Pathways for a multi-solving sustainability policy aimed at health (inequalities): A scoping review

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Background

Walkable neighbourhoods and cities, which have been conceptualized since the early twentieth century, have been increasingly implemented in recent decades on a global scale. These are now commonly termed 'x-minute cities' or neighbourhoods. For example, the '20-minute neighbourhood' – daily service needs met within a 20-minute round-trip – has its modern origins in Portland, Oregon, in the 2010s. The concept draws from historical ones, like Ebenezer Howard's 1898 'Garden city' and the 'compact city' approach[12]. In recent years other terms have been coined, such as the '15-minute city' in 2015 by Carlos Moreno at the Paris COP21 conference. These x-minute neighbourhood and city concepts have received strong policy support by national and local governments. For instance, they have been planned or adopted by nearly 33 cities around the world in the C40 cities network[3]. The concept has been gaining further popularity post-COVID-19, particularly, and has now been pitched as a wider "framework for sustainability, liveability, and health" (i.e., a multi-solving policy)[4].

With currently many assumed benefits but little empirical assessment, it is especially important to clearly understand the assumed pathway to improved outcomes in different settings. Without concrete operationalising of these policies, it is difficult to monitor, evaluate and assess the impact on its desired outcomes, which commonly include improving health and reducing inequalities[567]. While there has been a growing body of evidence on the general relationship between health and neighbourhoods, the evidence remains both mixed and unclear through which specific pathways x-minute neighbourhoods might improve health and health inequalities[8]. A recent paper by Olsen et al shows deprived neighbourhoods fitting most 20-minute neighbourhood domains, which raises the question whether accessibility through proximity alone is enough for improved health without more targeted planning[9]. It is therefore essential to explore how different operationalizations of x-minute

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[1] "The Portland Plan Progress Report," 2017.
[2] "Walkability: What Is It?," accessed December 9, 2022, https://doi.org/10.1080/17549170903092867.
[3] Alexa Gower and Carl Grodach, "Planning Innovation or City Branding? Exploring How Cities Operationalise the 20-Minute Neighbourhood Concept," *Urban Policy and Research* 40, no. 1 (January 2, 2022): 36–52, https://doi.org/10.1080/08111146.2021.2019701.
[4] Zaheer Allam et al., "The 15-Minute City Offers a New Framework for Sustainability, Liveability, and Health," *The Lancet Planetary Health* 6, no. 3 (March 1, 2022): e181–83, https://doi.org/10.1016/S2542-5196(22)00014-6.
[5] Gower and Grodach, "Planning Innovation or City Branding?"
[6] Lukar E. Thornton et al., "Operationalising the 20-Minute Neighbourhood," *International Journal of Behavioral Nutrition and Physical Activity* 19, no. 1 (December 2022): 15, https://doi.org/10.1186/s12966-021-01243-3
[7] O' Gorman and Dillon-Robinson, "20 Minute Neighbourhoods in a Scottish Context."
[8] V J McGowan et al., "Examining the Effectiveness of Place-Based Interventions to Improve Public Health and Reduce Health Inequalities: An Umbrella Review," *BMC Public Health* 21, no. 1 (December 2021): 1888, https://doi.org/10.1186/s12889-021-11852-z.
[9] "Nationwide Equity Assessment of the 20-Min Neighbourhood in the Scottish Context: A Socio-Spatial Proximity Analysis of Residential Locations," *Social Science & Medicine* 315 (December 1, 2022): 115502, https://doi.org/10.1016/j.socscimed.2022.115502.

neighbourhoods might impact health and health inequalities to inform these interventions as they are increasingly rolled at a city or even national scale, such as with Scotland's proposed national plan[10].

Theoretical focus

For this review, we define x-min neighbourhoods and cities as concepts that focus on "proximity, diversity, density and ubiquity" for greater accessibility and equality of service and space use. Their aim is creating spaces where all essential services for daily life are in accessible distance through walking, cycling, or high-quality public transport in residential areas. We scoped the existing evidence-base to answer our main research question: "How have pathways to health (inequality) outcomes been detailed within the operationalisation descriptions and plans of x-minute neighbourhoods, cities and urban areas?".

Methods

We followed the Arksey & O'Malley (2005) framework for scoping reviews, along with the subsequent methodological enhancements by Levac, Colquhoun & O'Brien and Peters as well as the PRISMA-ScR Checklist (18–21). Scoping reviews provide a broad overview of a topic, which is suitable due to the broad range of conceptualizations of x-minute neighbourhood and novelty in implementation. Identifying the research question (Stage 1) is described in detail in the published protocol[11].

Stage 2 & 3: Identifying and selecting relevant studies

Database selection and search strategy

We first identified practical plans or implementation examples from relevant academic literature, primarily looking for details of the implementation (plans) and how they envision health (inequality) impacts. A researcher searched academic literature in the databases Scopus, and the Ovid interface for Medline and Embase. The search used the following search terms as keywords in abstract and title, determined by input from the research team and collaborators with expert knowledge: *-minute city, *-minute neighbo*, *-minute community, Complete communit*, Walkable neighbo*, Liveable neighbo*, Compact city, Active city, Compact urban, Chrono-urban, Superblock, Isobenefit urban and Neighbo* unit[12].

For relevant grey literature, we followed a snowball search strategy to retrieve examples from searched academic literature and relevant C40 cites to look for planning or policy documents on government websites and related organisations. The search results were imported into the reference management software Zotero.

Study selection

Two phases of screening were conducted for the academic database searches by two reviewers against the in- and exclusion criteria: 1) screening of title and abstract and 2) screening of full text articles. At both screening stages, an initial 10% random sample were independently double

[10] "Local Living and 20 Minute Neighbourhoods: Planning Guidance - Draft for Consultation," n.d.
[11] Roxana Pollack et al., "How Could 'x-Minute Cities or Neighbourhoods' Impact Health? Protocol for a Scoping Review," January 20, 2023, https://doi.org/10.6084/m9.figshare.21897411.v1.
[12] T. M. Logan et al., "The X-Minute City: Measuring the 10, 15, 20-Minute City and an Evaluation of Its Use for Sustainable Urban Design," *Cities* 131 (December 1, 2022): 103924, https://doi.org/10.1016/j.cities.2022.103924.

screened to check for and attend to any discrepancies in screening agreement rate (measured by Cohen's kappa). All grey literature identified was screened by a reviewer to assess the links to health/health inequality outcomes explicitly. Four reviewers each individually then extracted a number of papers each, which was then checked by an additional reviewer. The following inclusion criteria were applied: 1) deal with 'x-minute concepts';2) discuss a concrete example(s) of a planned or realised implementation; 3) link to health outcomes, health inequalities or social determinants of health. Studies were excluded if they were not available in English (language title and abstract) or published priori to 1980.

Stage 4: Charting the data

Data was extracted on bibliographic variables: (article title, author(s), year of publication, journal title), setting variables (study location), concept variables (concept type, implementation status, concept characteristics), health, health inequalities, and social determinants pathways, and references used. Where health/health inequality/social determinant pathways were supported by references, we examined the original references to comment on the supporting evidence. The abstracted data was compared and discussed to ensure consistency between the researchers. For validation and coding, all data was compiled in the reference management software Rayyan, and decisions tracked in an excel spreadsheet.

First results

We included data from a final 110 papers on 37 cities. Within the included 37 cities, health was mentioned as a target outcome within all policy proposals, despite their varying concepts. It spanned a broad range of potential health concerns (e.g., physical, mental, non-communicable diseases, communicable diseases), however most often health included in a very general way (e.g., "wellbeing", "improved health"). Pathways to health outcomes were structured into three different key themes based on the main characteristic of the path: proximity, place redesign and environmental protection. Proximity-based pathways were the most common and focused particularly on assumed increased active travel and accessibility and use of services. Knock-on effects being theorised to lead to health outcomes within this pathway mostly focused on a reduction in car usage, pollution and emissions, increased physical activity, community engagement or safety and even improved healthcare. **Figure 1** shows the interconnection between these planned proximity-based improvements and the frequency of specific paths to health outcomes. Interestingly, many pathways mentioned in policy plans also focused on an element of place redesign, which included improved quality of services or infrastructure as well as the expansion of public and green spaces. Increased physical activity, sustainability, community engagement or safety and investment in the local economy were common knock-on effects for this pathway, which sometimes included specific health outcomes. Very few policy plans also specifically focused on environmental protection and its pathways to health, mostly referencing net zero and climate related mitigation measures connected to sustainability more generally.

However, while many planned or implemented policy concepts included broad pathways, a lot of health outcomes were not well connected to the planned changed to the built environment and connected impacts to social and structural determinants of health. Many policy plans included incomplete outlines of pathways to health outcomes or simply mentioned health outcomes without any obvious references to how these will be achieved at all.

Health inequalities were mentioned in about a third of policy plans, but very often without any more concrete descriptions of pathways or the specific outcomes themselves. The few pathways mentioned in policy plans focused on improved inclusion within communities, greater affordability,

and accessibility of services, both mainly revolving around proximity and place redesign. However, there were also concerns raised in some plans that inequalities could potentially increase via gentrification and increased prices as a place's desirability increased. These potentially unintended consequences might be particularly pertinent to evaluate and monitor, especially in the context of increasing health inequalities globally post-COVID-19.

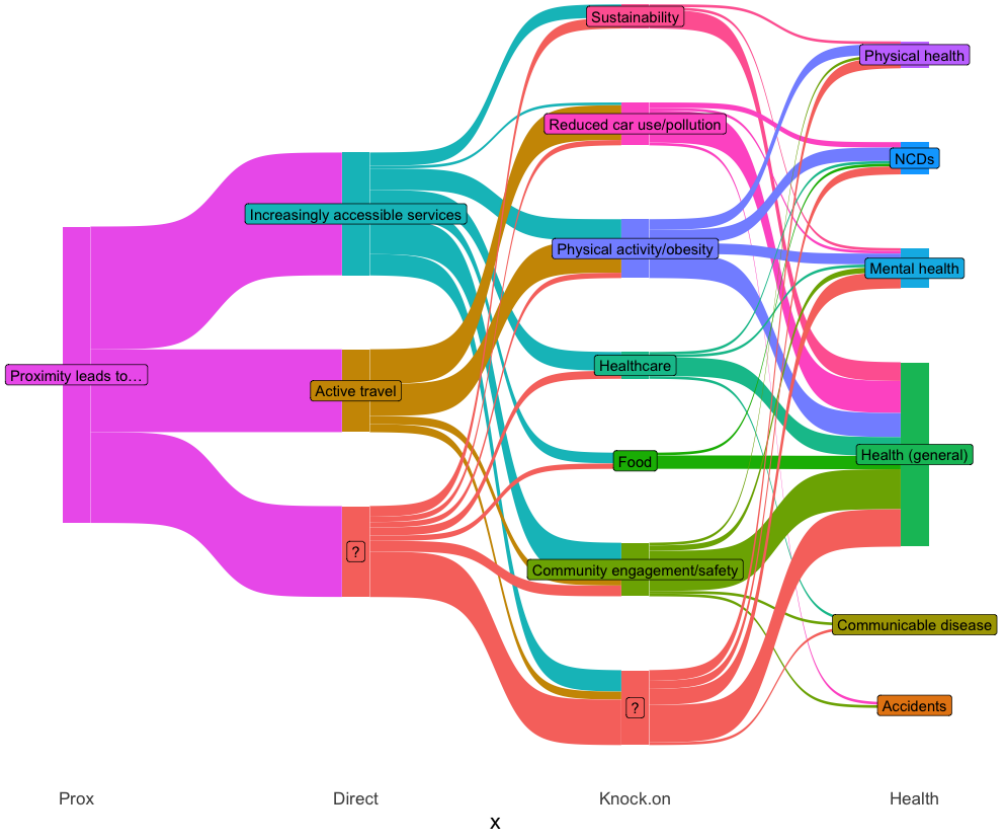

Figure 1: *Sankey diagram of proximity-based pathways to health outcomes across all city policy plans*

Conclusion and Outlook

In this study we explore the pathways between different planned and implemented x-min neighbourhood and city concepts to health and health inequality outcomes in their policy plans. First results indicate pathways to health (and in few cases health inequalities) follow a few key themes (proximity, place re-design, environmental protection). However, while some feature knock-on effects leading to specific health outcomes, many descriptions of pathway between the implementation of the city concept and targeted health outcomes are incomplete. Our first recommendations are that pathways in policy plans should be more detailed, better structured and referenced to aid their effective implementation as multi-solving policies and subsequent evaluation. Going forward, we will collate more of the specific pathways between implementation and direct/indirectly implied positive and negative health outcomes.