

School for Public Health Research (SPHR)

Project Title	<i>Modelling preventative interventions to address inequalities in chronic disease</i>
Project ID	SPHR-LIL-PH1-MCD
Lead Researchers	Simon Capewell - LiLaC; University of Liverpool Peter Diggle - LiLaC; Lancaster University
SPHR Collaborators	Martin O'Flaherty, Margaret Whitehead – LiLaC; University of Liverpool Mark Petticrew – London School of Hygiene and Tropical Medicine Martin White – Fuse; Newcastle University
External Collaborators / Partners	Nick Cavill, Independent Consultant on physical activity
Start Date	1 October 2012
End Date	30 September 2015
Outline	<p>BACKGROUND</p> <ul style="list-style-type: none"> • Coronary heart disease (CHD) represents the biggest single cause of death in the UK • CHD is currently the biggest contributor to inequalities in premature deaths • CHD is eminently preventable, but many preventive interventions aimed at changing behaviours fail to reduce inequalities, and some may even widen them • With UCL colleagues, we have developed & validated the <i>IMPACTsec Policy Model</i>. This can examine English mortality trends by socio-economic circumstance (SEC) quintiles and to quantify contributions from specific risk factors & treatments. <p>RESEARCH QUESTION</p> <ul style="list-style-type: none"> • Can we extend and build on the <i>IMPACTsec model</i> to evaluate and predict the effects of past and future environmental and health care interventions, in order to inform local priority-setting and evidence-based commissioning? <p>OBJECTIVES</p> <p>Using CHD as a case-study, we will:</p> <ul style="list-style-type: none"> • Identify, characterise and interpret published data on the effectiveness and differential socio-economic impact of environmental interventions on CHD prevention • Identify and access relevant data describing socio demographic trends in population CHD risk factors & effectiveness and differential impact of CHD therapies ; • Explore modelling methodologies to: <ul style="list-style-type: none"> ➢ ~quantify and describe the contribution of environmental and health care interventions on recent CHD mortality change by socio demographic group, and ➢ ~ predict likely impact of <i>future</i> policies & interventions; • Disseminate outputs in a form suitable for commissioners.



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	<p>METHODS</p> <ul style="list-style-type: none">• Systematic literature review:<ul style="list-style-type: none">➢ Review policies on tobacco control, diet & inactivity• Consult topic experts• Model impact of past and future environmental and health care interventions <p>DELIVERABLES</p> <ul style="list-style-type: none">• After scoping a variety of simulation methodologies, we will quantify contributions of past and future interventions to changing risk-factors for CHD, stratified by socio-economic quintiles.• Quantification of the precision and uncertainties associated with past estimates and future projections.• Evidence-based recommendations to public health and care commissioners with regard to priority-setting, evidence-based commissioning & addressing inequalities.
Findings	<p>Emerging findings from Rory McGill's systematic review (sent as an abstract to Society for Social Medicine) below:</p> <p>INITIAL DISSEMINATION AND PUBLICATIONS</p> <p>1. Assessing the potential effect of healthy eating policy interventions on socioeconomic inequalities: systematic review Rory McGill, Elspeth Anwar, Lois Orton, Helen Bromley, Ffion Lloyd-Williams, Martin O'Flaherty, David Taylor-Robinson, Maria Guzman-Castillo, Duncan Gillespie Patricia Moreira, Kirk Allen, Lirije Hyseni, Nicola Calder, Mark Petticrew, Martin White, Margaret Whitehead & Simon Capewell. (presented at SSM Sept 2013; manuscript under consideration by PLoS ONE)</p> <p>Main messages Interventions categorised by the "5 P's" show differential effects on healthy eating outcomes by SEG, with interventions categorised as Personal appearing the most likely to increase health inequalities. However the vast majority of studies retrieved did not explore differential effects by socio-economic group. Future policies aimed at improving population health should be routinely evaluated for their potential impact on health inequalities.</p> <p>2. Forecasting public health policy: quantifying expert opinion on the future effectiveness and inequality of action on dietary salt intake Duncan Gillespie^{1*}, Kirk Allen², Maria Guzman-Castillo¹, Piotr Bandosz¹, Patricia Moreira¹, Elspeth Anwar¹, Rory McGill¹, Ffion Lloyd-Williams¹, Helen Bromley¹, Peter Diggle², Martin O'Flaherty¹, and Simon Capewell¹ (Accepted for oral presentation at SSM)</p> <p>Main messages Forecast modelling using quantitative expert predictions can provide a rapid illustration of potential policy effects, especially useful when other data are scarce. Our forecast of dietary salt intake is a message to stakeholders that although product reformulation should be more effective and equitable than behaviour</p>



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change interventions, its reach to more deprived individuals must be ensured.

3. The health equity and effectiveness of future policy options to reduce dietary salt in England

Duncan O. S. Gillespie^{1*}, Kirk Allen², Maria Guzman-Castillo¹, Piotr Bandosz¹, Patricia Moreira¹, Rory McGill¹, Ffion Lloyd-Williams¹, Helen Bromley¹, Peter Diggle², Simon Capewell¹ and Martin O'Flaherty¹ **(Accepted for oral presentation at SSM)**

Main messages Our modelling approach suggests that reformulation may be the most effective and equitable intervention against premature CHD deaths, especially if legislated and enforced, and that social marketing and nutrition labelling have relatively little impact on the number of deaths or inequality.

4. Future trends and inequalities in premature coronary deaths in England: modelling study

AUTHORS Kirk Allen, Senior Research Associate^{1,2*}, Duncan O. S. Gillespie, Research Associate², Maria Guzman Castillo, Research Associate², Peter J. Diggle, Distinguished University Professor¹, Simon Capewell, Professor of Clinical Epidemiology², Martin O'Flaherty, Senior Lecturer² **(Population Health Metrics: Waiting for final decision after re-review)**
(Accepted for oral presentation at SSM)

Conclusions Overall, premature coronary death rates in England continue to decline steeply. Furthermore, absolute inequalities are decreasing, reflecting declines in the high premature mortality in deprived groups. However, relative inequalities are projected to widen further, reflecting slower mortality declines in the most deprived groups. More aggressive and progressive prevention policies are urgently needed.

Publications / Outputs

The following outputs has been produced in 2013 & 2014

1. The health equity and effectiveness of future policy options to reduce dietary salt in England: mechanistic policy forecast. Abstract presented at SSM 2014, manuscript being prepared for submission to WHO Bulletin.
2. Forecasting public health policy: quantifying expert opinion on the future effectiveness and inequality of action on dietary salt intake. Abstract presented at SSM, manuscript under review in BMC Public Health.
3. Quantifying the socio-economic benefits of reducing dietary trans fats: modelling study. Abstract presented at SSM 2014, Manuscript under consideration in **Circulation**.
4. Future trends and inequalities in premature coronary deaths in England: modelling study: abstract presented in SSM 2014, manuscript awaiting final decision from Population Health Metrics.
5. [Future declines of Coronary Heart Disease mortality in England and Wales could counter the burden of population ageing](#). Abstract presented at the American Heart Association Nutritional and Epidemiology meeting (April 2014) and manuscript published (PLoS One. 2014 Jun 11;9(6):e99482)
6. "Quantifying The Contribution Of Statins To The Observed Decline In Total Cholesterol In England 1991 - 2012: Socio-Economic Modelling Study" Manuscript submitted to BMJ. Abstract to be submitted to the AHA Epi 2015 conference.
7. Many of these outputs will be presented by Dr O'Flaherty at the upcoming Sheffield SPHR conference., and as a Sir Richard Doll Seminar in Public Health and



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	Epidemiology, at Michaelmas 2014 (Nuffield Department of Population Health, University of Oxford)
Impact	<i>To follow...</i>
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