

# Public health: why study neighborhoods?

Ana Isabel Ribeiro, MPH, PhD<sup>a,b</sup>

The idea that where individuals live makes a difference to their health is not new. Suffice to think of Snow's<sup>1</sup> well-known map of cholera deaths in London, a milestone in modern epidemiology, to realize that. Yet, epidemiology and public health have been mostly focused on the study of individual-level risk factors for disease.<sup>2,3</sup>

Since the 1990s there has been a renewed interest in the role of place in shaping population health.<sup>4,5</sup> This rehabilitation of the ecological perspective within epidemiology was triggered by an emerging interest in social inequalities in health, by the development of new statistical techniques, and by the realization that to understand health and health-related behaviors, we must adopt a socioecological framework that recognizes individuals as embedded within larger social systems.<sup>6</sup> Using Morgenstern's words, the idea underpinning this emerging line of research is that "although disease development is an individual biological phenomenon, it is possible that certain important disease determinants cannot be operationalized entirely at the individual level."<sup>3,7</sup>

Taking the residential neighborhood as an ecological unit of analysis, hundreds of cross-sectional and, more recently, longitudinal studies have linked neighborhood characteristics, both physical and social, to a wide range of health behaviors and downstream outcomes: physical activity,<sup>8,9</sup> diet,<sup>10</sup> mortality,<sup>11</sup> mental health,<sup>12</sup> perinatal outcomes,<sup>13</sup> quality of life, and well-being.<sup>14</sup> Most of the research on place effects has made serious efforts to ascertain whether places do indeed "matter" for health variation by trying to disentangle the so-called contextual and compositional effects. Essentially, when we observe differences in health between places, these differences might occur because of differences in the kinds of people who live in those places (a

compositional explanation), or because of differences between the places (a contextual explanation).<sup>4</sup> Although this dualism between context and composition may be more apparent than real – there is certainly a mutually reinforcing and reciprocal relationship between people and place<sup>15</sup> – it is important to address this issue from a public health perspective. If variations in health across neighborhoods are exclusively explained by the personal characteristics of people who choose to reside there, then policy makers only need to act in changing these personal characteristics, and place-based interventions become irrelevant; if, on the contrary, variations depend on contextual factors, then interventions toward residential, social, and physical environments become essential. Multilevel models have made it possible to somehow separate contextual and compositional effects, and demonstrate that, although personal characteristics seem to play a bigger influence on health, important contextual effects also exist.<sup>11,16</sup>

Although a considerable amount of work has been published on the relative importance of contextual and compositional effects, much less attention has been given to investigating the mechanisms and pathways through which people's health might be affected by their residential context. According to Macintyre et al,<sup>17</sup> these mechanisms can be organized into the following categories:

- a) Physical features of the environment shared by all residents in a locality. This encompasses features such as air pollution, noise exposure, water quality, and climatic characteristics that are almost equally shared by everyone who resides in a certain location.
- b) Availability of healthy/unhealthy home, work, and leisure environments. Neighborhoods tend to differ in terms of housing conditions, availability of healthy foods, and equipment for active leisure (green space, playgrounds, water features, etc). Contrasting to the previously mentioned physical exposures, these environments are not necessarily shared by all residents and the extent to which residents are exposed to such healthy/unhealthy environments depends on their material and sociocultural resources.
- c) Services to support daily living. Here we have educational, cultural, and health facilities; transportation; policing; religious institutions; and community organizations, among others. The effect of these features over one's health again depends on personal circumstances. For instance, transportation may be more important for those who do not own a car.
- d) Sociocultural features, such as the community's history, political, ethnical, and religious characteristics, but also the traditions, social norms, aspirations, social capital, and safety levels.
- e) Neighborhood reputation, that is, how residents and others perceive a certain neighborhood, which can generate feelings of stigma, condition the allocation of infrastructures in the area, and affect the residents' morale.

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<sup>a</sup> EPIUnit-Instituto de Saúde Pública, Universidade do Porto, Porto, Portugal,  
<sup>b</sup> Departamento de Ciências da Saúde Pública e Forenses e Educação Médica, Faculdade de Medicina, Universidade do Porto, Portugal.

E-mail address: ana.isabel.ribeiro@ispup.up.pt

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There are some obvious interactions between these categories and they are not mutually exclusive. Indeed, harmful neighborhood features tend to coincide in space and affect primarily deprived neighborhoods, which explains the mushrooming evidence demonstrating that individuals residing in socioeconomically deprived neighborhoods present poorer health outcomes, regardless of their own socioeconomic status.<sup>11</sup> Wealthy neighborhoods tend to attract beneficial facilities, such as healthy food shops,<sup>18</sup> cultural and recreational places,<sup>19</sup> and keep away toxic and harmful exposures such as air pollution,<sup>20</sup> waste dumps, or industries,<sup>21</sup> which are often disproportionately concentrated in disadvantaged areas. Furthermore, the socioeconomic structure of neighborhoods also influences behaviors, aspirations, and social norms shared by residents.<sup>15</sup> For instance, unhealthy coping behaviors such as alcohol consumption and smoking are more common in disadvantaged neighborhoods, not only due to the presence of infrastructures (tobacco/alcohol retailers) that potentiate such behaviors, but also because these behaviors are more widely accepted by the community.<sup>22,23</sup> Hence, residents in poor neighborhoods experience a “double jeopardy” – not only are they personally poor, but they are also more likely to reside in neighborhoods that lack the opportunities to lead a healthy life.<sup>4</sup> Notice that the importance of each mechanism may differ across countries and regions, due to different degrees of sociospatial segregation (the extent to which similar societal groups reside close to each other).

As anticipated, there are constraints and methodological problems in this line of research, which may affect the quality of inferences with regard to health outcomes. The so-called *Uncertain Geographic Context Problem* (UGCoP), for instance, is pervasive in most of the ongoing investigations. Focusing only on residential neighborhoods can introduce substantial uncertainty in research results, because people spend a considerable amount of time outside their home environment.<sup>24</sup> The UGCoP happens whenever administrative/statistical areal units do not correspond to people’s true geographic contexts. Ways to minimize UGCoP include the use of mobile tracking technology (eg, global positioning systems, GPS) or qualitative methods to identify people’s true geographic and temporal contexts.<sup>24,25</sup> In addition, the absence of a strong theoretical basis in the study of contextual health effects has been limiting the translational potential of these studies. Contextual effects related to space and place may be quite complex and need to be integrated with more individual theories about the processes and determinants that explain health and disease.<sup>26</sup> It is therefore important for researchers to begin to be explicit about the causal pathways they believe to be operating between neighborhood context and health, and to answer not only the question “what?” but most importantly the question “how?”<sup>27</sup>

From a public health perspective, obtaining a clearer understanding of the pathways through which neighborhoods exert their effects is essential for public policy formulations.<sup>28</sup> More than raising hypotheses, drawing attention to health inequalities and stimulating the political debate, investigations on place effects should guide public health interventions. These interventions may include improvements in services to support daily living such as classic public health measures that in the past yielded life-changing results (eg, sanitation in the 19th century). Moreover, the identification of critical geographical areas may also elucidate where traditional public health interventions, aimed at individual risk reduction, may best be targeted. The latter is especially relevant because to narrow the health gap in an

equitable way, one should bring up the health level of the groups of people who are worse off to that of the groups who are better off.<sup>29</sup> Naturally, place-based interventions should involve all local actors (citizens, economic, and political and social organizations) and should be accompanied by well-designed health impact assessments to ascertain their benefits and to guarantee they cause more good than harm.<sup>29</sup>

Summing up, place has acquired a predominant position in epidemiology and public health. It is currently non-negotiable that context matters for health but there is still a long road to go through before research findings translate into public health practice. To strengthen and revitalize research of contextual health effects, epidemiologists and public health specialists should anchor on robust geospatial technologies (eg, GPS, Geographical Information Systems), statistical techniques (multilevel and Bayesian models) and qualitative methods (interviews, ethnography), and well-defined conceptual frameworks to improve the quality of inferences. These will ultimately allow for uncovering etiological pathways and determining how place-based public health interventions should be designed.

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## Conflicts of interest

The author reports no conflicts of interest.

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