Unit 2023 PhD studentship proposals

Places and health programme

Does the planning system really affect population health and inequalities?
Supervisors:* *Dr Jon Olsen* *and* *Professor Rich Mitchell
It is well established that attributes of the built environment affect population health and inequalities. The process /system by which local and/or regional authorities decide what kind of built environment will exist and where can be loosely referred to as the 'planning system.' It follows that the planning system ought to have influence on progress in improving population health and reducing inequalities. In this PhD studentship, the candidate will draw on historic digital census and environmental data sets to explore and establish influence of the planning system in the greater Glasgow area on the development of population health and health inequalities that. The studentship would suit a candidate with skills in GIS, UK census data use and interests in population health and urban development.

How can we mix evidence and opinion in modelling impacts of built environment change?
Supervisors:* *Professor Rich Mitchell* *and* *Dr Jon Olsen
Urban (re)development almost always mixes different kinds of land use change, for example adding/removing housing, retail, transport infrastructure and services all at once. Research tools can provide pretty good quantitative estimates of the impacts of some of these kinds of developments on health, for example the relationship between road building, air pollution, and population house is relatively well quantified. However, impacts of other types of change are less well quantified despite being likely to have significant effects. Participatory systems mapping processes, including fuzzy cognitive mapping, can identify likely causal associations and/or my broadly rank the impacts but these processes do not produce precise quantifications which can be used in modelling. In this PhD, the candidate will explore whether and how we can mix different kinds of evidence to produce valid and robust quantitate models of plausible impacts of built environment change. This studentship would suit a candidate interested in both quantitative and qualitative methodologies, in pragmatic approaches to modelling, and in the impact of environment on health and health inequalities.

The role of nature, physical activity, and inequalities in health and wellbeing: a longitudinal analysis of the SPACES project
Supervisors:* *Dr Paul McCrorie* *and* *Dr Avril Johnstone
Evidence suggests that engagement with nature in childhood, such as visiting and playing in local parks, woodlands and other greenspaces, is important for improving health and reducing health inequalities. To help address important research questions in this area, we developed the SPACES project, an internationally novel dataset that combines rich GPS and accelerometery data for approximately 700 children at two time points; baseline at age 10/11 years old and follow up at 17/18 years old. Children who participated can be individually linked to Growing Up in Scotland (GUS) data, a longitudinal study that has tracked the lives of thousands of children since 2005, collecting data on: cognitive, social, emotional and behavioural development; physical and mental health and wellbeing; and other childhood health

related outcomes. This PhD aims to exploit these two powerful datasets to explore the longitudinal relationship between engagement with nature, physical activity, and children's health and wellbeing. Findings from this PhD will have policy and practice implications. Namely, we will be able to support the evidence on whether greater exposure to, and engagement with, the natural environment can help narrow the health inequalities resulting from socioeconomic inequality in young people across Scotland.

Relationships and health programme

What is the relationship between mental health, sexual wellbeing and reproductive health?
Supervisors: Professor Kirstin Mitchell, Dr Andy Baxter and Dr Ruth Lewis
This project will analyse data from the fourth National Survey of Sexual Attitudes and Lifestyles (Natsal 4; https://www.natsal.ac.uk/) to explore inter-relationships between reproductive health experiences, mental health and wellbeing, and sexual wellbeing in Britain. Examining key reproductive health outcomes – unplanned pregnancy, teen pregnancy, contraceptive use, abortion, menopause – it will explore how associations with mental and sexual wellbeing are shaped by inequalities (e.g. those of gender, socio-economic status, geographic location). These analyses could also make use of linked datasets (2021 Census; English pupil database). From the outset the research will involve close work with stakeholders to co-produce the research questions, and outputs. The PhD will suit a skilled quantitative analyst with an interest in producing evidence to underpin national sexual health policy.

Mental health of young people living in rural areas.
Supervisors: Dr Emily Long, Dr Claire Goodfellow and Dr Jo Inchley
Youth mental health is a key public health priority. Evidence suggests that adolescents living in rural and remote areas have worse mental health than their peers in urban areas of UK. This secondary data analysis project will use a rural over-sample from the Health Behaviour in School-aged children Scotland survey (HBSC; https://hbsc.org/) and other secondary data sources to examine differences in adolescent well-being by rurality. It will produce data to underpin strategies for targeted support to rural and remote youth. There will also be the opportunity to use other (qualitative and creative) methodologies to work with young people throughout the project.

People who use drugs and their social networks.
Supervisors: Dr Kathryn Skivington and Dr Mark McCann
Engagement with support is critical for long-term positive outcomes for people who use drugs. Such support can be formal (drug treatment, harm reduction services), or informal (social connection with family and friends). This PhD will explore networks of support available to people who use drugs. It will examine inequalities in networks of support by geographical area and by different types of services (such as social and formal supports for people recruited from Injecting Equipment Provision services, Residential Rehabilitation, community rehabilitation, peer-led groups). The PhD will involve social network analysis (full training provided), and could include further qualitative or quantitative analysis, depending on the student and focus.

Complexity in health programme

Considering the ethical issues of public sector/non-public sector partnerships within systems approaches to improve health

Supervisor: ***Dr Stephanie Chambers***

Many of the most pressing public health problems require systems-approaches to successfully improve health outcomes. There is greater recognition among policymakers and practitioners of the benefits of systems approaches that propose that different sectors have to work together to have the greatest impact. Nevertheless, within the literature around systems-approaches, there is limited discussion of when these relationships may be ethically challenging. For example, in tackling obesity, how can government and public health practitioners work with industry in a way that does not compromise public health aims? This PhD project could include a review of the evidence to examine whether ethical issues are raised in the literature on systems-approaches, interview a range of stakeholders about their views and experiences of partnerships, and the create guidance for partnerships within systems approaches to improve health.

Agent based models and population health

Supervisor: ***Dr Eric Silverman***

Agent-based models (ABMs) are computer simulations that allow researchers to model the behaviours of simulated individuals and their interactions with one another, as well as the surrounding physical and social context. ABMs allow us to examine how multiple, complex patterns of interactions between individuals, their health behaviours, and their surrounding environment, combine to determine population patterns in health outcomes. This modelling process can help us gain a better understanding of how to develop new interventions and policies to address these challenging 'wicked' issues. Potential areas of focus could include one of these:

Informal social care: ABM work in this area builds on previous studies investigating the complex challenges facing informal social care in the UK, and will develop policy solutions for improving social care provision and supporting carers as the population continues to age.

Alcohol: Alcohol is one of the major factors in contributing to addiction, death, cancer, violence and car crashes globally. ABMs provide a method to study how these factors lead to geographical and social inequalities in alcohol problems.

Green space: Contact with natural environments such as parks and forests leads to health benefits. These benefits may be greater for less advantaged people than for more advantaged people and, therefore, natural environments could help tackle health inequalities. What we don't know, however, is which landscape designs, population distributions, and means of promotion of natural spaces are likely to maximise benefits to human health. ABM can allow us to simulate different interventions, which helps us test some of our ideas before rolling them out in the 'real world'.

Applying systems methods to understand physical activity policy implementation

Supervisor: ***Dr Ben Rigby***

Promoting physical activity is a public health priority. Recent trends in research and practice support the need to address upstream and downstream determinants of physical activity through multiple policy solutions as part of a whole systems approach. Implementing whole systems approaches involving multiple levels and organisations is challenging and examination of physical activity policy implementation has been limited. Innovative solutions are required to co-develop 'active systems' that address the challenges of, and create supportive conditions for, implementation. The project will apply mixed methods approaches working with key stakeholders to generate data which will support the development of a theory of the necessary and sufficient conditions to support implementation.

Inequalities in health programme

Using data-driven prediction methods to identify exposure to benefits and benefit changes in investigating health impacts.
Supervisors: ***Professor Peter Craig*** ***and*** ***Dr Andy Baxter***
Changes to benefits and other social security provisions may affect the health and mental health of recipients and potential claimants. However, measures of benefit receipt, benefit income amount, eligibility conditions and health outcomes of interest are not always present in the same datasets and may be incompletely or inaccurately recorded in surveys. Using observed or synthetic populations it may be possible to predict a person's receipt of benefits. Machine learning and statistical models could be an avenue for transferring these predictions to datasets recording health outcomes, predicting benefit receipt from common socio-demographic variables. These imputed exposures could expand avenues for the investigation of the health outcomes of various benefit types by defining populations of interest and exposed/unexposed comparators. The project will explore alternative approaches for imputing benefit-related exposures and will suit candidates with an interest in quantitative methods for evaluating the health impacts of social security policies.

Do national social care policies impact on the health of long-term caregivers of older people?
Supervisor: ***Dr Elise Whitley***
Populations world-wide are aging with important implications for social, health and economic policy. In particular, improvements in medicine and technology mean that increasing numbers of older people are living for longer with disease, disability, and limitations to physical and cognitive functioning and there is a corresponding growing need for individuals, most often family members, to care for them. Existing work looking at caregivers of those with specific conditions such as dementia or schizophrenia indicates that caring is associated with worse quality of life and poorer mental and physical health. However, there is considerably less evidence regarding the health of caregivers more generally and, in particular, little is known about the impact of international differences in social care policies. Policies relating to informal and formal long-term care vary across European countries and, in particular, there are marked differences in the extent to which family members can be paid to provide care for their relatives. Cross-country differences in eligibility have been shown to impact on the uptake of funded care, but the extent to which these affect caregiver health and wellbeing is less well understood. This PhD will explore existing knowledge on the health and wellbeing of long-term caregivers and identify relevant cross-country differences in European social care policies. This will inform a quantitative analysis of European datasets to explore cross-country variation in caregivers' health and wellbeing, and the extent to which these can be explained by differences in social care policy.

Exploring the Nordic Health Inequalities paradox
Supervisor: ***Professor Vittal Katikireddi***
Scotland has large health inequalities. People in the poorest parts of Scotland usually live a shorter and less healthy life than those in the richest. The Nordic countries (including Sweden, Finland and Denmark) do not seem to have smaller health inequalities than elsewhere in Europe. However, this is surprising because these countries are thought to pursue social and economic policies (like progressive

taxation and generous benefits for those unable to work) which should help tackle health inequalities. The studentship will investigate this paradox. First, all previous studies that are relevant will be studied in detail in a systematic review to understand the potential explanations for this paradox. Second, potential limitations in the way health inequalities are being measured across countries will be studied. The student will explore what impact they may have on the comparisons being made across countries. Third, a more refined approach to understanding which countries pursue the most comparable social and economic policies will be developed. Fourth, we will assess which types of countries have the smallest health inequalities and how that relates to our more refined way of grouping countries. Throughout the PhD, we will work with Public Health Scotland to develop evidence to inform the efforts of Scottish Government, UK Government and WHO Europe to tackle health inequalities. An advisory group will help ensure this research produces findings that can be acted upon.

Systems Science Research in Public Health programme

Developing health inequality scenarios for future planning: Scoping methods and options

Supervisors: Professor Petra Meier and Professor Vittal Katikireddi

In recent years, international teams of climate scientists, economists and energy systems modellers have built a range of so-called "Shared Socioeconomic Pathways" (SSPs) that examine how global society, demographics and economics might change over the next century. The global and national SSPs are used as important inputs for the latest climate models and status assessments. The proposed PhD will build on this idea to explore options for developing similar pathways for health and socio-economic inequalities in the UK, including how best to consider past dynamics and trajectories and likely future changes. From the outset the research will involve co-production with experts and stakeholders. The PhD is about developing appropriate methods and options, and is not in itself expected to generate quantitative models of the pathways (which would be the work of a much larger team taking forward the findings of this research). Therefore no computer modelling skills are required. The PhD will suit candidates with a keen interest in health inequalities, public health, social policy, future-casting and providing decision support.

Understanding the impact of climate mitigation on mental health for different population groups

Supervisors: Dr Jennifer Boyd and Professor Alison Heppenstall

Evidence indicates that climate change has negatively impacted the mental health of citizens globally, causing anxiety, stress and depression. Yet many policies introduced or recommended to mitigate greenhouse gas emissions are independently associated with improved mental health, for example active travel and access to green spaces. The proposed PhD will scope out climate mitigation policies endorsed or implemented by the Scottish, Welsh, Irish or UK Governments and develop a system map linking the relevant identified policies to mental health outcomes. The research will involve co-production with experts and stakeholders. The PhD will involve the generation of quantitative models of pathways from climate mitigation to mental health and will test the impacts of these policies on different socioeconomic, ethnic, age, disability and gender groups mental health outcomes. Therefore, some experience of computer modelling is required. The PhD will suit candidates with a keen interest in sustainability, health inequalities, public health, policy, and quantitative simulation modelling.

Limits to Increases in Working Life Expectancy: The Role of Health and Health Inequalities

Supervisors: Dr Andreas Hoehn, Dr Jonathan Stokes and Dr Corinna Elsenbroich

In nearly all countries of the world, populations are aging. This phenomenon is caused by the fact that individuals live longer, while birth rates are decreasing. This situation presents a challenge for the long-term sustainability of social security systems, as the fraction of the working aged population is steadily decreasing. One key mechanism to counteract this trend is to ensure a higher working life expectancy. Analogously to the well-established measure of (period) life expectancy,

working life expectancy provides an intuitive and timely measure to quantify the expected average number of years spent in employment.
Theoretically, working life expectancy can be increased by a variety of simple measures, including an increase of the retirement age, or reducing involuntary exclusion from the labour market. However, the success of these measures in real-world settings will often be dependent on the health status of the work force – a relationship which is not well understood. Using multistate Markov models and microsimulation, this PhD project will examine (1) the association between health and the length of working life, and (2) how improvements in health would affect the length of working life. In order to gain insights into potential pathways between health and employment, this project will involve co-production with experts and stakeholders at an early stage of the project. This PhD will suit candidates with an interest in advanced quantitative methods, health inequalities, and decision support. With the help of an interdisciplinary team of supervisors, the student will develop a strong understanding of systems science and open science practices while addressing a pressing question at the intersection of health and social policy.