Contextual effects on health inequalities: a research agenda

Odile Sauzet and Alastair H Leyland

The neighbourhood context in which we live can affect our health in many ways. Some are obvious: pollution incurred by living close to a motorway can impact on our respiratory health; or the lack of local possibilities for walking affects how much we exercise, potentially leading to weight gain or cardiovascular problems. Some contextual effects are less direct; mean neighbourhood income can influence the availability of goods, services and facilities in an area and, since these are available to everyone, affect the health of high and low income residents[1]. This is an example of the importance of distinguishing individual and contextual effects. Another example of a contextual effect would be neighbourhoods prone to crime and anti-social behaviour being a source of stress and thus increasing, among other things, the risk of mental illness among all of the residents. But then social capital at the neighbourhood level can be a modifying factor, providing resources which then affect social behaviours, leading to healthier lifestyles for all.

If the neighbourhood context can affect health, then the physical context in which we live can contribute to health inequalities between areas. Such an inequality is in addition to inequalities determined by individual characteristics or behaviours. These inequalities are not due to personal choices and are iniquitous. A large body of scientific literature now exists demonstrating that context does impact on health inequalities but open questions remain in particular regarding the underlying mechanisms that lead to health inequalities at the area level[2]. For this reason a series of workshops over the last four years at the Centre for Interdisciplinary Research (ZiF Bielefeld, Germany) brought together researchers representing several disciplines to consider contextual effects on health inequalities, raising challenges and investigating solutions.

Merely showing that the neighbourhood context has an effect on the health of its inhabitants, although interesting, is not in itself sufficient. Without understanding how contextual health inequalities are generated, evidence of an effect cannot be translated into benefits for the populations concerned. To have public health relevance, research into contextual health inequalities must have the long term aim of acquiring knowledge that can be transferred into interventions and policies, thus making a difference to people's health.

Research into contextual effects on health inequalities can play a public health role by addressing populations rather than individuals. Given the tendency for similar people to live near each other, the difficult task of disentangling context from composition is critical. But there is a benefit of knowing the pathways by which the context manifests itself in the development of health inequality. Specifically this would enable the development of interventions which use the same pathways, thus reaching individuals through their neighbourhood context. Disadvantaged people are usually hard to reach at an individual level, but intervening at the area level may prove more effective.

Of course, calls for improvements in research on contextual effect are not new[3]. However, two aspects particularly relevant for the development of interventions at area level are emerging. The first concerns the nature and size of effects which are to be expected in research on contextual health inequality. How do we measure such effects? And what effect size matters? Often, evidence of contextual effects has been obtained by fitting multilevel models which provide a measure of the correlation of the outcome between individuals contained in administratively defined geographical units. Can we translate this correlation into a quantifiable effect?

The second issue is that measuring effects requires data. Longitudinal data, preferably lifelong data, are required to study contextual effects because past contexts, not necessarily only the present context influence health. Critical periods during the lifecourse which are particularly relevant for the development of contextual health inequalities need to be identified[4].

Such cohorts tend to be rare and expensive and the full range of information we need is not always present. Therefore researchers must be creative with data and look for alternatives to birth cohort studies. One possibility is to pool existing datasets to create accelerated cohorts in which subgroups with similar profiles but at different life stages are matched. An alternative is to create cohorts from different registers from the health

and other sectors. A further potential line of investigation is to use simulation based methods such as agent-based modelling to assess hypotheses or investigate the expected effect of interventions[5].

We have been writing about contextual effects for decades. That there are substantial health inequalities is not disputed. It is, therefore, time to take research on the ways in which contextual effects create health inequalities to the next level by making such research fit for the development and assessment of interventions. To achieve this, some methodological challenges remain. Meeting these challenges requires concerted action from the research community into the measurement of contextual effects and the acquisition of the necessary data.

References

1. Diez-Roux AV. Bringing context back into epidemiology: Variables and fallacies in multilevel analysis. *American Journal of Public Health;* 1998;2:216–222.

2. Galster G. The Mechanism(s) of Neighbourhood Effects: Theory, Evidence, and Policy Implications. In: van Ham M, Manley D, Bailey N, Simpson L, Maclennan D, eds. *Neighbourhood Effects Research: New Perspectives:* Springer Netherlands; 2012:23–56.

3. van Ham M, Manley D. Neighbourhood effects research at a crossroads. Ten challenges for future research. *Environment and Planning A;* 2012;12:2787–2793.

4. Kuh D, Ben-Schlomo Y, Lynch J, Hallqvist J, Power C. Life course epidemiology. *J Epidemiol Community Health* 2003; 57:778-783.

5. El-Sayed, A M; Scarborough, P; Seemann, L; Galea, S: Social network analysis and agent-based modeling in social epidemiology. *Epidemiologic perspectives & innovations* 2012, 9:1