Making post-war urban neighbourhoods healthier

involving residents' perspectives in selecting locations for health promoting urban redesign interventions

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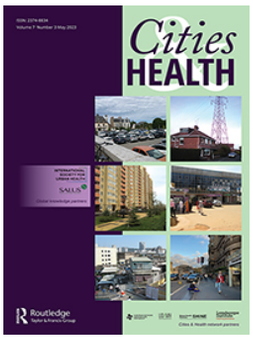
DOI
10.1080/23748834.2023.2197165

Publication date
2023

Document Version
Final published version

Published in
Cities and Health

Citation (APA)
Reijneveld, S. A., Koene, M., Tuinstra, J., van der Spek, S. C., Broekhuis, M., & Wagenaar, C. (2023). Making post-war urban neighbourhoods healthier: involving residents' perspectives in selecting locations for health promoting urban redesign interventions. *Cities and Health*, *8*(1), 82-90. https://doi.org/10.1080/23748834.2023.2197165



Cities & Health

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rcah20

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To cite this article: Sijmen A. Reijneveld, Marijke Koene, Jolanda Tuinstra, Stefan C. van der Spek, Manda Broekhuis & Cor Wagenaar (2023): Making post-war urban neighbourhoods healthier: involving residents' perspectives in selecting locations for health promoting urban redesign interventions, Cities & Health, DOI: 10.1080/23748834.2023.2197165

To link to this article: https://doi.org/10.1080/23748834.2023.2197165

CITIES & HEALTH
https://doi.org/10.1080/23748834.2023.2197165

Routledge
Taylor & Francis Group

ORIGINAL SCHOLARSHIP

Making post-war urban neighbourhoods healthier: involving residents' perspectives in selecting locations for health promoting urban redesign interventions

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ABSTRACT

Post-war urban neighbourhoods in industrialised countries have been shown to negatively affect the lifestyles of their residents due to their design. This study aims at developing an empirical procedure to select locations to be redesigned and the determinants of health at stake in these locations, with involvement of residents' perspectives as core issue. We addressed a post-war neighbourhood in the city of Groningen, the Netherlands. We collected data from three perspectives: spatial analyses by urban designers, interviews with experts in local health and social care ($n = 11$) and online questionnaires filled in by residents ($n = 99$). These data provided input for the selection of locations to be redesigned by a multidisciplinary team ($n = 16$). The procedure yielded the following types of locations (and determinants): An area adjacent to a central shopping mall (social interaction, traffic safety, physical activity), a park (experiencing green, physical activity, social safety, social interaction) and a block of low-rise row houses around a public square (social safety, social interaction, traffic safety). We developed an empirical procedure for the selection of locations and determinants to be addressed, with addressing residents' perspectives. This procedure is potentially applicable to similar neighbourhoods internationally.

ARTICLE HISTORY
Received 2 September 2022
Accepted 27 March 2023

KEYWORDS
Urban health; urban design; intervention; post-war neighbourhood; Netherlands

Introduction

One of the major challenges of urban redesign to improve city health is to involve residents, urban design and health and social care professionals jointly in selecting locations for health promoting urban redesign interventions in a post-war neighbourhood. Many publications have shown that various components of the urban built environment affect health world-wide (Giles-Corti *et al.* 2016, Bird *et al.* 2018, Giles-Corti *et al.* 2022). Most of these components regard physical qualities such as insufficient indoor and outdoor air quality and noise pollution (Giles-Corti *et al.* 2016). A gradually expanding body of knowledge links urban design characteristics with unhealthy lifestyles (WHO 2022c, 2022b). Over the past decades, the WHO Healthy Cities programme has further substantiated this (e.g. Yang *et al.* 2018, WHO 2022a).

Post-war urban neighbourhoods, built in the period between 1950 and 1970 in Europe, have in particular been shown to negatively affect the lifestyles of their residents (van Beckhoven *et al.* 2009). These neighbourhoods have been designed with two main purposes, i.e. first to provide a sufficient amount of high-quality resident dwellings and second to enhance a sense of community by limiting their size and providing them with clear, green borders that set them apart from similar neighbourhoods. Regarding the first purposes, after World War II the Netherlands as well as most other Western European countries had enormous shortages of dwellings due to a mass destruction of houses and lack of new buildings during this war (Bouma 2011). Regarding liveability, the underlying idea was that the construction of neighbourhood could increase the social cohesion and thereby the well-being of residents, an idea labelled by Coleman as 'environmental determinism' (Coleman 1985). Common aspects of the resulting neighbourhoods regarded a total design of the full neighbourhood, with open building blocks, orthogonal planning with a main structure of green and water and spatial segregation of functions like living, shopping and working (Wagenaar 2015). This resulted in a design of patterns of detached blocks of housings around shared green spaces in a repetition into various directions or only in

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/23748834.2023.2197165.

a row. Repetition is the principal quality of these neighbourhoods: building components are standardized, floorplans are standardized, the number of housing typologies is limited, and the urban layout of the 'living units' is repeated numerous times (which is why in the Netherlands they are often referred to as 'stamps' and 'strips'). Consequently, the sites that were selected for this project are hardly ever unique, which enhances the replicability of our findings.

Though initially esteemed highly by residents, gradually post-war neighbourhoods have become far less advantaged, on the one hand, due to problems related to their urban design and, on the other hand, due to changes in the population of these neighbourhoods with attraction of more socially disadvantaged groups (van Beckhoven *et al.* 2009). The design of these neighbourhoods provides physical barriers that frustrate walking and cycling (mainly traffic arteries), and a lack of destinations within walking or cycling distance. For cities, these characteristics have been shown to result in mobility patterns that obstruct physical activity (Schwartz and Rosen 2015, Bird *et al.* 2018, Balsas 2019, Cerin *et al.* 2022). Furthermore, the inaccessibility of greenery and the presence of greenery that is perceived as unsafe frustrate direct social and visual contact and active use of nature (Barton *et al.* 2016). Finally, 'social hubs' such as clubs, cafes, restaurants, and community centres are typically rather far away which limits opportunities for social contacts (Roche 2013, Wagner and Caves 2019). Regarding population composition, these neighbourhoods often also suffer from an aging population, a low socio-economic status, and a high incidence of loneliness, depression and chronic diseases, i.e. an accumulation of public health challenges (van Beckhoven *et al.* 2009).

Urban redesign has been shown to potentially improve public health by enhancing healthy lifestyles (Giles-Corti *et al.* 2016, Bird *et al.* 2018, Giles-Corti *et al.* 2022). For urban areas, it has been shown to be particularly effective in the domains of physical activity (Hunter *et al.* 2019, Bonaccorsi *et al.* 2020, Cerin *et al.* 2022, Zhang *et al.* 2022), and social connections (Wagner and Caves 2019), and for safety in urban areas (Jiang *et al.* 2018) or the built environment in general (Blitz and Lanzendorf 2020, Amiour *et al.* 2022). Major health gains have been reached by interventions in the physical structure and the layout of the living environment, e.g. the construction of sewers and water pipes since the mid-nineteenth century, and the start of public housing around the beginning of the 20th century (Mackenbach 2020). Similar gains regarding lifestyles (Barton *et al.* 2016, 2021, Giles-Corti *et al.* 2022) can probably be reached by redesigning the urban physical environment, but evidence on the best interventions in various urban physical contexts is still scarce.

Decision-making on the most promising urban interventions and the locations in which they have the largest effects requires better methods to make optimal use of the input of urban designers, of professionals involved in health and social care, and of residents, given the large investments in time, money and means (Barton *et al.* 2021, Giles-Corti *et al.* 2022). Each of these three groups typically has its own aims and perspectives on optimal urban design, maximum gains in health and well-being and maximum alignment with daily living, respectively. However, in this process, the residents are the most important beneficiaries, so the health promoting urban interventions should address their needs and support their more health-promoting lifestyles. Despite their importance, residents' role in these processes mostly remains marginal due to the difficulty of determining residents' needs, the dominance of urban designers in urban redesign processes and local governments finding it hard to get an in-depth knowledge of the needs of neighbourhoods' residents (Voorberg *et al.* 2015, Nabatchi *et al.* 2017, Bartels 2017). This also relates to current initiatives in healthy city planning across Europe (WHO 2022c, 2022b, 2022a).

Using urban redesign as a tool for promoting healthy lifestyles requires the selection of locations where urban interventions promise substantial effects on specific aspects of healthy lifestyles (Giles-Corti *et al.* 2022, WHO 2022a). Citizens' knowledge is indispensable for selecting these locations, as it adds everyday user experiences to the knowledge of various experts, policy makers and other stakeholders. Moreover, a focus on distinct sites of a modest scale facilitates the citizens' involvement in the analysis and design processes. A core criterion for the success of such a procedure is that the residents are involved in the selection of the locations and determinants that the urban planners need to work on. Second, the locations and the health issues associated with them should be suitable for spatial interventions that promote the health of the residents and the wider group of citizens involved, and can be implemented. Therefore, this study aims at developing an empirical procedure to select the locations to be redesigned and the determinants of health at stake in these locations, with involvement of residents as a core issue. This article addresses both the process of the selection and its outcomes, including the underlying reasoning. The procedure that we developed can help local governments, citizens, researchers and organisations involved in urban design and public health in the process of creating more healthy post-war urban neighbourhoods.

Methods

We developed this procedure in a post-war neighbourhood in the city of Groningen, the Netherlands.

This neighbourhood is representative of similar neighbourhoods built elsewhere in the Netherlands and Europe from the same period. The selection procedure of locations to be redesigned envisaged two stages: a preparation and data collection stage and a formal stage of selection of relevant and promising locations and health topics that require improvements by urban redesign (e.g. physical activity, more social contact and cohesion and/or traffic safety). The full selection procedure was guided by a multidisciplinary team consisting of urban designers and experts, public health and social care experts, representatives of residents, city civil servants, and organisational experts, 16 people in total, further referred to as 'the full team'. These constituted the consortium Urban Design for Improving Health in Groningen (UDIHiG), see biographical note.

The setting and the neighbourhood

Groningen is with 230,000 inhabitants the fifth largest city of the Netherlands, and with almost 60,000 students a typical, historical college town in the north of the country. It has relatively large socioeconomic differences within the city. Specifically, we focused on the neighbourhood of Paddepoel, a post-war neighbourhood encompassing 11,000 residents. It is characterised by a number of spatial, demographic and socioeconomic challenges that are representative for this type of 'post-war reconstruction' neighbourhoods, as outlined in the introduction. These challenges in particular regard a focus on car mobility, large roads cutting the neighbourhood in quadrants with repeating housing blocks, one central shopping mall and relatively abundant but mostly inaccessible and unprogrammed green. Figure 1 shows a picture of the neighbourhood shortly after its building, with a building pattern of stamps and strips typical for post-war neighbourhoods.

Figure 1. Aerial photograph of the neighbourhood in the early 1950's, shortly after its inception *(reproduced with permission of the copy right holder, Aerophoto Eelde)*.

Stage 1 preparation and data collection

In the first stage of the procedure, we collected information from three sources that aligned with the general aim of the study, i.e. with involvement of residents as a core issue. Sources regarded: 1) a spatial analysis by three urban designers, 2) the opinions of 11 experts in public, social and health services, and 3) a survey among residents. The *urban designers* performed an analysis of the spatial qualities of the neighbourhood with a focus on mobility in the sense of design of main and ancillary roads, degree of connection between housing and neighbourhood services, and barriers within and at the borders of the neighbourhood; design of and access to public greenery; and building typologies.

Data on the opinions of *experts in public, health and social services* who were involved in providing services to the neighbourhood were collected by face-to-face interviews. Experts were selected based on having frequent contact with the neighbourhood and its residents as part of their daily work, e.g. by being municipal worker responsible for public spaces, worker at a housing corporation, head of a school, policeman, member of a residents' committee, or providing youth, social or mental health care. They were interviewed by pairs of interviewers using a topic list covering health in general, traffic safety, social safety, physical activity, social encounters, and further lifestyles.

Data on the *opinion of residents* was collected by an online survey among a convenience sample of residents. These were informed about the survey by means of advertisements in the neighbourhood newspaper, personal mailings to mail addresses provided by the neighbourhood council, and letters provided to a random sample of living addresses in the neighbourhood, in total comprising 1000 residents. In the online survey, online respondents aged 18 and over were invited to participate. The survey consisted of questions on background characteristics (age, gender, educational level, working situation, time spent per week in the neighbourhood, and self-rated health) and on liked and disliked walking and cycling routes, disliked and liked locations because of appearance, social interaction, social safety, and traffic safety, i.e. covering the main topics of the project. These topics were derived from the formulated aims of the project regarding relevant topics. They were not specifically directed by the findings regarding the two other sources (urban designers and experts' opinions) to avoid that the latter would restrict the responses of the residents. For example, the survey did not specifically focus on problematic locations as identified by the urban designers and experts but asked residents in general to indicate problematic and attractive locations throughout the neighbourhood. Each topic was supported by a map of the neighbourhood in which

respondents could indicate three locations that they particularly liked and three locations that they particularly disliked. Respondents who have children below age 18 received separate questions about their children. Topics regarded traffic safety and general safety, and liked and disliked locations to play, again all supported by maps of the neighbourhood. All questions were piloted, first among first team members and second among local residents. The questionnaire is included as Supplementary File 1.

Stage 2 selection

The second, selection, stage of the procedure is aimed at selecting three locations that would be particularly relevant to be redesigned, as well as a selection of key health determinants and components (further: health topics) for each of these locations, on which the redesign should focus. The selection occurred during two online sessions due to COVID-circumstances, each attended by the full team, following a format of focus group discussion (FGD) meetings (Patton 2014). The first session lasted 3 h. In preparation for the selection procedure, the full team received reports on the three sources, and an online presentation of a summary of the information at the beginning of the meeting. After these summary presentations, all team members had to choose three locations that according to them should be prioritized for redesign, based on the information received from the reports and the presentations and using a list of criteria (Box 1). All locations chosen were then put together on one map and discussed until consensus was reached. In the second meeting, which lasted 1.5 h, the topics that should be addressed for the three locations were selected building on the same prior information, again discussed until consensus was reached on preferably three, but a maximum of four, topics.

Analysis and reporting

Regarding analyses, for stage 1 these were specific per source, being a spatial analysis by urban designers; a report per topic of the interviews with experts; and descriptive statistics of the survey data. For stage 2, we aim at reaching consensus in two rounds.

Box 1. Criteria for selection of the locations to be redesigned
The locations must:
- be widely recognised by residents as detrimental for a healthy lifestyle
- be redesignable to stimulate a healthier lifestyle
- allow redesigns that are transferable to other post-war neighbourhoods
- be diverse in type and theme
- preferably offer opportunities to align with other already funded initiatives

Regarding reporting, for stage 1, we report the summary findings per source of information, i.e. urban designers, experts and residents. For stage 2, we report the locations as selected and the topics per location, as resulting from the FGD meetings.

Results

Process of the selection

*Stage 1

In stage 1, we collected data from urban designers, experts in public, health and social services, and residents. The analysis of the *urban designers* yielded five main problems: 1) many cars, broad roads, unrestricted parking; 2) much greenery, but often poorly programmed and maintained; 3) rigorous functional zoning: only few enterprises and cafes; 4) many physical barriers inside and at the borders of the neighbourhood; 5) clusters of similar housing types, a lack of urban qualities. Figure 2 provides a summary of the spatial analysis. Details of the spatial analysis are included in Supplementary File 2, and the summary is presented at the first FGD meeting in Supplementary File 3.

Experts in public, social and health services provided information on parts of the neighbourhood about six topics: general health, traffic safety, social safety, physical activity, social encounters and other lifestyles. This showed e.g. traffic safety on the main roads to be an issue for pedestrians and cyclists, and social safety to be problematic in the south-western part of the neighbourhood. In the entire neighbourhood, opportunities for social encounters were very limited. A summary of these topics is given in Figure 3, and the summary is presented at the first FGD meeting in Supplementary File 4.

The online survey among *residents* had a response of 99 participants, 25 of whom also reported on their primary school-aged children; the average age of respondents was 46 years (range: 19–86), 51 were female. The residents reported on pleasant and unpleasant walking and cycling routes, places they considered to be attractive or suitable for social encounters and issues regarding traffic and social safety. For children, the focus was on routes to school and places to play and hang around. Residents reported several parts of the neighbourhood to be particularly challenging for them and pointed out areas that they saw as problematic for children due to e.g. unsafety, see Figure 4, and the summary as presented at the first FGD meeting in Supplementary File 5.

*Stage 2

In stage 2, we selected the locations of the neighbourhood to be redesigned and the topics the redesign of these parts should focus on, in two online sessions with the full team, lasting 3 and 1.5 h, respectively. Both selection rounds made use of the criteria listed in Box 1. In the first one,

Figure 2. Core challenges in a spatial analysis of the Paddepoel neighbourhood: providing better East-West connections (yellow), reduction of car traffic and connecting fragmented green areas (green), and upgrading underused public spaces (brown); red stars indicate locations rated a highly promising for redesign by the urban designers.

Figure 3. Core challenges in the Paddepoel neighbourhood according to the opinions of experts in public, health and social care, regarding six topics; circles indicate areas of particular concern, lines indicate roads deserving particular attention, and the question mark indicates a general lack of appropriate sites.

data from each of the three sources was presented at its start. Next, we used Miro software (www.miro.com) in both sessions to support the process. Sessions were chaired by the first author and minuted by the second author who also safeguarded all online Miro-outputs.

Outcomes of the selection procedure

The processes led to consensus regarding the three locations to be redesigned and the relevant health topics per location. The main reason for the selections was the alignment with the criteria as listed in Box 1.

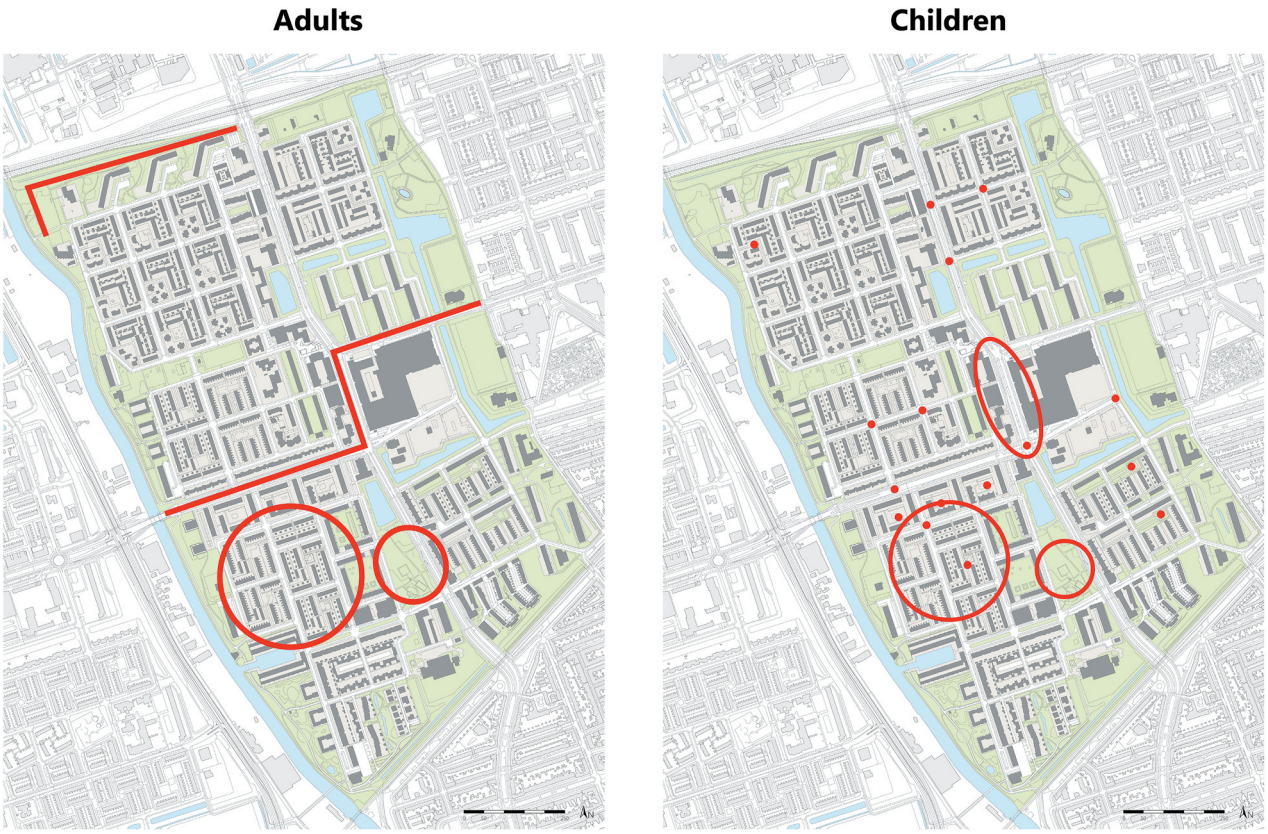

Figure 4. Core challenges in the Paddepoel neighbourhood according to the opinions of residents for themselves and for the minors they took care of; dots represent road crossings and play grounds.

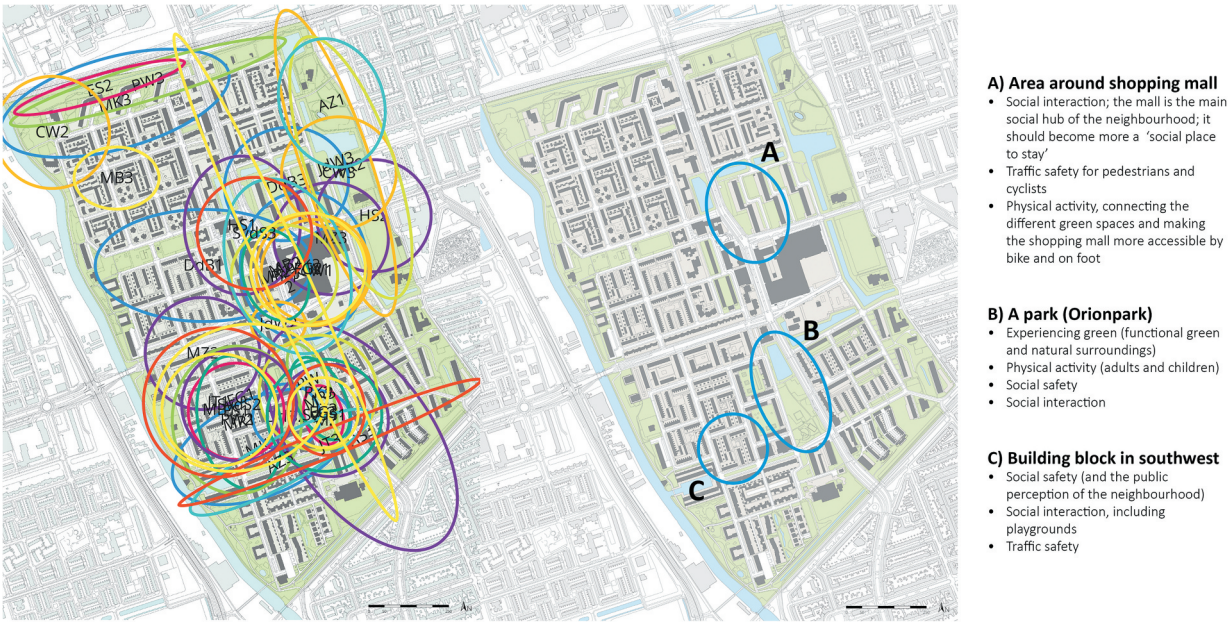

Figure 5. locations selected by the various assessors – each assessor indicated with initials and a colour shared with one other team member (left); priority-location and topics per location are listed on the right.

The ultimate selection first regarded two park-regions but then the decisive criterion was that in one already some changes had been planned. Figure 5 shows the selected locations per assessor on the left, and the three prioritised locations and topics per location on the right side of the image.

Discussion

We developed and piloted an empirical procedure to select locations and topics for urban redesign, making use of the expertise accumulated in the urban design disciplines, interviews with experts in public, health

and social services, and the perspective of the residents. The procedure resulted in the selection of three locations with three or four health topics per location: an area adjacent to the central shopping mall, a park and a building block of low-rise row houses. Topics to be addressed regarded social interaction (3×); traffic safety (2×); social safety (2×); physical activity (2×); and connection to and quality of greenery. We discuss this procedure regarding its process and its outcomes.

Interpretation of the main findings

Regarding the process of the procedure as developed, the project was successful in combining three sources of information, urban designers, experts in public, health and care, and residents, and integrating and prioritising their views. Several factors may have explained this successful integration of sources to select locations and topics for urban renewal. A first factor regards the formal use of three sources reflecting the expertise and opinions of the three stakeholder groups. This may have led to a better balancing of the expertise and interests of these groups (Nabatchi *et al.* 2017). Second, this balancing is likely to have been promoted by all three groups being represented in the multidisciplinary team that directs the project, making the process to meet a further requirement for successful collaboration (Voorberg *et al.* 2015). A promoting factor may be that this team has already collaborated for 2 years when embarking on the selection of locations and topics. This length of collaboration provides room for the boundary work that is typically needed to realize a successful multidisciplinary team, allowing to learn each other's language, align differences and weigh the various interests (O'Mahony and Bechky 2008, Quick and Feldman 2014). However, it could be challenged whether the selections that were made indeed represent the various perspectives including that of residents, who are underrepresented in the project team; this definitely requires further confirmation. To summarize, the process as followed is innovative regarding formal use of sources and composition of the team but definitely requires further strengthening and study on the contribution of components, such as the online way of working, and on realizing full co-creation and co-production with residents in realising spatial interventions (Voorberg *et al.* 2015).

As outcome, the procedure led to the selection of three locations of varying nature, an area adjacent to the central shopping mall, a park and a low-rise building block out of a stamp pattern, and to a range of health topics to be included in the redesign. The locations as selected regard the typical challenges of the post-war neighbourhoods (Coleman 1985, van Beckhoven *et al.* 2009, Bouma 2011, Wagenaar 2015). The first location regards the inaccessibility for pedestrians and cyclists of the centralized shopping location, due to the focus on car mobility in the original design. The second regards the relatively abundant but poorly accessible green. And the third location regards the typical set-up of the stamp pattern of dwellings, with underused green and much focus on cars in the design of roads. The topics as selected align with evidence on the effectiveness of urban redesign regarding green, mobility and safety on outcomes such as physical activity (Hunter *et al.* 2019, Bonaccorsi *et al.* 2020, Cerin *et al.* 2022, Zhang *et al.* 2022), traffic safety (Blitz and Lanzendorf 2020), social safety (Jiang *et al.* 2018, Hunter *et al.* 2019), health (Bird *et al.* 2018, Hunter *et al.* 2019), and social interaction (Wagner and Caves 2019). As such, they partly reflect the a priori criteria as set, but they also show that residents identifying specific parts of such post-war neighbourhoods offer opportunities to improve health by redesigning the domains as specified. Next, they also align with priorities that have recently been set up to create healthier urban environments (Giles-Corti *et al.* 2022, WHO 2022b). The process as described yields commitment to address these parts and topics in an integrated way. It is thus feasible to reach agreement on locations and health topics by this procedure, with the next challenge being the realisation of the redesigns.

Regarding the role of residents, essential for successful urban redesign (Voorberg *et al.* 2015, Bartels 2017), the three locations that were selected had the highest scores in the ratings of residents as shown in Figure 4, which may be interpreted as some reach of the aim to specifically include the perspectives of residents. The formal set-up of the selection procedure may have contributed to this, with as main component the use of a predefined set of criteria for selection, and the composition of the full team with quite intense collaboration from the project's start. It suggests that such an approach helps to take into account their perspective, similar to what has been shown for other domains (Voorberg *et al.* 2015).

Strengths and limitations

Strengths of this study are that it empirically assesses a procedure that is formalised, aims at balancing various interests, and makes extensive use of various data. Limitations are that this regards just one case-study and that response rates on the residents' survey were low. The latter relates to a general challenge in community surveys, even more among vulnerable populations (Bonevski 2014). Such response rates may be improved by e.g. using financial incentives and using telephone interviews instead of questionnaires, strengthening co-creation of also the surveys, and adapted design and wording of invitation letters (Bonevski, 2014). Moreover, the validity of the procedure still has to be corroborated by actually yielding better health outcomes.

Implications

Our findings on a procedure for the selection of locations and topics to promote health in a post-war neighbourhood invite for further confirmation in other settings, and for translation of its outcomes to actual development of urban interventions that can be evaluated regarding outcomes. Moreover, the involvement of residents in the survey and other components of the project may further be strengthened by involving more residents in the project from the beginning (Voorberg 2015; Bonevski 2014). A next step towards actual implementation will be to expose residents to the developed plans using virtual reality (Stauskis 2014, Kuliga *et al.* 2015, van Leeuwen *et al.* 2018), as a relatively easy approach to further evaluate and adapt plans for urban redesign. Next, this can be implemented in other settings as a routine approach. Finally, the effects of redesign on health outcomes have to be established, preferably in experimental or quasi-experimental comparative pre-post measurement studies.

Conclusion

The procedure as developed is promising to select the locations to be redesigned and the determinants of health at stake in an urban post-war neighbourhood, taking the perspective of multiple stakeholders into account with the involvement of residents.

Acknowledgments

We thank the full team of urban designers, municipal advisors, and citizen representatives as outlined in the biographical note for their contribution to the project, in particular Marieke Zwaving, city of Groningen, and Derk den Boer, neighbourhood Paddepoel representative.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This study has been supported by a grant from ZonMw, the Dutch national funder of research in health and health care, grant 5310013221. This sponsor had no role in any part of the study (i.e. not in design; collection, analysis and interpretation of data; writing of the report; and decision to submit the article for publication).

Ethical approval

Ethical clearance for the fieldwork of this study has been provided by the Ethical Review Board of the Delft University of Technology, 2020/1123.

Geolocation

This regards the Paddepoel neighbourhood of the city of Groningen, the Netherlands.

Notes on contributors

The consortium Urban Design for Improving Health in Groningen (UDIHiG) entails scientists and practitioners from health sciences, design disciplines, change management with a focus on co-creation, and city and citizens – to develop a methodology that optimizes the involvement of the residents. Urban planners including the city architect are involved; they introduce intervention techniques from a field that, although health motives determined its evolution, developed outside the scope of the health sciences. Incorporating this domain aligns with the WHO's 'health in all policies' initiative and the ambition to integrate the findings of the project in future projects of the city of Groningen.

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