Project Details	
Project Code	PHS27Br Stone
Title	Modelling the impact of homelessness and related social exclusions on health in the UK
Research Theme	Population Health Sciences
Project Type	Dry lab
Summary	Homelessness is an increasing problem which is associated with considerable health harms. Homelessness overlaps with other forms of social exclusion, such as incarceration and drug use, which further increases their health harms. Interventions exist to reduce homelessness and/or mitigate its associated health harms, but it is unclear what interventions are needed to reduce the health harms related to homelessness to low levels. This PhD will use advanced statistical methods and mathematical modelling to better understand the health harms related to homelessness and other social exclusions and to determine the importance of different public health responses for addressing these health harms.
Description	Homelessness is an increasing problem in the UK. Homelessness overlaps with other forms of social exclusion, with homeless people in England having high levels of drug use (20-40% used heroin/crack in last year) and incarceration (25-50% ever incarcerated). These forms of social exclusion are inextricably linked. Homelessness is associated with considerable health harms, including heightened infectious disease risk, resulting in their life expectancy being 30 years lower than the general population. Other social exclusions further increase health harms, with data suggesting that just being homeless doubles mortality risk, while also experiencing incarceration and/or opioid use increases mortality risk 8-times. Interventions exist to reduce homelessness and its associated health harms, and similarly for people who use drugs and incarcerated people. For homeless people, this includes supported housing interventions, which improves numerous health outcomes, including infectious diseases, and reduces drug use and criminal justice involvement. Although homelessness, incarceration and drug use are interlinked, it is unclear the degree to which one social exclusion increases the likelihood of experiencing another or the degree to which each social exclusion contributes to health harms. Although modelling could help get insights on this, no existing studies have modelled the syndemic of homelessness and other social exclusions, or their health harms. This will be the focus of this PhD, which sits at the interface of mathematical modelling and population health, and will advance a novel area of research focused on modelling the social determinants of health among marginalised groups. The overall aim of the studentship is to use mathematical modelling to quantify the health harms associated with homelessness and related social exclusions and assess the impact of interventions that act on these social exclusions. The student will use advanced statistical methods to analyse UK datasets of homeless people and related groups to estimate the size of the homeless population, the degree to which it overlaps with other social exclusions, and determine how multiple social exclusions worsen health and intervention outcomes of homeless people. These findings will be

	used to develop a mathematical model of the dynamics of homelessness and related social exclusions for the UK to evaluate the degree to which the risk of homelessness is affected by other social exclusions, and to estimate the contribution of other social exclusions to the health harms of homeless people. Lastly, the model will be used with data on relevant interventions to project their impact on reducing homelessness and their health harms. The project will focus on infectious disease related health harms (e.g., HCV or skin/wound related infections) and mortality, but could incorporate other health harms. The student will need a first degree (minimum 2:1) in a highly numerate subject and will develop skills in infectious disease modelling and advanced statistical methods. They will join a vibrant and diverse multi-disciplinary research team with global experience in infectious disease modelling, epidemiology and undertaking research in homeless groups. The groups at Bristol, Cardiff, and UKHSA hold several collaborations, which provide an opportunity for the student to work on various datasets. This project has the potential to strengthen the public health response for homeless individuals. There is flexibility in refining the project aims. For example, depending upon the student's interests, the epidemiological analyses and models could be tailored to focus on different health harms (e.g., mental/physical health outcomes). There is also flexibility in the datasets that could be analysed, including cross-sectional surveys of homeless people and people who use drugs, longitudinal surveys where homelessness is recorded, or linked administrative data to consider longitudinal trends in homelessness, drug use and incarceration, and their impact on health. We plan the PhD to focus on the UK, but there are opportunities to focus on other global settings through our international collaborative network. Lastly, although the focus of the models will be the homeless population, there is flexibility in which other social exclusions are included, which we initially planned to be drug use and incarceration. To help inform these choices, the student will be referred to key articles, encouraged to undertake brief literature searches, and supported to engage with collaborators.
Can be completed part time?	Yes
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