GEOGRAPHIES OF SPACE, PLACE, AND POPULATION HEALTH

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Health outcomes and health behaviours vary across people and places. Whilst this may seem an obvious observation when thinking about differentials between the global north and south, it is also an important fact when considering inequalities within any one nation or region.   As an example, in 2009 life expectancy for a male living in the North East region of England was 76.8 years, whereas females had a slighter higher figure of 80.9 years. However males and females living in the South East region of the country could expect to live to just over 79 years and 83 years, respectively. In a similar vein, people from lower socio-economic grades in England are much more likely to smoke than people with higher socio-economic status and the likelihood of an individual smoking is much lower in less deprived areas compared to poorer areas (Twigg, Moon et al. 2000). In essence, where a person lives is as important as who they are in terms of their health.

To understand more fully the significance of geography for population health it is useful to note the distinction in meaning between the terms 'space' and 'place'. Whilst these terms are often used interchangeably in general discourse, they do have a subtle but important difference when used in the discussion of geographical influences on health. Space often refers to a simple point or area location based on Euclidean geometry and might define, for example, the locations of sources of industrial pollution or the distances between health service facilities and the populations they serve. The area covered by municipal parks, gardens and other green spaces, described as a total proportion of the urban area may be regarded as spaces for possible health enhancement. In contrast, place has a more rooted definition that takes into account the social relations and social construction of space. Not only does place *contain* social relations and physical resources but it is fundamental in the *formation* and *evolution* of social relations. Importantly, there is an on-going recursive interplay; people create and forge places and places influence people.

One of the first acknowledgements of the importance of geography in explaining health outcomes can be found in the Hippocratic writings of ancient Greece where, in the treatise '*Airs, Waters and Places',* it is noted that the quality of air and water would influence the physical health and disease of people and that the 'constitutions and habits of a people follows the nature of the land where they live'. Indeed, the fundamental understandings underpinning this early introduction to public health were applied centuries later in the cleaning up of the densely populated towns and cities of the industrialised nations during the nineteenth and early twentieth century. Clean water supplies, improvements in sanitation and overall living standards contributed to large decreases in mortality rates and increases in life expectancy.

Space and place however have not always been dominant in public health discourse. In the early twentieth century, the importance of scientific western medicine prevailed and the idea of specific aetiology (i.e the assumption that for every diseases there is a single and observable cause that can be isolated) took hold. In parallel, attention shifted more towards the links between individuals and health outcomes and less on the contexts within which they

lived their everyday lives. The recognition of individual lifestyle and health-related behaviours, namely smoking, alcohol intake, diet and exercise in contributing to variations in chronic conditions became a strong focus for public health policy. Furthermore, the methods and techniques to look at the links between behaviour and outcome in the ever-increasing sources of individual level data sustained this focus on individual causes rather than geographical contexts (Macintyre, Ellaway et al. 2002).

However the 1990s saw a resurgence amongst epidemiologists, sociologists, public health practitioners and geographers in attempts to understand what it is about place that influences health outcomes (Moon 1995). This return to the 'old' style of public health was due partly to the disenchantment with the so-called 'victim blaming' approach associated with individual behaviour and a recognititon that individuals (agents) are unable to make rational choices outside of the social, economic and political contexts (structures) within which they live. In turn, public health researchers became interested in determining how much of an influence place had in shaping health status and health-related behaviour. How much explanation could be ascribed to individual characteristics (*composition*) and how much could be explained by place and space factors (*context*) dominated the early discussions (MacIntyre, Maciver et al. 1993).

In parallel with the development and adaption of the theoretical dualism of contextual and compositional explanation of health inequalities, the late 1980s and early 1990s witnessed advances in statistical causal modelling that were directly applicable to the investigation of place effects on health. Causal modelling based on traditional regression techniques conflated individual and area level explanations and were unable to sidestep the ecological fallacy, whereby relationships found at an ecological or geographical level are assumed to exist at an individual level. New developments in multilevel methods correctly ascribed explanation and unexplained variation at different geographical levels or contexts and thus avoided false conclusions based on ecological fallacies. Multilevel models were able to determine how much variation in health outcome was due to individual level factors and how much was due to area influences. In more complex designs, 'cross-level' interactions explore independent influences for a certain type of person found in a certain type of place. For example, in a multilevel analysis of mortality variations across England and Wales, Ecob and Jones (1998) found that the risk of dying decreases with the level of professional workers in the area but this decrease is greater for individuals in the skilled and professional social classes, resulting in individual social class differentials being less marked in areas where the proportion of professional workers is low and more marked where they are at their highest density. Furthermore, modelling of higher level variances and co-variances can reveal how the general relationships vary across different types of places.

Much of this early work, undertaken by geographers, focused on individual and spatial variations in health-related behaviours such as smoking and alcohol consumption (for a review see Twigg and Cooper 2009). Whilst focusing on the technique itself, the research also highlighted the substantive advantages that the approach could offer in unpacking the complexity surrounding individual and area influences on health related behaviours (e.g. Jones, Moon et al. 1991). Furthermore, and perhaps unusually so for findings based on quantitative technique, the narratives had much to say regarding the links to social theory and embedded the work amongst ideas surrounding structuration theory and critical realism, both of which attempt to capture the complexity of reality by highlighting the ongoing, recursive nature of people-place interaction.

The early multilevel approaches tended to work with place-level descriptions that were comprised of aggregate counts of the characteristics of individuals within them as is often found in traditional indices of deprivation. However the argument was that these higher 'level' summaries of material and social resources had an independent effect over and above individual indicators of deprivation (Duncan, Jones et al. 1999). A number of debates ensued as to whether such area level indicators had very much more to add in terms of explanatory power over and above individual level characteristics of deprivation (see for example MacIntyre, Maciver et al. 1993; Sloggett and Joshi 1994; Diez-Roux, Merkin et al. 2001; Pickett and Pearl 2001). As the debates became more nuanced there was a plea to capture place effects that went beyond measures derived from aggregate counts of the types of individuals found in those areas and instead capture truly ecological characteristics of place (Macintyre, Ellaway et al. 2002). Such contextual characteristics summarized opportunity structures in the local physical and social environment and might include the quantity and quality of green space; the affordability and availability of healthy eating opportunities; the regularity; reliability and affordability of public transport or the subjective qualities and perceptions of the immediate residential environment.

Alongside debates and shifts to capture more meaningful place descriptions, concentration also focused on a deeper understanding of causal pathways. Again much of the original multilevel modeling work was criticized for being too simplistic in the operationalisation of place effects. Early proponents of the importance of place warned against the rather crude dualism of the context versus composition dichotomy, arguing that they were not 'mutually exclusive, competing and culturally and historically universal' (Macintyre, Ellaway et al. 2002, p129). Instead, there should be an acknowledgement that individuals and households are moulded and influenced by the local environment. For example, local labour markets will influence individual social class and local housing markets will influence individual tenure. In essence these individual level variables (i.e. class and tenure) are very much inflenced by their contextual setting and therefore the effect of rented tenure in London is not the same as rented tenure in a deprived part of Scotland. Conclusions dismissing place differentials based on personal characteristics fail to recognise that these individual influences are very much themselves contingent on local opportunity structures or *collective* descriptions of place (Frohlich and Potvin 1999; Macintyre, Ellaway et al. 2002; Macintyre and Ellaway 2003). These include social, cultural and historical elements of communities, accepted norms or cultures of behavior such as practices and attitude regarding smoking in the homes of immediate neighbours or other family members; cultural attitudes towards alcohol consumption or traditions regarding fast food consumption. Whilst the interplay between places and people was routinely being investigated within extensive, quantitative multilevel modeling frameworks (as 'cross-level' interactions), researchers were also calling for a broader but more nuanced understanding of their socio-theoretical underpinnings.

Collective dimensions of place also interweave into studies which have investigated the influences of social capital on health and provide a useful framework within which to determine how aspects of social cohesion, neighbourhood trust, collective efficacy, levels of civic participation may all contribute to individual health outcome. This work connects with the causal mechanisms described in Richard Wilkinson's income inequality thesis whereby large income differentials between the rich and poor in developed nations lead to poorer health outcomes. Here it is hypothesised that the existence of socio-economic gradients results in less cohesive communities and lower stocks of social capital. In turn this may lead to less social support, more health damaging behaviours and higher levels of stress, all of which influence health outcomes (Wilkinson and Pickett 2009).

Alongside the operationalisation difficulties identified above, investigating place effects on health is further challenged by the persistent problems associated with attempts to define those places, neighbourhoods and communities that might influence a particular health outcome or behaviour. In reality, individual attitudes and behaviours are influenced and affected simultaneously by many different sets of people and environments (e.g household, neigbourhood, place of work, social and leisure). Moreover, with increasing population movement and migration and the rise in popularity of 'virtual' social networking (e.g. via Facebook and Twitter), spheres of influence become ever more widespread, multi-scalar and complex (Pearce, Barnett et al. 2011). Cummins *et al* (2007) have argued for a definition that incorporates relational, rather than conventional, views of place where places are seen as nodes in networks, which are dynamic and fluid, separated by socio-relational space, acknowledging that their populations are mobile. Moreover, the characteristics of these places are described by, and contingent on, different individuals and groups across the lifecourse, all of whom ascribe different power relations and cultural meanings to place.

Notwithstanding these difficulties, work is now attempting to address all of these challenges. For example, it is widely accepted that local and regional context shapes smoking behaviour. More specifically, residing in an area of social disadvantage increases an individual's propensity to smoke. However in theorizing the links between place and smoking, Pearce et al (2011) argue that key pathways relate to place-based practices and area-level policy regulation. Place-based practice incorporates concepts of social capital; behavioural norms and cultures; contagion; and neighbourhood crime disorder and stress. Area-level policies such as smoking cessation initiatives, control of tobacco retailing and advertising and urban renewal can all be regarded as contextual influences which shape smoking behaviour. Importantly, the assumed 'protective' or 'harming' effect of any one of these pathways is not necessarily uniform across all types of places or people and further research is needed to understand the contingent nature of the relationships and multiscalar complexity.

It is now widely acknowledged that future studies into place effects must be more theoretically driven, relying less heavily on convenient and available measures of neighbourhoods from routine surveys. Instead studies should focus on the mechanisms that drive individuals to undertake social practices recursively within social structures and within places constituted at various scales in various ways at different times (Frohlich, Corin et al. 2001). Intensive, theory-exploration approaches should inform extensive, hypothesis testing techniques within a framework of methodological pluralism to find real conclusions to best inform public health policy and practice.

Cross References
Spatial Epidemiology
Geographies of Health Inequality
Neighborhood disadvantage/Place/Living conditions
Social capital
Income inequality hypothesis
Health behaviours
Smoking and health
Health and culture

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