Program

Forenoon session

Coffee and Registration - Loke Lounge
08:00 – 08:50

Welcome note - Room: Loke
9:00 – 9:10
Sven Oskarsson, Chair SWE-REG

Key-note speech I - Room: Loke
9:10 – 10:00
Key-note speaker: Naja Hulvej Rod, Professor, Head of Section of Epidemiology, Department of Public Health, University of Copenhagen
Title: "Health complexity and big data: examples from the Danish Life Course Cohort Study".
Abstract:
Disease processes are multifactorial and highly complex, and there is a need to continue to push the research boundaries beyond single-factor data analysis and extend the research methodology framework to incorporate real-world complexities. Thus, it is important to unravel the interdependency between the multiple factors in complex systems, so that manipulation of a single or a few modifiable factors can be targets of feasible interventions that eventually will alter disease risk at in the population. Flexible modelling methods (e.g., AI-based methods) combined with large data materials from registers, biobanks, population studies, wearables and web sources provide us with a golden opportunity to rethink traditional methods for epidemiological research.
Electronic health records and information from nationwide population registers allow us to address patterns of life time exposures and disease trajectories in an unprecedented way. It also carries hopes for improved disease prediction that will allow for early intervention or even prevention of disease onset. Empirical examples will be drawn from the Danish Life course Cohort (DANLIFE) study, which is a nationwide, register-based, life-course cohort that is based on comprehensive and continuously updated information on social adversity and health from the Danish registers. These unique data from a large, unselected population provide an unprecedented resource for testing life-course mechanisms, such as sensitive periods and the accumulation of various stress factors across childhood, adolescence, and young adulthood. Ultimately, this knowledge will help us identify points of intervention and develop more effective and targeted treatment and health interventions related to health inequality.

Coffee break with poster vernissage (poster list at end of program) - Loke lounge
10:00 - 10:20

Oral Session 1 - Room: Loke
Theme: LONG-TERM, LIFE-COURSE AND INTERGENERATIONAL STUDIES I
Moderator: Annika Rosengren

Oral session 1.1
10:20 – 10:40
Title: Geographic immobility over three generations - the role of ethno-linguistic identity and geographical context
Speaker: Andrea F. Monti, Faculty of Education and Welfare Studies, Department of Sociology, Stockholm University and Åbo Akademi
Abstract:

Research concerning internal migration increasingly acknowledge family members also outside the household as important factors in (im)mobility decisions. Through multi-generational support exchange and location specific capital, older generations and familiar environments have shown to constitute strong geographical attractors. However, less is still known about (im)mobility across generations, whether it is transmitted between generations and under what conditions. We examine the intergenerational transmission of geographical immobility, focusing on differences by ethno-linguistic affiliation and regional characteristics. Using Finnish register data spanning over five decades, we provide an overview of regional immobility patterns across three generations. We then analyse who is more likely to live in one's birth region also as a grown up. Finland offers an interesting case due to its official recognition of two languages, with historically different mobility patterns across ethno-linguistic groups. If immobility runs across generations it has great implications, as it would bear impact on local-specific ties, networks of social support, access to educational opportunities and specialized job markets. If in addition generational immobility differs across regions or ethno-linguistic affiliations, this will not only affect local language use but be an influential factor behind different living conditions between groups. Preliminary findings show notable differences between Swedish and Finnish speakers, with larger shares of Swedish speakers living in municipalities and regions of their ancestors. Additionally, having local ancestral family ties is associated with higher likelihoods of staying in place. This association is further found to be stronger within the minority group.

Oral session 1.2
10:40 – 11:00
Title: Adulthood outcome trajectories after childhood adversity: a longitudinal study of sex/gender differences in resilience and vulnerability in a Swedish birth cohort
Speaker: Lisa Bornscheuer, Department of Public Health Sciences, Stockholm University
Abstract:

Background: Childhood adversity is associated with an increased risk of disadvantage across
the life course, including, among others, health and socioeconomic outcomes in adulthood. Despite this, most individuals navigate adversity avoiding long-term negative effects – a process that is commonly referred to as resilience. To date, little research is available on what differences there are between men and women in terms of longitudinal outcome patterns after experience of childhood adversity.
Method: We used data from a Swedish 1953 birth cohort (n=13,692). As a first step, we applied ordinal regression in order to test for associations between exposure to childhood adversity and cumulative vulnerability in adulthood. To explore sex/gender as moderator of the relationship, we added an interaction term to the model. In a second step, we ran group-based multi-trajectory modelling in the subset of the sample that had been exposed to childhood adversity (n=929). Lastly, we ran a multinomial regression analysis using the group membership variable from the trajectory modelling as outcome and sex/gender as

independent variable. Preliminary discussion: We could replicate previously observed associations between childhood adversity and adulthood disadvantage in this general population sample, relying on prospectively collected data. In the full sample, women were significantly more likely to have a higher vulnerability score when compared to men. In the smaller sub-sample, sex/gender was not significantly associated with longitudinal outcome patterns, but we saw a slight trend for women to be more economically resilient when compared to men.

Oral session 1.3
11:00 – 11:20
Title: Studying Healthy Ageing in Long Lived Families: A Register and Historical Family Data Approach
Speaker: Ingrid van Dijk, Centre for Economic Demography, Department of Economic History, Lund University
Abstract:

Why do some families reach advanced age in good health, whereas in other families disease and mortality are common at much earlier ages? We study members from long-lived families, characterized by multiple generations of exceptional survival and health up to very high ages and seek to establish disease patterns in these families. We use a unique combination of sources: historical parish registers for a region in Scania, Sweden (SEDD) linked to modern national register data (Statistics Sweden), and the Netherlands Leiden Longevity Study, containing similar data on long-lived families. Using historical records, we identify members of long-lived families by considering life span of multiple generations of relatives in comparison to their birth cohort. We calculate the share of long-lived ancestors weighted by genetic distance (LRC score). We study chronic disease trajectories using records of first hospital admission and the main diagnosis (ICD-code) as well as data from general practitioners. Individuals are followed prospectively over 20 years.
Preliminary results show that long-lived ancestors (LRC score) are associated with a lower hospitalization risk (HR=0.58). Similarly, with every unit increase in LRC score the risk of hospitalization due to metabolic diseases and malignancies decreases by 60% (P=.484·10-3) and 39% (P=4.43·10-2). Moreover, the risk of death decreases with 56% (P=1.72·10-3). We conclude that an increasing number of long-lived ancestors is strongly associated to later disease incidence and lower mortality. Studying the mechanisms of healthy ageing in long-lived families can therefore provide further insights into the determinants of healthy ageing over time. Future research will focus on survival to infectious disease as an indication of immune robustness, and the role of socioeconomic characteristics.

Oral session 1.4
11:20 – 11:40
Title: A 20-year study of atrial fibrillation-related stroke and uptake of novel oral anticoagulant drugs in the Swedish total older population
Speaker: Mozhu Ding, Unit of Epidemiology, Institute of Environmental Medicine, Karolinska Institutet
Abstract:

Background: Great efforts have been made to improve stroke prevention in atrial fibrillation (AF) patients, but how these efforts have affected AF-related stroke burden on a population level is unknown. We aimed to examine temporal trends in the incidence of AF-related stroke, if it varied by use of novel oral anticoagulant drugs (NOAC), and if the risk of stroke associated with AF changed over time.
Method: We used data from the Swedish total population aged ≥70 years, which is linked to the Patient Register and Prescribed Drug Register.
Results: While incidence rates (IR) of all strokes declined during 2001-2020, IR of AF-related stroke remained stable between 2001-2010, but showed a consistent decline between 2010-2020. Individuals with new-onset AF diagnosed in 2009-2011, 2012-2014, and 2015-2017 were respectively 13%, 30%, and 46% less likely to develop 3-year incident stroke,

compared to those diagnosed in 2006-2008. Meanwhile, the use of NOAC among AF patients increased
substantially after 2012. Adjusting for NOAC use partly explained the decreasing risk of stroke among AF patients in 2012-2014 and 2015-2017. However, by the end of 2020, 24% of all first-ever strokes were still AF-related.
Conclusion: Although overall stroke incidence has declined in the last 20 years, the decline in AF-related stroke incidence became apparent only from 2010 onwards, and is partly explained by the increasing use of NOAC. Yet by the end of 2020, still one-fourth of all first-ever strokes were AF-related, which represents a great potential for future gains in stroke prevention among AF patients.

Oral session 1.5
11:40 – 12:00
***Title*:** Toxic Metal Injustice? Socioeconomic Status at Birth and Proximity to Airborne Contamination
Speaker: Linuz Aggeborn, Department of Government; Uppsala Center for Labor Studies and Department of Economics; Uppsala University - Uppsala Center for Fiscal Studies
Abstract:
We study airborne levels of three toxic metals -- arsenic, lead, and mercury -- and ask whether geographical closeness to contamination of these metals is unequally distributed within the population of newborn children. We answer this question by applying registry data from Sweden and data on airborne pollution for the years 1992--2014. Exposure to arsenic, lead, and mercury has previously been linked to negative health effects including worse cognitive development. However, we find no evidence that closeness to contamination is associated with socioeconomic status at the place of residence at birth. This leads us to conclude that environmental injustice with regard to mercury, lead or arsenic contamination is negligible. The likely explanation is that contamination is not visible enough, and therefore not sufficiently salient, to result in residential sorting.

Oral Session 2 - Room: Tor 1
Theme: USE OF REGISTERS IN CLINICAL RESEARCH
Moderator: Jesper Lagergren

Oral session 2.1
10:20 – 10:40
***Title*:** AI-support to diagnose patients with breathing difficulties in the emergency department
Speaker: Ellen Tolestam Heyman, Department of Emergency Medicine/Varberg, Halland Hospital/Region Halland
Abstract:
Background:
Breathing difficulties (dyspnea) represents 5-10% of all adult emergency department (ED) visits. Acute heart failure (AHF), exacerbation of chronic obstructive pulmonary disease (COPD-E) and pneumonia are the three most prevalent diagnoses. About 20% of elderly, dyspneic patients are being misdiagnosed, which is associated with increased mistreatment and mortality. Today, there are no scores with or without artificial intelligence for diagnosing dyspnea.
Methods:
A population-based register study was performed, with visits in Region Halland´s two EDs. Inclusion criteria was adults with main complaint dyspnea. Study period was 1st of July 2017 – 12th of December 2019.The outcome to predict was the three most prevalent diagnoses. An adjudicating committee with two emergency medicine specialists reviewed 1 070 ED visits to ensure good diagnostic quality. Prediction time was after triage, i.e. after an initial assessment by a nurse. The aim was to include as much routinely collected data as possible from the whole regional health care system, five years back in time from the index ED visit.

"Events" were created by tagging each piece of data with a timestamp. The approach was enabled by Region Halland´s data warehouse and analysis platform.
Results:
In total, 10 315 ED visits by 6 967 unique patients were included. The outcomes AHF, COPD-E and pneumonia constituted 14.9%, 13.3% and 13.1% of the cohort. Total number of events in the cohort was more than 18 million. Mean number of events per visit was more than 1 700.The data will be explored by different machine learning techniques.

Title: Can register data predict treatment outcomes among rheumatoid arthritis patients treated with TNFi?
Speaker: Serkan Arda Yilal, Division of Clinical Epidemiology, Department of Medicine, , Solna, Karolinska Institutet
Abstract:
Background: Rheumatoid arthritis (RA) is a chronic inflammatory disease where the immune system attacks the joints. Effective disease-modifying anti-rheumatic (DMARD) treatment is important to prevent irreversible joint destruction, but as not all patients respond to treatment and prediction models are needed.
Methods: We linked the Swedish Rheumatology Quality (SRQ) register to various Swedish nationwide registers and retrieved data on demographics, RA clinical status and medical history before start of tumour necrosis factor inhibitor (TNFi) treatment. We aimed at predicting persistence to TNFi treatment at 1 year and employed a multimodal late as well as early fusion strategy using four different machine learning methods (elastic net, random forest, decision trees and XGBoost), ten-fold cross validation with area under the curve for the receiver operating characteristic (ROC-AUC) as performance metric.
Results: From SRQ, we identified n=11907 individuals with RA initiating TNFi as their first ever biological DMARD 2010-2020 (mean age 55.6 years, n=8334 (75.1%) women). At one year, n=6922 patients (62.3%) were persistent to TNFi. In the early fusion model, XGBoost performed best with a ROC-AUC of 0.625. In the late fusion models, the ROC-AUCs were lower per modality (0.568-0.614), but performance increased in the fusion step to 0.624.
Discussion: Prediction modelling of treatment outcomes in RA is difficult. Register data slightly improved upon prediction of persistence to TNFi treatment compared to using only clinical data.
Conclusion: Early and late fusion strategies yielded similar prediction results. More advanced modelling strategies and data from modalities other than registers might further improve prediction.

Title: The association between SARS-CoV-2 and de novo hypertension during pregnancy
Speaker: Anne Örtqvist Rosin, Division of Clinical Epidemiology, Department of Medicine, Karolinska Institutet
Abstract:
Background: The suggested association between SARS-CoV-2 and de novo hypertension during pregnancy (HDP) may be due to bias. We aimed to further investigate this association, taking temporality and confounding into account.
Methods: The study included all pregnant women with a singleton birth after 22 gestational weeks in the Swedish Pregnancy Register and the Medical Birth Register in Norway between March 2020 and May 2022 (N=312,456). Dates of all PCR-verified SARS-CoV-2 tests and dates of diagnoses of HDP were collected from national health and surveillance registers. The association between SARS-CoV-2 and HDP was investigated using a stratified Cox proportional hazard model, with SARS-CoV-2 as time-varying variable. Thus, those with SARS-CoV-2 after onset of HDP were treated as unexposed. The model was

adjusted for background characteristics and stratified by date of conception, taking variation in baseline risks of SARS-CoV-2 and testing capacity during the study period into account.
Results: SARS-CoV-2 was not associated with an increased risk of HDP (adjusted HR 0.99, 95% CI 0.93-1.04). Further, no significant association was found when examining SARS-CoV-2 by trimester or for different calendar time periods corresponding to dominating virus variants.
Discussion: Compared to previous studies, this study took exposure-outcome temporality into account in order to avoid bias due to excess testing in the outcome group and immortal-time bias. Moreover, data is population-based and analyses are adjusted for a large set of possible confounders.
Conclusion: This population-based study did not find any evidence of SARS-CoV-2 being associated with an increased risk of HDP.

Oral session 2.4
11:20 – 11:40
Title: Clarithromycin use and risk of cardiovascular events among patients hospitalised with community-acquired pneumonia
Speaker: Simone Bastrup Israelsen, Department of Infectious Diseases, Copenhagen University Hospital – Hvidovre and CAUSALab, Unit of Epidemiology, Institute of Environmental Medicine, Karolinska Institutet
Abstract:
Background: The macrolide antibiotic, clarithromycin, is indicated to treat individuals with both community-acquired pneumonia and Helicobacter pylori infections. There is evidence to suggest that clarithromycin increases risk of cardiovascular events, but most previous studies are within those indicated for Helicobacter pylori, despite the rising burden of cardiovascular disease in those with pneumonia. Within a target trial framework, we aim to estimate the causal effect of dual therapy with clarithromycin and a beta-lactam compared with beta-lactam monotherapy on risk of cardiovascular events in individuals with pneumonia.
Methods: This is a multicentre register-based cohort study of >3,000 patients hospitalised with community-acquired pneumonia between 2017-2020 in Denmark. Individuals are eligible if they are ≥18 years, with no recent hospitalisation, no immunosuppression, and no contraindications to study medication. The primary outcome is a composite of major cardiovascular events, including myocardial infarction, stroke, or coronary revascularisation procedure within 90 days. Secondary outcomes include ventricular arrythmias and mortality. Inverse probability weighting based on baseline covariates is used to emulate randomisation. Analyses that estimate the observational analogues of the intention-to-treat and per-protocol effects are performed and risks, risk differences, and risk ratios are presented.
Discussion: In the absence of trial data, clinicians still need to decide how to best treat individuals with community-acquired pneumonia. This target trial emulation can assist in this clinical decision-making process.
Conclusion: Results from this study could inform future treatment guidelines in community-acquired pneumonia, reassessing the place for clarithromycin to cover atypical pathogens or by reconsidering its use among certain subgroups of individuals.

Oral session 2.5
11:40 – 12:00
Title: Osteoporosis medication is only prescribed to a small portion of older Swedes with a history of fragility fracture
Speaker: Stina Ek, Unit of Epidemiology, Institute of Environmental Medicine, Karolinska Institutet
Abstract:
Background: Fragility fractures among older adults is the most severe consequence of osteoporosis and associated with severe costs for patients and society. Pharmacological

secondary fracture prevention is effective and should be prescribed to individuals with osteoporosis according to national guidelines. However, undertreatment seem to remain and it is not clear if treatment differs between different sociodemographic groups.

Methods: We identified all individuals in Sweden aged 70 years and older between 1 January
2007 and 31 December 2020 who had experienced a fragility fracture within the past five years. Osteoporosis medications from the Prescribed Drugs Register were recorded per calendar year and included the medications: bisphosphonates, strontium ranelate, denosumab and parathyroid hormone.

Results: In recent years, between 8-17% of women with a fragility fracture have received osteoporosis medication, depending on age. Corresponding number for men is 5-9%. The proportion has increased over time for both men and women, except for 70–79-year-old women who had a decrease in prescription proportion.

Discussion: Prescription has increased among individuals with a fragility fracture over time but is still at low rates. During the study period, medications given on requisition - instead of by prescription – has increased considerably. Since requisition medication information is not available on an individual level, it is difficult to estimate the true proportion that receives osteoporosis medication.

Conclusion: Osteoporosis medication prescription is low among older adults with a fragility fracture, however, due to additional sources of medications it is not possible to estimate the magnitude of the issue and which groups might be more affected.

Oral Session 3 - Room: Tor 2
Theme: METHODOLOGICAL ISSUES, DATA QUALITY, NOVEL USE OF REGISTER DATA I
Moderator: Karin Modig

Oral session 3.1
10:20 – 10:40
Title: COVID-19 Research using a Novel Data Enclave: Lessons Learned from a United States Perspective
Speaker: Jessica Young, CAUSALab, Unit of Epidemiology, Institute of Environmental Medicine, Karolinska Institutet
Abstract:

Background
Because the United States does not have a universal healthcare system, electronic health records (EHR) are maintained by individual health systems. In attempts to enable COVID-19 research, the US National Institute of Health created the National COVID Cohort Collaborative (N3C) EHR, a database aggregating data from over 75 sites across the country. We conducted a data quality investigation to inform best practices for using these data for public health research.

Methods
Using N3C we identified adult patients hospitalized for COVID-19. We discuss how to appropriately define concepts of interest, highlight data quality considerations, and offer suggestions for researchers using data repositories for epidemiologic research.

Results
Only 22% of data partners had sufficiently high-quality reporting of key variables such as lab values related to COVID-19 severity. For drug exposures, dosage was missing for 89% of remdesivir records, and 41% of dexamethasone records. Dates for initiation and end of drug treatment were inconsistently reported.

Discussion
When working with large heterogeneous data repositories, it is prudent to consider which data partners are appropriate for the analysis at hand. Limiting data to include only partners with high quality reporting may be necessary for internal validity. Drug treatment studies

requiring detailed dosing and timing information will need to further limit their population to data contributors with reliable dosage information and dates of exposure.
Conclusion
With increasing availability of large databases combining multiple sources, we as researchers
must think carefully about the quality of the data, and how to responsibly use these data for research.

Oral session 3.2
10:40 – 11:00
Title: Investigating missing mechanisms on the example of number of teeth in the Dental Health Register
Speaker: Henrike Häbel, Department of Learning, Informatics, Management and Ethics, Karolinska Institutet

Abstract:
Background: Number of teeth is often used as a measure for oral health. What does it mean if this information is missing and, for instance, more likely for individuals suffering from dementia or with low socio-economic status?
Methods: I will give a short introduction to types of missing data, and how to identify the underlying mechanism. On the example of studying oral complications in an older population with and without dementia, I will present and compare three widely used statistical methods on how to deal with missing data, namely 1) excluding individuals with incomplete data from the study, 2) including a missing-data-category, and 3) imputation. For all examples, dental data were obtained from the Dental Health Register (DHR), the National Board of Health and Welfare. The DHR was established in July 2008 and contains data on dental procedures and dental health status under the National Dental Care Benefit Scheme. Data from the DHR were linked to data from the Longitudinal Integrated Database for Health Insurance and Labour Market Studies (LISA and the Swedish Dementia Registry (among others).
Discussion and conclusion: Before excluding individuals with missing number of teeth, it should be made sure that the missingness was non-informative. Including a missing-data-category can be an easy method for dealing with informative missingness but the number of teeth needs to be categorized and cannot be analyzed as a continuous variable. If the latter is essential to the study, the mechanism needs to be identified and incorporated in the imputation routine.

Oral session 3.3
11:00 – 11:20
Title: New approach to study the over-coverage in population registers.
Speaker: Eleonora Mussino, Department of Sociology, Stockholm University
Abstract:
Background:
The need for evidence-based policy built on rigorous research has probably never been greater than throughout the COVID-19 pandemic, which has exposed the need for accurate population data. Recent findings, however, have raised concerns regarding the quality of population registers due to the increase of over-coverage. Over-coverage is introduced through individuals whose death or migration out of the country is not registered. Not only does it give biased estimates of the size of the total population and of subgroups, it also affects measures such as average income, fertility, health and mortality - measures that underpin most policy decisions. Over-coverage is found to be more pronounced among migrants. Despite general acknowledgment by government agencies and researchers that over-coverage might induce serious bias into population estimates, there is no common understanding on how to deal with over-coverage in population estimates and social science research.

Methods

This paper examines and discusses ways of improving current estimation methods using Swedish total population register data. In particular, using capture and recapture models we aim to derive a new and replicable indicator of over-coverage that can be applied in different context to correct for this problem.

Title: Coverage of the Swedish Rheumatology Quality register: to what degree are b/tsDMARDs treatments for spondyloarthropaties recorded?
Speaker: Daniela Di Giuseppe, Division of Clinical Epidemiology, Department of Medicine Solna, Karolinska Institutet
Abstract:

Background: The Swedish Rheumatology Quality register (SRQ) is a major source of information on clinical data for patients treated with biological and targeted synthetic disease-modifying anti-rheumatic drug (b/tsDMARD) for rheumatic diseases. Data from SRQ are fundamental for research on drug effectiveness and safety. Objectives: To understand to what degree patients with psoriatic arthritis (PsA) and spondyloarthritis (SpA) treated with b/tsDMARD treatments are recorded in the SRQ. Methods: We identified all dispensed oral or subcutaneously administered b/tsDMARDs, approved for use in PsA or SpA, from the Swedish Prescribed Drug register (PDR, with 100% coverage) in 2018-2019. We required the patients who received the dispensation to have at least one ICD code for PsA (L405, M070, M071, M072, M073) or SpA (M45.9, M46.1, M46.8, M46.9) as main diagnosis from a visit to a rheumatology or internal medicine (IM) unit in the National Patient Register (NPR) before dispensation, but no main diagnosis of rheumatoid arthritis (ICD code: M05, M06 (excluding M06.1 and M06.4), M12.3). Furthermore, to limit the assessment to patients with contemporary contact with the specialized rheumatology care, we also required at least one visit with a PsA or SpA main diagnosis from rheumatology/IM during 2017-2019. We then checked if the patients and their treatments were registered in SRQ. Results: In 2018-2019, a total of 7922 unique b/tsDMARD prescriptions had been dispensed to 6311 patients with PsA, having contemporary contact with the specialized rheumatology care. Of them, 5676 patients were registered in SRQ (91.1%), of which 94.4% with a PsA diagnosis and 96.2% with at least one registration of a b/tsDMARD. The coverage of the single drugs in SRQ, as compared to dispensations in PDR, ranged between 55.2% to 94.3% (69% to 96.1% considering only patients also in SRQ), with the tumor necrosis factor inhibitors (TNFi) having the best coverage (81.6-94.3%) (Table 1). Regarding SpA, 7129 unique b/tsDMARD prescriptions had been dispensed to 6001 patients. The coverage of the patients and the single drugs was even higher than the coverage for PsA, with 94.6% of the patients been registered in SRQ, and a range of coverage for the single drug between 57.9% to 92.6%.

Lunch with poster vernissage (poster list at end of program) - Loke lounge

Afternoon session

Key-note speech II - Room: Loke
Key-note speaker: Mårten Palme, Professor of Social Insurance, Department of Economics, Stockholm University
Title: How I Addressed Four Fundamental Research Questions in the Social Sciences using Swedish Register Data".
Abstract:

In this lecture I give four examples from my 25 years of research on Swedish register data. These examples correspond to the following four research questions. (1) What is the returns

to investments in education? (2) What is the true degree of social mobility in a society? (3) What are the relations between incomes, income inequality and health inequality? (4) What are the long-term effects of prison sentences? In addition to discussing methods, identification issues and (briefly) results, I will talk about why I think big data sets based on registers are necessary for being able to address research questions similar to the four ones I bring up in my lecture empirically.

Coffee break with poster vernissage (poster list at end of program) - Loke lounge
13:50 – 14:10

Parallel oral sessions (4-6)
14:10 – 15:30

Oral Session 4 - Room: Loke
Theme: LONG-TERM, LIFE-COURSE AND INTERGENERATIONAL STUDIES II
Moderator: Maria Brandén

Oral Session 4.1
14:10 – 14:30
Title: The recent trend in educational mismatch among second generation immigrants in Sweden: A register-based study
Speaker: Wooseong Kim, Department of Sociology, Demography Unit, Stockholm University
Abstract:
Notwithstanding overall convergence compared with the first generation immigrants, the second generation often experiences labor market disadvantages and falls behind their native peers, particularly concerning employment. This study focuses on educational mismatch as another immigrant labor market integration indicator. While researchers have documented a disproportionate risk of educational mismatch among first generation immigrants, the situation regarding their descendants has been largely unexplored. This study addresses this issue by providing an overview of the educational mismatch among second generations in Sweden. Sweden offers an interesting case because it has a substantial and diverse immigrant population.

This study uses the collection of Swedish register data to identify immigrant generation status and construct measures of educational mismatch. The study population consists of the employed and the self-employed aged between 25 and 64 from 2001 to 2016. The study first presents the recent trend in the prevalence of educational mismatch during the study period by generation status and by ancestral origin. In addition, this study conducts multinomial logistic regressions to investigate the association between immigrant generation status and educational mismatch risk, conditioning on social and demographic characteristics.

The preliminary results show the overall intergenerational decline in educational mismatch among immigrants with differences across ancestral origin groups. The second generation North African, Middle-Eastern, and Asian immigrants show a higher prevalence of overeducation and undereducation than ancestral Swedes. The multinomial logistical regression results also concur with the descriptive observations. These findings call for further investigation of the reason for observed heterogeneity and its consequences.

Oral Session 4.2
14:30 – 14:50
Title: How Does University Education Pay Off? A Longitudinal Analysis of Life-Cycle Earnings
Speaker: Haodong Qi, Department of Global Political Studies, Malmö University
Abstract:
Background

While it has been long established that schooling increases labor earnings, it remains unclear how such a return is realized. Is it because persons with more education tend to establish a better condition prior to working life, or because they invest more in training and learning during working life?

Methods

Relying on the Swedish income register data 1971-2016, we conducted a cohort analysis of life-cycle earnings. This 45-year-long panel data allows us to estimate a model which integrates heterogeneous income profile (HIP) into Mincer's human capital earnings function. Using the estimated model, we quantify how much lifetime income inequality is due to difference in: 1) earnings capacity established at age 25; 2) post-school human capital investments and the profitability of these investments; and 3) experiences of income shocks during working life.

Results

The results revealed notable gendered mechanisms. For men, university education increases post-school human capital investments, which leads to a higher lifetime earning. For highly educated women, the income premium is driven primarily by a greater earning capacity at age 25, and secondarily by a lower childbearing cost.

Conclusion

Our results suggest that heterogeneity in human capital production (as opposed to income shocks) plays a key role in driving income inequality between university graduates and their lesser-educated counterparts. A key implication of this finding is that, to tackle lifetime inequality, social investment in the process of producing human capital (e.g. formal education as well as life-long learning) would be more effective than spending on social insurance schemes.

Oral Session 4.3
14:50 – 15:10

Title: Socioeconomic Consequences in Adult Life after Childhood Cancer in Scandinavia (SALiCCS)- a Nordic register-based cohort and collaborative research programme

Speaker: Hanna Mogensen, Unit of Epidemiology, Institute of Environmental Medicine, Karolinska Institutet

Abstract:

Background: Survivors of childhood cancers have a long life ahead of them but may face a broad range of socioeconomic consequences due to their disease or its treatment. These outcomes are difficult to study because of the rarity of childhood cancers and the methodological challenges in studies involving social factors. The Nordic population- and health registers provide the unique opportunity to link individual data and study socioeconomic outcomes longitudinally. Therefore, the research programme Socioeconomic Consequences in Adult Life after Childhood Cancer in Scandinavia (SALiCCS) was initiated.
Methods: SALiCCS is a register-based cohort including five-year survivors of childhood cancer from Sweden, Denmark and Finland, matched population comparisons and siblings. All survivors diagnosed at ages 0-19 years, since 1971 and onwards, have been followed over time. Information from national registers have been harmonized, pooled, and analysed at a secure server at Statistics Denmark, reached by remote access for involved researchers.
Results: The SALiCCS core population includes 21,292 five-year survivors, 103,303 population comparisons and 29,644 siblings. Key findings include that survivors are at increased risk of psychiatric disorders, delays in attainment of upper secondary education, and health-related unemployment. Ongoing projects investigate educational achievements further, income patterns, and other social outcomes among survivors.
Discussion/Conclusion: The process of collecting and pooling Nordic micro data has been demanding but has resulted in a three-country wide collaboration and a uniquely large population-based cohort of childhood cancer survivors where important social outcomes with high validity can be assessed—findings that are of upmost relevance for evidence-based survivorship care.

Oral Session 4.4
15:10 – 15:30
*Title***:** Disentangling the multigenerational transmissions of socioeconomic disadvantages and mental health problems: Findings from the Stockholm Birth Cohort Multigenerational Study
Speaker: Baojing Li, Department of Public Health Sciences, Stockholm University

Abstract:
There is a paucity of research examining the patterning of socioeconomic disadvantages and mental health problems across multiple generations. The current study therefore aimed to investigate the interconnected transmissions of socioeconomic disadvantages and mental health problems from grandparents to grandchildren through the parents, as well as the extent to which these transmissions differ according to lineage (matriline/patriline) and grandchild gender. Drawing on the Stockholm Birth Cohort Multigenerational Study, the sample included 21,416 unique lineages centered around cohort members born in 1953 (parental generation) as well as their children (grandchild generation) and their parents (grandparental generation), and socioeconomic disadvantages were operationalized as low income, and mental health problems as psychiatric disorders. A series of path models based on structural equation modelling were applied to estimate the associations between low income and psychiatric disorders across generations and for each lineage-gender combination. We found a multigenerational transmission of low income through the patriline to grandchildren. Psychiatric disorders were transmitted through both the patriline and matriline, but only to grandsons. The patriline-grandson transmission of psychiatric disorder was partially operated via low income of the fathers. Grandparents' psychiatric disorders influenced their children's and grandchildren's income. We conclude that there is evidence of transmissions of socioeconomic disadvantages and mental health problems across three generations, although these transmissions differ by lineage and grandchild gender. Our findings further highlight that grandparents' mental health problems could cast a long shadow on their children's and grandchildren's socioeconomic outcomes, and that socioeconomic disadvantages in the intermediate generation may play an important role for the multigenerational transmission of mental health problems.

Oral Session 5 - Room: Tor 1
Theme: USE OF REGISTERS IN RISK FACTOR RESEARCH
Moderator: Helena Backman

Oral Session 5.1
14:10 – 14:30
*Title***:** Age at menarche and menopause and new-onset asthma in women
Speaker: Guo-Qiang Zhang, Krefting Research Centre, Sahlgrenska Academy, University of Gothenburg

Abstract:
Background: Evidence on the role of endogenous female sex hormones in the development of asthma in women is conflicting. To quantify the relation of age at menarche and menopause to risk of new-onset asthma.
Methods: We conducted a matched case-control study based on the West Sweden Asthma Study (WSAS), including women aged 16–75 years followed from 2008 to 2016. We applied Frequentist and Bayesian conditional logistic regression models.Results: We included 114 cases and 717 controls. In Frequentist analysis, the odds ratio (OR) for early-onset menarche (≤ 12 years vs > 12 years) was 1.34 (95% confidence interval [CI] 0.81–2.22). Subgroup analyses showed that the point estimate decreased consistently with older baseline age: ≥ 25 years: 1.41; ≥ 35 years: 1.30; ≥ 45 years: 1.09; ≥ 55 years: 0.88; and ≥ 65 years: 0.89. The OR for early-onset menopause (≤ 50 years vs > 50 years) among menopausal women was 1.13 (95% CI 0.48–2.65). In Bayesian analysis, the OR for early-

onset menarche and menopause had a 95% probability of falling between 0.97 and 1.65 and between 0.65 and 1.70, respectively. The respective probability of OR being larger than 1 was 95.7% and 59.1%.

Conclusion: Early-onset menarche may increase asthma risk in women. Selection bias due to selection of women by baseline asthma status may likely explain the decrease and the reversal of effect estimate with increasing age. We did not find evidence that age at menopause influences asthma risk in menopausal women.

Oral Session 5.2
14:30 – 14:50

Title: Overweight and Obesity and Venous Thromboembolism in Young Women

Speaker: Annika Rosengren, Department of Molecular and Clinical Medicine, University of Gothenburg

Abstract:

Background: Overweight and obesity rates have increased in recent decades, particularly among the younger population. The long-term consequences of obesity at young age with respect to venous thromboembolism (VTE) are not well known.

Objective: To investigate the association between body mass index (BMI) in early pregnancy as a proxy for prepregnancy weight and VTE in women of childbearing age.

Methods: This registry-based prospective cohort study analysed data from the Swedish Medical Birth Registry, which is linked to the National Patient and the National Cause of Death Registries for information on VTE incidence. The Cox proportional hazards model was used to determine the association between BMI and VTE.

Results: The mean age at registration was 27.8 (standard deviation, 4.9) years. During a median follow-up duration of 15 years (interquartile range, 7–23 years), 1776 and 2562 patients had deep vein thrombosis and pulmonary embolism, respectively. The risk of VTE linearly increased with increasing BMI. Women with high normal weight, i.e. with a BMI of 22.5–25.0 kg/m2, had an adjusted hazard ratio (HR) of 1.30 (95% confidence interval [CI], 1.19–1.41), whereas those with a BMI of 30–35 kg/m2 and ≥35 kg/m2 (severe obesity) had an adjusted HR of 2.35 (95%CI 2.05–2.70) and 3.49 (95% CI, 2.85–4.27, respectively.

Conclusion: The risk of subsequent VTE increased apparently among women in early pregnancy, even in those with high normal BMI, whereas those with severe obesity had a markedly high risk of VTE during long-term follow-up.

Oral Session 5.3
14:50 – 15:10

Title: The relationship between congenital heart disease and cancer in Swedish children: A population-based cohort study

Speaker: Christina-Evmorfia Kampitsi, Institute of Environmental Medicine, Karolinska Institutet

Abstract:

Background: Birth defects have been consistently associated with elevated childhood cancer risk; however, the relationship between congenital heart disease (CHD) and childhood cancer remains conflicting. Considering the increasing patient population with CHD after improvements in their life expectancies, insights into this relationship are particularly compelling. Thus, we aimed to elucidate the relationship between CHD and cancer in Swedish children and adolescents.

Methods: All individuals registered in the National Medical Birth Register (MBR) between 1973 and 2014 were included in this study (n=4,178,722). Individuals with CHD (n=66,892) were identified from the MBR and National Patient Register, whereas cancer diagnoses were retrieved from the National Cancer Register. The relationship between CHD and childhood cancer (<20 years at diagnosis) was evaluated using Cox proportional hazards regression models.

Results: Among children with CHD, 221 had a cancer diagnosis during childhood. We observed increased risks of childhood cancer overall, leukemia, lymphoma, and

hepatoblastoma in children with CHD, but after adjustment for Down syndrome, only the increased lymphoma (HR=1.64, 95% CI 1.11–2.44) and hepatoblastoma (HR=3.94, 95% CI 1.83–8.47) risk remained. Moreover, an elevated lymphoma risk (HR=8.13, 95% CI 4.06–16.30) was observed in children with complex CHD.

Conclusion: We found associations between CHD and childhood lymphomas and hepatoblastomas, not explained by a diagnosis of Down syndrome. Stronger associations were observed in complex CHD. The findings can inform both the medical monitoring of children with CHD and future research on the causal mechanisms underlying the relationship between CHD and childhood carcinogenesis.

Oral Session 5.4
15:10 – 15:30
Title: Surgeon proficiency gain and survival after gastrectomy for gastric adenocarcinoma: a population-based cohort study
Speaker: Johannes Asplund, Department of Molecular Medicine and Surgery, Karolinska Institutet
Abstract:

Background: The quality of surgery is essential for survival in gastric adenocarcinoma. Studies on surgeons' proficiency gain of gastrectomies are scarce. Yet, such knowledge may guide surgeons' training programs.

Methods: Population-based cohort study of patients who underwent gastrectomy for gastric adenocarcinoma in Sweden 2006-2015 with follow-up throughout 2020. Data were retrieved from national registries and medical records. Risk prediction models were used to calculate outcome probabilities, and risk-adjusted cumulative sum (RA-CUSUM) curves were plotted to assess differences (change points) between observed and expected outcomes. The main outcome was long-term (>3-5 years) all-cause mortality after surgery. Secondary outcomes were all-cause mortality within 30 days, 31-90 days, 91 days-1 year and >1-3 years of surgery, resection margin status, and lymph node yield.

Results: The study included 261 surgeons and 1,636 patients. The >3-5-year mortality was improved after 20 cases, where it decreased from 12.4% before to 8.6% after this change point (p=0.027). Change points were suggested, but not statistically significant, after 22 cases for 30-day mortality, 28 cases for 31-90-day mortality, 9 cases for 91-day-1-year mortality, and 10 cases for >1-3-year all-cause mortality. There were statistically significant improvements for resection margin status after 28 cases (p<0.005) and for lymph node yield after 13 cases (p<0.001).

Conclusions: This study reveals proficiency gain curves regarding long-term survival, resection margins, and lymph node yield in gastrectomy for gastric adenocarcinoma. The findings suggest a need to conduct at least 20 gastrectomies with experienced support before doing these operations independently.

Oral Session 6 - Room: Tor 2
Theme: NOVEL USE OF REGISTER DATA II
Moderator: Anita Berglund

Oral Session 6.1
14:10 – 14:30
Title: Churches of two ethnicities – A register-based study on ethnolinguistic differences of religious affiliation in Finland
Speaker: Weiqian Xia, Department of Sociology, Stockholm University
Abstract:

Background
The universal model of secularization has been challenged in recent years by research showing the diverse pattern of religious changes across groups. Yet, relevant research in

Europe is hampered by lacking representative data for minority groups, especially in the highly secular and historically religiously homogeneous Nordic context. The two native ethnic groups in Finland sharing the same religious tradition offer a unique context to study.

Methods

In the current study, we innovatively deploy the unique Finnish register data with religious affiliation information to investigate the difference in religious affiliation between the Finnish-speaking majority and the Swedish-speaking minority in Finland and explore the mechanism to explain the difference.

Results

The Swedish-speaking population in Finland has consistently been more affiliated with the National Lutheran Church than the Finnish-speaking in the past five decades. The socioeconomic differential of religious affiliation is smaller among Swedish speakers, so they are less affected by modernization. The higher affiliation rate of the Swedish speakers can be partly explained by their lower levels of internal migration.

Conclusion

Despite being socioeconomically advantaged in the Finnish society, the Swedish-speaking group in Finland has a higher affiliation rate to the National Lutheran Church, contrary to the expectation of modernization theory. It is likely due to their stronger attachment to the community.

Discussion

We offer a pioneering first study using unique register data to study religious changes. We will in future research examine further the trends, determinants, and outcomes of religious affiliation in the highly secular Finnish context

Oral Session 6.2
14:30 – 14:50
Title: Can upper secondary education make a difference for political participation? The effect of general or vocational education on voter turnout
Speaker: Marcus Österman, Department of Government, Uppsala University
Abstract:
The link between education and political participation is one of the most discussed and researched subjects in political science. However, despite the considerable size of this literature, there is a limited number of studies that are able to causally identify the effects of education. Such studies are particularly scarce when it comes to examining how the type and curriculum of education affects political participation, as most previous research focuses on education length. In this article, we present a quasi-experimental study on the effects of general vs. vocational secondary education on electoral participation. Data-wise, we use Swedish individual-level population data on the choice of upper secondary education and turnout in elections. By exploiting the admission process with a regression discontinuity design, we are able to avoid selection bias related to the choice of different programmes and get better support for causal inference. We find no positive effects of attending a general programme, in contrast to a vocational programme, on voter turnout for students who apply to both general and vocational programmes. If anything, there are indications of a negative effect of starting a general programme rather than a vocational programme. Among the group of students who choose between both general and vocational programmes, we also find substantial negative effects of starting a general programme on grades and the likelihood of graduating from upper secondary school. These latter finding may present possible mechanisms behind the negative effects on electoral participation. Our results suggest that previous research on type of education and political participation, which has mainly relied on correlational evidence, may have overestimated the positive effects of general education on turnout by capturing student selection effects.

Title: Do football players have an increased risk of neurodegenerative disease and psychiatric disorders? A nationwide register-based cohort study
Speaker: Manzur Kader, Division of Clinical Epidemiology, Department of Medicine, Solna, Karolinska Institutet
Abstract:
Background: There is growing concern that repetitive minor head trauma (e.g., through the heading of a football) may increase the risk of neurodegenerative disease and certain psychiatric disorders; however, epidemiological data are scarce.
Methods: We conducted a cohort study to compare the risk of neurodegenerative disease (a composite of Alzheimer's disease and other dementias, motor neuron disease, Parkinson's disease), and psychiatric disorders (depression/use of antidepressants, alcohol-related disorders) among 6007 male football players who had played in the Swedish top division, Allsvenskan, during 1924-2019 and 56168 controls from the general population matched by sex, age, and region of residence. We used nationwide registers (Patient Register, Cause of Death Register, Prescribed Drug Register) to identify the outcomes during follow-up 1969-2020.
Results: We observed a higher risk of neurodegenerative disease (HR=1.46, 95% CI=1.33-1.60), and lower risk of depression or use of antidepressants (HR=0.57, 95% CI=0.51-0.63), and alcohol-related disorders (HR=0.70, 95% CI=0.62-0.80) among the players compared with the controls.
Discussion: Using register-based data, our findings show that, compared with general population control, football players in the Swedish top division had an increased risk of neurodegenerative disease and a lower risk of depression or use of antidepressants and alcohol-related disorders.

Title: The returns to returning – Economic returns to remigration to Finland
Speaker: Weiqian Xia, Department of Sociology, Stockholm University
Abstract:
Background
How the experience of migration affects the labor market outcome after remigration is difficult to be causally examined since both migration and remigration processes are driven by various mechanisms of selection. In the current study, we investigate the labor market outcomes of return migration under the context of massive migration from Finland, mainly to Sweden, in the late 20th century and subsequent remigration flow.
Methods
With Finish register data 1970-2019, we use a unique sibling fixed-effect design comparing the return migrants to their same-sex siblings who have not migrated, to rule out the confounding of family background and pre-adolescent experience.
Results
Return migrants have substantially higher risks of unemployment or labor market inactivity, and lower incomes compared to their same-sex siblings who have no migration experience. The disadvantage exists across gender and educational level, while stronger for women and those without tertiary education. However, the labor market disadvantage also alleviates over time in the long run, and once employed, the income deficiency almost diminishes.
Conclusion
We strengthen previous findings in the literature that return migrants have disadvantages in the Finnish labor market, with a more rigorous sibling comparison design to provide strict control for selections based on family background and pre-adolescent experience.
Discussion

We argue that the labor market disadvantage of return migrants to Finland is likely due to the disruption of the social network during the years spent abroad. However, the disadvantage can be reduced over time with the individual's reintegration into the Finish labor market.

Topic: THE FUTURE OF REGISTER-BASED RESEARCH
Moderators: SWE-REG node leaders - Anita Berglund and Sven Oskarsson
Panel: SWE-REG node leaders - Helena Backman, Jonas Björk, Maria Brandén, Jesper Lagergren, Karin Modig and Annika Rosengren

Poster sessions

Poster 1
Title: The Nordic Helicobacter Pylori Eradication Project (NordHePEP): A Nordic Registry-Based Cohort
Speaker: Anna-Klara Pettersson, Department of Molecular Medicine and Surgery, Karolinska Institutet
Abstract:
Background: The bacterium Helicobacter pylori (HP) infects the stomachs in >50% of the global population. HP-infection is causally associated with gastric adenocarcinoma and might influence risk also of other gastrointestinal tumours of the tract in different directions. Whether HP-treatment changes cancer risk is unknown for most tumours. This question requires a very large cohort with long follow-up which has not been possible before, but the drug registries in the Nordic countries have now been available long enough to help provide answers.
Methods: The Nordic Helicobacter Eradication Project (NordHePEP) is a population-based cohort of all patients having had HP-eradication treatment in any of the national prescribed drug registries in Denmark, Finland, Iceland, Norway or Sweden. Additional data came from the national registries of cancer, patients, death and population. The comparison group is the background population of the corresponding age, sex and calendar year. We will calculate standardised incidence ratios with 95% confidence intervals to assess cancer risk.
Results: After 3 years, all cohort data for NordHePEP have been collected and merged. NordHePEP includes 674,771 HP-eradicated individuals. During up to 23 years of follow up, 59,292 participants developed any cancer, including 15,496 with a gastrointestinal cancer.
Conclusions: It requires much time end efforts, but it is possible to retrieve and merge data, including drug use, from all Nordic countries for population-based registry-based cohorts. NordHePEP has the prerequisites for providing valid and robust results regarding how HP-eradication influences cancer risk.

Poster 2
Title: A multi-dimensional comorbidity score based on hospital discharge diagnoses
Speaker: Marcus Westerberg, Institutionen för kirurgiska vetenskaper, Uppsala universitet
Abstract:
Background: The ability to account for comorbidity using for example the Charlson comorbidity index when estimating survival in a population diagnosed with cancer could be improved by using a comorbidity index based on all International Classification of Diseases (ICD) codes.
Methods: We created three comorbidity indices predicting death within 1, 5, and 10 years respectively, using entries of ICD-codes in the Swedish Patient Registry and time to death in 286,688 comparator men randomly selected from the general Swedish population without

prior prostate cancer. We also evaluated the indices in an additional 54,539 comparator men and 68,357 men with prostate cancer.

Results: The new comorbidity indices predicted survival better than the Charlson Comorbidity Index (CCI) and a previously published drug comorbidity index (DCI), ranging between 0.630-0.758 for CCI and 0.668-0.804 for DCI, while the c-indices in the validation cohort of comparison men and men with prostate cancer were C=0.830 and C=0.782 respectively for the 1-year comorbidity index. Calibration curves indicated good correspondence between predicted and observed probabilities of death. The correlation between DCI and the comorbidity indices was approximately 0.5-0.6, and the comorbidity indices stratified men into groups with distinctively different survival in strata defined by age and either CCI or DCI.

Conclusion: We argue that our comorbidity indices are useful predictors of death in register-based studies of men with prostate cancer, outperforms CCI and adds complementary information about comorbidity in addition to age and DCI

Poster 3
Title: Characteristics, prescribed drug and care transitions of centenarian population in Sweden: a national register-based cohort study.
Speaker: Shunsuke Murata, Institute of Environmental Medicine, Karolinska Institutet
Abstract:

Background

The number of centenarians is increasing rapidly. Therefore, understanding centenarians' characteristics such as living arrangements and care transitions is required to prepare for future health and social care demands. This study aimed to describe characteristics, prescribed drugs, and care transitions.

Methods

This study used a population-based cohort study linked to several registers. We included participants who became 100 years old between 2013 and 2018. Some variables at the 100th birthday were extracted, such as the socio-economic status, the number of prescribed drugs, and the Charlson comorbidity index. The participants were followed for two years with collecting care transition.

Results

The final study population consisted of 5,886 participants (women, 81%). More than half of the centenarians lived in care homes, while most others lived alone. Among those living at home, 69% had home care, and 31% lived at home without any formal home care. Among participants, 36% had no comorbidities, and 21% had three or more comorbidities. Between their 100th birthday and six months prior, 6% of the centenarians had no prescribed drugs, while 8% had ten or more drugs. Sixty-four percent had died two years later. Of the remaining ones, 56% resided in a care home, and 12% lived at home without home care.

Discussion and conclusion

Most centenarians at home lived alone and needed some care. Two in three centenarians died after two years. Most centenarians required some care at their 100th birthday and more levels of care after two years.

Poster 4
Title: Generalizing the effects of a randomized controlled trial to its target population: an example using the TASTE trial
Speaker: Conor MacDonald, Unit of Epidemiology, Karolinska Institutet
Abstract:

Participants recruited into randomized trials may not represent the entire eligible population where the intervention will be applied. For example, the randomized trial TASTE recruited eligible patients with myocardial infarction in the SWEDEHEART register and found no benefit of thrombus aspiration on 1-year mortality. However, individuals in the TASTE trial may differ from other eligible individuals in the register. Using the TASTE trial and SWEDEHEART register data as an example, we will demonstrate the use of novel causal

inference methods to estimate the effect of thrombus aspiration in the entire population of eligible individuals.

Methods: We will estimate the probability of trial participation for each eligible individual in the register using a logistic regression model with pre-selected covariates. This participation probability will be used to determine inverse probability weights of trial participation. We will then estimate the 1 year risk of death in the entire eligible population using a weighted pooled logistic regression model, fit to the trial data. The estimated risk at 1-year will be used to compute the risk ratio and risk difference. Confidence intervals will be generated using bootstrapping.

Discussion / Conclusion: Swedish register data uniquely allowed identification of enrolled and unenrolled populations eligible for the TASTE trial. Differences in multiple characteristics were observed between the enrolled and unenrolled population. Generalizing the results from the trial to the entire eligible population will allow us to determine if the trial results were applicable to the entire eligible population.

Poster 5
Title: Female unemployment and child poverty among immigrants in Denmark
Speaker: Anna Tegunimataka, Economic History/ Centre for Economic Demography, Lunds Universitet
Abstract:
The challenges of immigrant poverty are many. Unemployment and difficulties in escaping economic hardship have long-term negative consequences for individuals and families and influence the well-being of future generations. This paper has two main aims. First, it studies long-term changes in immigrant family poverty in Denmark, with a particular focus on the developments from 2001 onwards that came with a number of policies directly aimed at immigrant families. Second, it studies the link between female labor force participation and the escape from poverty for immigrant children and families, taking country of origin differences in labor force participation of females into consideration. Denmark is chosen as the setting for this study as it is a country with low general levels of poverty and an extensive social security system. Yet, poverty levels among immigrants are throughout the study period the highest in Scandinavia and seem to be persisting over time. The period of study (1980-2017) is interesting since it is characterized by large (by Danish standards) inflows of immigrants that coincided with major reforms directed towards immigrant families. Initial results show increasing poverty levels for especially non-western immigrants since the early 2000s and that the difference in poverty levels between ethnic groups can be attributed to differences in female labor force participation.

Poster 6
Title: Are couples still bargaining over the unpaid work?
Speaker: Flore Debruyne, Department of Sociology, Stockholm University
Abstract:
The lion's share of unpaid work (such as childcare) is still mainly done by women. Many theories are used to explain the division of unpaid work among couples. Some of those theories argue that this choice results from a rational process, and continue being cited in recent years. Blood and Wolfe (1960) explained that couples enter a bargaining situation when deciding who takes up household work. The partner who has the most resources, has the most marital power to pass off tedious household tasks to the other partner. Becker (1991) used an economical rational choice model to explain the traditional division. Because individuals aim to maximise their utility function, they will specialise in a certain sector where they are the most effective. Both theories come to the same conclusion: the partner who earns more does less unpaid work because (i) they have more bargaining power, or (ii) it is economical beneficial. In light of recent empirical work however, the explanatory power of these theories may be questioned. To investigate whether the theories of Becker and Blood and Wolfe are accurate to explain the division of unpaid work in different-sex-couples, we use Swedish register data.

Title: Mapping Swedish register data to a common data model: experiences from the European Health Data and Evidence Network
Speaker: Máté Szilcz, Department of Medical Epidemiology and Biostatistics, Karolinska Institutet
Abstract:

BACKGROUND: legal and data protection issues often complicate cross-national studies. Mapping administrative data to a common data model (CDM) permits powerful federated network analysis. We aim to describe the challenges and possibilities of mapping administrative data to a CDM based on our experience as the first Swedish data partner in the European Health Data and Evidence Network (EHDEN).
METHODS: EHDEN is a large-scale federated network across Europe, funded by EU. Currently EHDEN includes 166 data partners from 27 countries and ≈630 million patient records. Each data partner is responsible for harmonizing their data to the Observational Medical Outcomes Partnership CDM. The CDM uses standardized vocabulary that transforms disparate observational health databases into a common model. This architecture ensures privacy by design as the data remain hosted on local servers run by individual data partners. To date, there are ≈80 peer-reviewed publications based on federated analysis part of the EHDEN project.
DISCUSSION: we are currently mapping Swedish register data to the CDM using our data including routinely collected administrative and healthcare data with national coverage on all individuals aged 65 or older from 2004 to 2020 living in Sweden. The data harmonization is conducted in collaboration with a certified partner company. Manual mapping of vocabularies, such the medical procedures (in Swedish 'KVÅ') registered in the National Patient Register represent one of the major challenges.
CONCLUSION: mapping Swedish Register data to a CDM is challenging, but represents a promising approach to conduct high quality register research in a collaborative way.

Title: Exogenous sex steroid hormones and new-onset asthma in women
Speaker: Guo-Qiang Zhang, Krefting Research Centre, University of Gothenburg
Abstract:

Background: There remains controversy on the role of exogenous sex steroid hormones in the development of asthma in women. To quantify the relation of hormonal contraceptives and menopausal hormone therapy (MHT) in the development of new-onset asthma.
Methods: We conducted a matched case-control study based on the West Sweden Asthma Study (WSAS), including women aged 16–75 years followed from 2008 to 2016. We applied Frequentist and Bayesian conditional logistic regression models.
Results: We included 114 cases and 717 controls. In Frequentist analysis, the odds ratio (OR) for ever use of hormonal contraceptives was 2.13 (95% confidence interval [CI] 1.03–4.38). Subgroup analyses showed that the point estimate increased consistently with older baseline age: ≥ 25 years: 2.07; ≥ 35 years: 2.69; ≥ 45 years: 3.07; ≥ 55 years: 4.13; and ≥ 65 years: 4.98. The OR for ever use of MHT among menopausal women was 1.17 (95% CI 0.49–2.82). In Bayesian analysis, the OR for ever use of hormonal contraceptives and MHT had a 95% probability of falling between 0.79 and 1.55 and between 0.92 and 1.52, respectively. The respective probability of OR being larger than 1 was 72.3% and 90.6%.
Conclusion: For use of hormonal contraceptives, selection bias due to selection of women by baseline asthma status may likely explain the upward trend in the effect estimate with older age. This suggests that use of hormonal contraceptives may decrease asthma risk in women. Use of MHT increases asthma risk in menopausal women.

Title: Machine learning to predict major adverse cardiac events using only pre-hospital data
Speaker: Axel Nyström, Department of laboratory medicine, Lund University

Abstract:

Background: Chest pain is one of the most common complaints at the emergency department (ED), and cardiovascular disease is a leading cause of death. But only a fraction of patients with chest pain have a major adverse cardiac event (MACE) within 30 days. Accurately predicting MACE is therefore an important task at the ED.

Methods: In this work, we will use machine learning (ML) to predict MACE using only pre-hospital data. In particular, we extract features from past diagnoses, medications and treatments up to five years prior to the ED visit. A key outcome metric will be the number of patients that can be safely ruled in or out. The dataset contains over 50k chest pain episodes from multiple EDs in Skåne, Sweden.

Results: There are no results to show at the time of writing. Discussion In previous work, we have seen that ML can be used to accurately predict MACE using electrocardiograms (ECGs) and lab-values. But lab-values can take hours to process, especially if multiple samples are required. If the correct decision can be found for some patients already before taking lab-values, this would clearly be beneficial.

Conclusion: In the past, we have tried to make our MACE predictions better. Now we try instead to make them sooner.

Poster 10

Title: Multi-modal self-supervised learning on EHR trajectories for predicting early death
Speaker: Ali Amirahmadi, School of Information Technology, Halmstad University

Abstract:

Background: Electronic Health Records (EHRs), in combination with machine learning, have provided an opportunity to improve different aspects of society's health by modeling health status indicators at both individual and population levels. Exploring the most associating risk factors for early death using EHR trajectories, the longitudinal aspect of the data needs to address many different challenges. Handling long and short-term dependencies in combination with effectively aggregating information from different data sources are the primary ones.

Methods: In this project, we used data from the Malmö Diet and Cancer Cohort. We used the history of diagnoses, medications, and two questionaries (baseline and 5 year follow-up) in a cohort of approximately 30 000 persons. Self-supervised representation learning (SSRL) and Multi-Modal Learning (MML) were used to build effective data representations. Specifically, we trained a transformer-based network on a masked language model by predicting the masked EHR code based on the rest of the patient's history and predicting the codes in the next visit. Furthermore, we train our network on a matching task to align different data sources. The SSRL and MML techniques were evaluated on an early death prediction task.

Results: We established baseline models using logistic regression, random forest, and neural networks on each data source and all their combinations. Preliminary results showed questionary dataset is more informative. The effectiveness of SSRL and MML on models' performance is still under investigation. Also, for analyzing the underlying cause of death, we used Shap-values and self-attention weights at individual and population levels.

Conclusion: We aimed to make an efficient EHR encoder from various data sources with different characteristics for a prediction task using EHR trajectory data. Despite the promising ability of SSRL and MML to deal with the complexity of EHRs, there are some drawbacks. Transformers, as the backbone of this model, are very data hungry. Moreover, finding more appropriate tasks and loss functions for avoiding mode collapse are essential

Poster 11

Title: Physical activity before and after a cancer diagnosis in relation to total cancer mortality and cancer-specific mortality among individuals with diabetes
Speaker: Stanley Teleka, Department of Surgical Sciences, Medical Epidemiology, Uppsala University

Abstract:

Background: The impact of physical activity (PA) before and after a cancer diagnosis on total cancer mortality and cancer-specific mortality remains unclear, especially among individuals with type 2 diabetes (T2D).

Methods: We analysed individuals diagnosed with T2D from the Swedish National Diabetes Register with incident cancer, recorded in the national cancer register, from 2004 to 2021. Pre- and post-diagnosis PA was categorised as never, less than once/week, 1-2 times/week, 3- 5 times/week, and daily; and recorded >12 months before cancer diagnosis and >12 months after cancer diagnosis. Change in PA (before and after a cancer diagnosis) was categorised as low maintainers, increasers, decreasers, and high maintainers. Cox regression was used to calculate hazard ratios (HR) and 95% confidence intervals (CI) for total cancer mortality and cancer-specific mortality adjusted for relevant confounders.

Results: We found an inverse association between PA and total cancer mortality for both pre-diagnostic PA and post-diagnostic PA; HR (95% CI) for those performing daily PA were 0.81 (0.78-0.85) and 0.70 (0.66-0.74), respectively, compared to those performing no PA. Compared with those who had low PA both before and after cancer diagnosis, individuals with higher levels of PA prior to diagnosis had lower total cancer mortality even if they decreased their PA after diagnosis [maintained high PA: 0.77 (0.71-0.84), decreased PA: 0.81 (0.72-0.90)].

Conclusion: Higher levels of PA before and after cancer diagnosis were associated with lower total cancer mortality. For some cancer types, higher levels of PA before cancer diagnosis seem to represent a health 'buffer' with regards to mortality.