhijit	Centre for Ageing Research and Education, Duke-NUS Medical School	abhijit@duke-nus.edu.sg
Wolfson	Michael	University of Ottawa	Michael.Wolfson@uOttawa.ca
Yurris	Christopher	McGill - CAnD3	christopher.yurris@mail.mcgill.ca
Zhang	Yuan	Carolina Population Center, University of North Carolina	yuan_zhang@unc.edu
Zimmer	Zachary	MSVU, GACI	zachary.zimmer@msvu.ca

CONFERENCE ORGANIZERS

Zachary Zimmer, Mount Saint Vincent University
Renee Field, Mount Saint Vincent University

ADIVSORY COMMITTEE

Marc Luy, Vienna Institute of Demography of the Austrian Academy of Sciences
Saito Yasuhiko, Economics, Nihon University, Tokyo, Japan
Carol Jagger, Newcastle University
Mary Beth Ofstefal, Population Studies Center, University of Michigan
Susan Kirkland, Department of Community Health & Epidemiology,
Faculty of Medicine at Dalhousie University
Jean-Marie Robine, Institut National De La Sante Et De La Recherche Medicale
Eileen M Crimmins, AARP Chair in Gerontology at the USC Leonard Davis School of Gerontology
Chi-Tsun Chiu, Institute of European and American Studies, Academia Sinica in Taiwan
Nicolas Brouard, Director of Research Emeritus, French Institute for Demographic Studies (INED)
Miles Taylor, Director, Pepper Institute on Aging and Public Policy Co-Director, Aging Research on
Contexts, Health and Inequalities, Florida State University
Jennifer Alishire, University of Southern California