RF16 AN AGENT-BASED MODEL OF SOCIAL CARE SUPPLY AND DEMAND IN THE UK

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10.1136/jech-2018-SSMabstracts.105

Background Social care provision is vital for ensuring the health of ageing and vulnerable populations. The UK relies on informal care for 50% of care provision, meaning that social care policies have significant implications for health services sustainability in this context. We present an agent-based simulation of UK informal care provision, demonstrating how this framework captures troubling trends and inequalities in social care.

Methods We constructed an agent-based model in Python that simulates individual human agents in a virtual UK from the year 1860 to 2022. Population dynamics are driven by UK birth rates and mortality rates. Agents can form partnerships, reproduce, migrate domestically for work or other purposes, change jobs, and provide social care. Care decisions are taken based on employment status, salary, age, health status, geographical location, and their relationship to those in need of care. Simulated agents participate in a detailed economy, and are members of different socioeconomic status groups depending on their income.

Output files track agents' socioeconomic status, social mobility, informal care provision, and payment for formal care services. Simulation output includes individual-level agent statistics and population-level analyses of care provision by age, sex, socioeconomic status, and employment status. Simulation results were calibrated against 2011 UK Census data for key population dynamics measures.

Results Simulation results in the year 2022 show significant inequalities in social care need and provision by gender and SES group. Agents in the lowest SES quintile (Group I) show a mean unmet care need of 19 hours/week, as compared to 12.5/week in in the highest (Group V). Carers in Group I supply an average 8.6 hours/week of care, compared to 3.6 hours/week in Group V. Thus, agents in Group I not only make a lower wage, they also lose more hours of work to care provision, and need more care themselves. In addition, female agents provide 1.9 times more informal care than males, while receiving lower average wages. Finally, the simulation shows a trend of growth in unmet care need from 1.17 hours per capita in 1976 to 2.38 by 2022.

Conclusion This work demonstrates that a well-constructed agent-based simulation can provide a platform for investigating the influence of economic and social factors on social care provision. This framework thus provides a means to develop and test new social care policies which better account for the complexities and challenges facing informal carers across the country, and in turn better protect health services sustainability.

RF17 WHAT MAKES ADOLESCENTS BINGE DRINK SO OFTEN? RESEARCH EVIDENCE FROM A POPULATION SCHOOL SURVEY IN CHILE

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10.1136/jech-2018-SSMabstracts.106

Background Binge drinking is known to cause alcohol-related harm among young people. Although the link between adolescent binge drinking and adolescents' own, parental or peer factors were established, little is known about the factors that associate with the frequency of binge drinking in the school contexts. The aim of this study is to examine the contextual associations between parental, peer and school factors and the frequency of binge drinking among Chilean school children aged 13 to 18. We hypothesised that severe school level deprivation would be associated with an increased number of binge drinking events as well as lower levels of parental supervision, and parental and peer drinking.

Data Information on frequency of binge drinking in the past month, parental supervision, paternal and maternal drinking and peer drinking was extracted from the Tenth Chilean School Population National Substance Use Survey conducted in 2013. Frequency of binge drinking was analysed among those reporting alcohol use. The individual-level information was linked to school-level information (percentage of free school meal children) obtained from the Ministry of Education

Methods Hierarchical data, individuals (n=41,146) nested within schools (n=1,687), were analysed using multilevel zero-inflated Poisson regression. Coefficients from the Poisson part were exponentiated to obtain Incidence Rate Ratios (IRR). Estimates were adjusted for parental education, child's age and school type and boys and girls were analysed separately.

Results Results from the Poisson part in the final model showed significant associations between lower levels of parental supervision and increased binge drinking frequencies in boys and girls. For girls, maternal drinking during weekends increased their binge drinking episodes by 10% (IRR=1.11 95% CI 1.03; 1.20), while mother's daily drinking habits increased them by 24% (IRR=1.24 95% CI 1.18; 1.38). Maternal daily drinking also showed increases in boy's binging episodes by 21% (IRR=1.21 95% CI 1.11; 1.31). Having at least half of friends that consumed alcohol increased the average number of binge drinking episodes by 21% (IRR=1.21 95% CI 1.13; 1.28) for boys, but by 60% (IRR=1.58 95% CI 1.45; 1.71) for girls. School deprivation was positively associated with the number of events of binge drinking for girls only (IRR=1.0034 95% CI 1.002; 1.005).

Norms, especially mother's supporting alcohol use and peer influences were major contributor for frequent binge drinking among Chilean adolescents. Girls are likely to be more vulnerable to frequent binge drinking, influenced by their peer groups and school environment.

RF18 VARIABLE SELECTION AND DATA REDUCTION FOR THE DEVELOPMENT OF A SMALL AREA DEPRIVATION INDEX FOR HEALTH RESEARCH IN BRAZIL

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10.1136/jech-2018-SSMabstracts.107

Background People living in areas with higher material deprivation have poorer health and increased mortality. In order to study these inequalities context-specific indicators of material

deprivation are necessary. In this study, we present the first step in the development of an index to investigate the effects of spatial concentration of deprivation on health status and mortality in Brazil. Our goal was to obtain a summary indicator of deprivation in the environment surrounding each household by census tract.

Methods Neighborhood conditions at the smallest level available (census tracts) were characterized using data from the latest edition of the Brazilian Census (2010). We selected variables that measure the deprivation of the area surrounding a household. These were lack of paving, street lighting, sidewalks, presence of open sewage and accumulated waste. Confirmatory factor analysis (CFA) using a Structural Equations Model approach was performed to reduce the number of variables and test the existence of the two underlying dimensions: sanitary conditions and infrastructure. Factors were extracted as index variables through regression scores and classified in population quintiles, as categories of deprivation intensity. QGis and ArcGIS were used to plot these deprivation factors on a map for face validity and analysis of overlap with other similar indexes (i.e. Human Development Index and MPI-Multidimensional Poverty Index).

Results The 2 77 576 census tracts in Brazil, cover a population of approximately 97,613,505 in 56,528,865 households CFA identified the two factors proposed, with good indexes of fit and model specification (x^2_8=11606.06; CFI=0.98; RMSEA=0.07; p<0.05). To test the index in use, we analyzed the distribution of deprivation throughout the regions and federative states of Brazil. The quintiles of census tract showed a clear geographic pattern, with most deprived areas (the fifth quintile) concentrated within the poorest regions of each state (as classified by the MPI).

Conclusion The selection of variables was based on an extensive theoretical framework, combining a variety of aggregate variables with coverage for more than 98% of the Brazilian population. This data-reduction demonstrates there are underlying deprivation factors which means there is considerable potential for creating a small area deprivation index using other indicators of material deprivation for the whole of Brazil at the census tract level. Use of the census will enable replication with future versions of the census. Therefore, it will be crucial for monitoring inequalities in health and mortality in Brazil.

RF19 ABSTRACT WITHDRAWN

RF20 COMPARING STRATEGIES TO PREVENT STROKE AND ISCHEMIC HEART DISEASE IN THE TUNISIAN POPULATION: MARKOV MODELING APPROACH USING A COMPREHENSIVE SENSITIVITY ANALYSIS ALGORITHM

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10.1136/jech-2018-SSMabstracts.108

Background Premature heart disease and stroke are generating a large and growing burden of disease and death in low and middle income countries. Though eminently preventable, debate continues about whether to prioritise primary, secondary or tertiary prevention.

The application of mathematical models in medicine and population health has proven useful, offering the potential to analyse and compare the effectiveness of different interventions to prevent future cardiovascular disease. We therefore developed a comprehensive algorithm of sensitivity analysis on Markov model applied to evaluate the impact of three interventions to reduce Ischemic Heart Diseases (IHD) and Stroke deaths: (i) improving medical treatments in acute phase, (ii) secondary prevention of stroke by increasing the prescribing of statins, (iii) primary prevention using health promotion to reduce dietary salt consumption.

Methods We developed and validated a Markov model for the Tunisian population aged 35–94 years old over a 20 year time horizon.

We compared the impact of specific treatment of stroke, life style and primary prevention on both IHD and stroke deaths. We reported the total number of CVD deaths (ischemic stroke and IHD deaths) that may be prevented or postponed for each specific scenario.

We then undertook extensive sensitivity analyses using a probabilistic multivariate approach and a simple linear regression metamodeling using R software.

Results The model forecasts a dramatic mortality rise, with approximately 1 11 000 cumulative IHD and Stroke deaths *(95% uncertainty interval 107,000–115,000)* predicted in 2025 in Tunisia.

Dietary salt reduction offered the potentially most powerful preventive intervention. This population level strategy might reduce IHD and stroke deaths by 27%, compared with 3% for secondary prevention following stroke and 1% for medical strategies for primary prevention.

The metamodeling highlighted that that the initial development of a minor stroke substantially increased the subsequent probability of a fatal stroke or IHD death.

Conclusion The primary prevention of cardiovascular disease via a reduction in dietary salt consumption appeared much more effective that secondary or tertiary prevention approaches applied after disease had manifest in individual patients.

Our simple but comprehensive algorithm offers a potentially attractive methodological approach that might now be extended and replicated in other contexts and populations.

RF21 LIVING WITH MULTIMORBIDITY IN GHANA: A QUALITATIVE STUDY GUIDED BY THE CUMULATIVE COMPLEXITY MODEL

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10.1136/jech-2018-SSMabstracts.109

Background Defined as the co-occurrence of more than two chronic conditions, multimorbidity has been described as a significant health-care problem: a trend linked to a rise in non-communicable disease and an ageing population. Evidence on the experiences of living with multimorbidity in middle-income countries (MICs) is limited. In higher income countries