

PROJECT SUMMARY

The Nature Impact on Mental Health Distribution (NAMED) project aimed to investigate associations between mental health and the urban residential environment in the Brussels-Capital Region, Belgium. With mental health we refer in our project both to mental illness (presence of symptoms of psychopathology such as depression) and mental well-being (happiness, life satisfaction, affect, positive functioning, sense of purpose, and self-acceptance). A multidisciplinary research team combined data-driven and interview-driven research to gain a more comprehensive understanding of these associations.¹⁻³

In the data-driven part, mental health data from the [Health Interview Survey](#) were linked to environmental indicators for the urban built environment, urban vegetation, air and noise pollution (see Pelgrims et al. 2021 for elaboration on the used data).³ The interview-driven part involved walking interviews with Brussels' dwellers on their experiences of their neighborhood environment in relation to their mental health.²

To translate our findings into recommendations for practice and policy, we validated our results during an interactive workshop with the citizens, interviews with experts from the health and environmental sector in the Brussels-Capital Region, and through a review of existing scientific literature. This policy brief contains the key findings and recommendations of the NAMED project for policy and practice.

Key findings of the NAMED project

1. Mental health benefits from a socially cohesive environment
2. Mental health benefits from a physically active environment
3. Poor indoor housing quality declines mental health
4. Citizens are unequally affected by negative and positive environmental factors
 - 4.1. Motorized traffic harms mental health
 - 4.2. Nature strengthens mental health
5. Cities are complex systems, with urban mental health outcomes depending on many interactions

KEY FINDINGS

1. Mental health benefits from a social cohesive environment

The data-driven research part showed that in the different statistical models, social support was always significantly associated with nearly all mental health outcomes. This implies that social support is an important determinant to mental health.

In the interview-driven research part, participants confirmed the importance of good community ties for mental well-being. Some experienced great mutual support among neighbors which contributed to feeling secure in their neighborhood. Several participants mentioned the importance of having a sense of community with the relating outcomes of feeling part of a bigger community, not being isolated, mutual understanding and support. Good neighbor ties or social memories in the neighborhood made several

participants feel at home and attached to their neighborhood or specific places in their neighborhood.

2. Mental health benefits from a physically active environment

The data-driven research part showed that in the different statistical models, physical activity was always significantly associated with nearly all mental health outcomes. This implies physical activity is an important determinant to mental health.

Regarding physical activity, the interviews learned us that several participants needed physical activity to cope with negative feelings, to break their routine, and to feel healthy. Additionally, having the possibility to walk to neighborhood services, such as local stores, supported a sense of security and improved neighborhood satisfaction.

3. Poor indoor housing quality harms mental health

The data-driven research part found that the inability to keep warm is a potential risk factor for depressive disorder, and that humidity, mold and smoking inside the dwelling are associated with suicidal ideation.

4. Citizens are unequally affected by negative and positive environmental factors

The data-driven research part showed that following groups are more exposed to air pollution, have less access to green spaces and are more exposed to noise pollution from multiple sources in their residential environment: people with a lower level of education, people with lower income, and people with a non-European country of birth. Aircraft noise during the night mainly affects people with a higher socio-economic status.

The interview-driven part highlighted that some neighborhoods suffered greatly from neighborhood socio-economic deprivation, referring to the low physical position (vandalism, graffiti, loitering, litter, abandoned buildings) and low social position (substance use, loitering, dealing, crime, harassment, violence) and economical position (income, education level) of a neighborhood (van Vuuren et al., 2014).⁴

In these neighborhoods, the continued presence of clandestine garbage dumps and vandalism caused negative feelings of frustration and despair. Regarding neighborhood security, participants referred to problems with loitering, vandalism, squatters, drugs dealing, substance use, and burglary. A lack of neighborhood security negatively affected mental well-being in the sense that some participants felt restricted in their daily activities as they were scared to go out at night, or to pass by some specific places. Also annoyance to noise from the traffic and people was mentioned to contribute to mental distress. Finally, participants living in more deprived neighborhoods mentioned to experience a great lack of nearby nature and recreational space.

3.1 Motorized traffic harms mental health

The data-driven part found a significant association between traffic-related air pollution and depressive disorder and between self-reported noise annoyance from multiple sources (including traffic noise) and depressive and sleeping disorder.³

In the interview-driven part some participants expressed their concerns about traffic-related air pollution and

therefore avoided busy streets. A lack of traffic safety, more precisely bike and pedestrian safety, was linked to feeling insecure while cycling or walking, but also to annoyance and confusion by the lack of good infrastructure. Especially, for people with children the lack of traffic safety was a burden to their mental well-being as they constantly needed to keep an eye out and did not dare to let their children go out alone.²

Traffic noise affected mental well-being as it caused annoyance, impeded people to relax and disturbed bird sounds. The interviews clarified the importance of having a good balance between liveliness and calmness in a neighborhood, and to have nearby opportunities to find peace. Some referred to their individual residence where they suffered from sleeping problems due to noise from air traffic, mainly in high socio-economic neighborhoods close to the airport with a high frequency of take-offs and landing.²

3.2 Nature strengthens mental health

Once adjusted for socio-economic and lifestyle data, the data-driven part could not demonstrate a significant positive effect of residential greenness on mental health based on the available data. On one hand, this lack of association may be related to methodological issues (these are elaborated in a separate document on methodological recommendations). On the other hand, Brussels-Capital Region is a city with very high environmental inequalities: economic status and green space availability are highly correlated as explained above. This makes it difficult to disentangle the impact of socio-economic factors and green spaces on mental health.³

However, the interview-driven part strongly underlines the importance of nature to mental health. The most common response of the participants regarding green spaces was the feeling of escaping from the city hustle and to take a break from daily routines. Other responses to mental well-being in relation to green spaces involved: connecting to nature, exploring nature, getting fresh air, relaxing, rebuilding energy. Natural environments were also visited for the self-regulation of negative feelings. Some participants mentioned the importance of green spaces to maintain their physical and social activities, and as such contributing to mental well-being. Additionally, participants referred to small blue-green infrastructure such as trees, flower beds, and fountains contributing to a feeling of fascination and relaxation.²

5. Cities are complex systems, with urban mental health outcomes depending on many interactions

The data-driven part showed the importance of both personal determinants, such as socio-economic status and physical activity, social determinants, such as the quality of social support, and physical determinants, such as poor indoor housing quality and air quality to mental health.³

The interview-driven part highlighted the broad range of factors (social, physical, personal, institutional) and interactions among those factors that better explain how Brussels' inhabitants experience their neighborhood in relation to their mental health (Fig. 1). For example, social diversity in the neighborhood contributed positively to mental health as some participants experienced more tolerance and solidarity among neighbors and an ease to connect. Among the physical factors, neighborhood services, such as public transport, commercial (grocery stores, bars, restaurants), and welfare services (pharmacies, medical houses, and

schools) were mentioned to contribute positively to mental health as these services met individual needs and offered a certain comfort and sense of security.²

Several physical neighborhood factors such as parks, local services and citizen-based initiatives were mentioned to support neighbor ties and strengthen a sense of community. Difficult personal life events were shown to enforce restorative needs to cope with negative feelings and sometimes motivated visits to specific places. Regarding the institutional factors, tailoring policies to neighborhood contexts through participatory planning and responsiveness to local demands were mentioned to be important to improve neighborhood satisfaction. A detailed description of all factors and interactions can be read in the published article by Lauwers et al. (2021).²

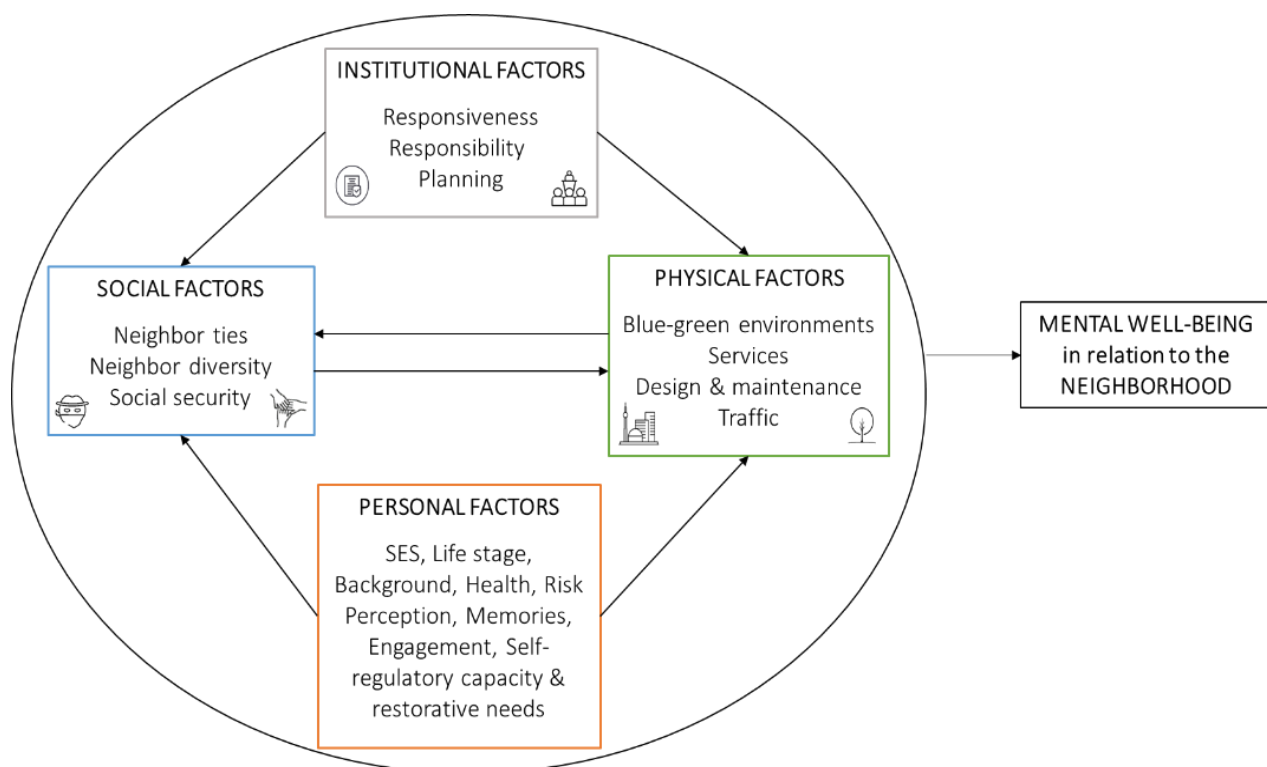


Figure 1 Schematic overview of the interview themes and interactions between personal, social, physical, institutional factors describing the influences of the neighborhood environment on mental well-being.

Key recommendations of the NAMED project

1. Plan socially
2. Promote physical activity
3. Detect, control and mitigate indoor housing quality
4. Prioritize low income neighborhoods and implement strategies to counter (green) gentrification
 - 4.1. Reduce motorized traffic
 - 4.2. Create and maintain qualitative green infrastructure
5. Tailor to local contexts and work transdisciplinary

KEY RECOMMENDATIONS

1. Plan socially

The physical environment should not be viewed separately, but rather in relation to the social environment. Therefore, it is considered important to include local inhabitants into (urban) planning. One can plan socially by **shaping space through a social process**. In other words, planning through participation in order to detect subtle daily experiences and sensitivities and to create a dialogue between inhabitants with different perceptions on the neighborhood.

Furthermore, socio-spatial planning puts emphasis on **equity and inclusion**, which is about not letting the same voices claim the future of the environment, but making an extra effort to let a diversity of users, and in particular the most vulnerable users, have their say and their place in the neighborhood.

Finally, **providing free space, financial support or material to support citizen-initiated neighborhood projects, or including these initiatives into future development plans** allows to maintain the social value of these projects on the long term.

2. Promote physical activity

Physical activity can be promoted by investing in **walkable and bikeable neighborhoods**. Following major principles are proposed to improve walkability: accessibility, connectivity, comfort, legibility, context, and sharing.⁴ Following major principles are proposed to improve bikeability: directness, connectivity, attractiveness, safety, and future proof.⁵

Besides improving the infrastructure to support active mobility, physical activity can also be promoted through **medical prescription**. Therefore, we call for a better uptake of the existing project « [Bewegen Op Verwijzing](#) » in the medical centers of the Brussels-Capital Region.⁶

3. Detect, control and mitigate indoor housing quality

Regarding indoor housing quality, it is important to keep on **informing** inhabitants on the negative impact of bad housing quality on (mental) health and how they can improve their housing quality. Think about the common problem of humidity that can easily be solved by ventilating enough. The example of a **neighborhood network** of community organizations that sensibilise residents and support renovation processes regarding indoor housing quality has already proven to be effective.

Also **general practitioners** are key players to detect housing-related health problems and make use of the existing service **RCIB (Groene Ambulance)** that checks the housing quality of their patients based on particular diagnoses.⁷ Therefore, it is important that this service is well known among all medical centers present in the Brussels Capital Region.

Brussels Capital Region has drawn regional minimum housing requirements with a focus on safety, health, and basic comfort. However, it is still up to the tenants to file a complaint about their housing condition, which is often a big threshold given the rather difficult relations with landlords. A growing number of cities, such as Los Angeles, New York, and Rochester, proactively inspect all rental housing, including privately owned, every several years. Unlike rental code enforcement, which is complaint-based, **Proactive Rental Inspection (PRI) programs** in the United States have proven to be more effective in protecting tenants' health and safety. Due to these programs, tenants no longer need to worry about initiating inspections or any subsequent repairs. PRI provides an easy guide on Proactive Rental Inspection: Healthy Housing Through Proactive Rental Inspection.⁸

4. Prioritize low income neighborhoods, but counter green gentrification

Generally, spatial quality contributing to better mental health seems to be at the expense of affordability. Developments in the neighborhood often lead to an increase of house and rental prices, pushing the current residents away. Green, environmental, or ecological gentrification is a process in which cleaning up pollution or providing green amenities increases local property values and attracts wealthier residents to a previously polluted or disenfranchised neighborhood.⁹ However, the risk for gentrification should not be a reason not to invest in more affordable, less attractive neighborhoods, because also among these residents there is a desire for more livability, characterized by more greenery, less noise and more safety. Recent literature includes some strategies to counter this gentrifying effect¹⁰: 1) **dissect the role that finance capital and financialization play in urban greening** – unpacking financial actors, their intermediaries and economic beneficiaries is an important next step for green gentrification research, 2) **adapt a multi-actor approach in planning discussions** to strive for combined goals of urban greening, equitable economic redevelopment and environmental equity, 3) aim for **early co-production** to better align new developments with diverse current users and to help residents to feel recognized and more attached to the created space. The [Urban Green Justice toolkit](#) provides additional strategies on this issue.¹¹

Other strategies to monitor both quality and affordability, include the principle called "skimming" in which part of the increase in value due to greening, slowed mobility or other forms of qualitative developments in the public space, flows back to the community. This profit can then be used to invest in for example social housing.

There is also a great deal of potential in **innovative housing projects** (see joint housing projects, LoggingFirst, Community Land Trust), but the number of examples remains too limited and the realization an administrative tangle due to gaps in the current legislation, demanding for an **adaptive legislative framework**. Finally, **stronger solidarity mechanisms between the richer and poorer neighborhoods** and a **region-** rather than **municipal-based tax system** could reduce these inequalities.

Neighborhoods characterized by a lower socio-economic score both low in indoor and outdoor quality. A combination of overpopulation in small housing and a limited supply of public space often leads to conflict in those neighborhoods. Therefore it is necessary to

develop public space with attention to the private living situations of local inhabitants. Living small directly associates with more public space use, so **the availability and size of public space should be aligned with private living conditions**. Additionally, the **activities possible in this public space should meet shortcomings experienced due to limited private space**.

4.1. Reduce motorized traffic

The move from the individual car to more collective and active travel modes requires an enormous change in mentality. **Raising awareness about the sense of urgency and the negative impact of air pollution on (mental) health** can help to reduce the often strong polarization between proponents and counterparts, as this demonstrates that the intervention benefits everyone in terms of (mental) health. Furthermore, **small-scale actions** such as cycling lessons or a bicycle library help to warm and include a wide audience to more active modes.

Reducing motorized traffic demands a **combination of hard and soft interventions**. Hard or traffic management interventions are strategies aimed at modifying social conditions and structures. These measures aim to change transportation behavior by altering the physical environment (e.g. closing roads, building bicycle lanes, etc.) and through legal or economic policies (e.g. prohibiting car traffic in city centers, congestion pricing, introducing parking fees, etc.). Soft interventions or psychological interventions are "strategies aimed at influencing people's perceptions, beliefs, attitudes, values, and norms".¹²

Regarding soft interventions, research shows that **targeting social, cultural, and moral norms** are most effective, followed by the ones targeting information and awareness of own driving behavior (e.g. by keeping track of own car use). Soft interventions that focus on **recognizing and broadening understanding of own travel behavior, deepening own environmental understanding, and making plans to use the public transit system** instead of personal vehicles were also shown to be successful. Regarding information and awareness raising, research showed that **combining a personal talk with information delivery** is a more effective way to trigger behavioral change than the delivery of information alone. Finally, research suggests that **the combination of personal (e.g. amount of money saved) and prosocial (e.g. emitting pollutants that were avoided) feedback** may be especially effective in overcoming the inertia of driving habits.¹²⁻¹⁵

Considering the existing evidence, the magnitude of air quality benefits from hard interventions is rather modest. Road/congestion pricing and low emission zones in European city centers appear to be moderately successful in improving air quality, while **speed management strategies, trip reduction strategies, vehicle and fuel regulation and technology development** have been successful in greatly reducing emissions rates in many countries. **Aggressive traffic management strategies, or combinations of multiple smaller traffic management strategies** seem necessary to generate substantial benefits.¹⁶

More specifically for the Brussels-Capital Region, it was also suggested to continue focusing on **good alternatives**: continue good and affordable public transport, better exploit the potential of the RER train and up-scale the use of cargo-bikes across different sectors.

4.2. Create and maintain qualitative blue-green infrastructure

The NAMED project learned us that in relation to mental health, the quality of a green space was not necessarily defined by its extent. **Both small and big sized green spaces** were considered important. Regarding smaller green spaces, the quality was often defined by its **close distance, its cleanliness, its intimacy (e.g. walled), and its structural diversity (e.g. presence of colorful flowers, art works, big trees, water elements, etc.)**. Regarding the larger green spaces, qualities included its **extent** allowing to wander around or sport for a while, its **open view**, its **large trees**, its **diversity in terms of animals and plants**, the **absence of cars**, its potential to do different kind of activities, etc. The quality of a green space is also defined by its **adaptations to different users**, e.g. the presence of a playground, toilet for both children and elderly, an outdoor fitness, a running trajectory, benches, etc. These findings add to an overview of perceived green space qualities provided by McCormack et al. (2010) that could serve as a good starting point to plan green spaces.¹⁷

Planning for species diversity is noted to be paramount to support ecosystem resilience and multi-functionality, to minimize exposure to high concentrations of plant emissions (biogenic volatile organic compounds and pollen), to protect against pest and disease outbreaks, and to improve mental health.^{18,19} The 5–10% species diversity principle is supported by substantial research indicating that no individual species should comprise more than 5–10% of an assembly, which is most effectively observed at city scale.¹⁸

Brussels-Capital Region covers a lot of **big qualitative green spaces**, however, as illustrated these are not equally distributed. Therefore, it is important to make them also **available for less affluent neighborhoods through creation or to improved access by public transport**. If no space is available in close distance to these neighborhoods, investment should go towards **improved quality of small-scale blue-green infrastructure**.

An additional greening strategy might be the **implementation of minimum green norms** in real-estate or urban spatial development plans. Such norms define the type, the minimum area of green space that should be created and the maximum distance. Flanders region developed guiding (not binding) green standards, however, there seems a need to update these standards with current knowledge on the impact of nature on (mental) health. Such minimum standards can be included in construction plans through regulations. Brussels Environment already provides the [Be Sustainable toolbox](#) to better incorporate these qualities in development plans.²⁰ However, project developers are not yet spontaneously using such tools. It requires **political ambition** to get real estate developers to consider the quality of the surrounding environment. An **instrument that makes project developers aware of the importance of greenery** could support policy makers during the negotiation process.

Finally, it also seems that many inhabitants are not familiar with the availability of nature in the Brussels-Capital Region, so **increased awareness on the availability and access**, e.g. through medical centers, might support a wider audience to profit from the mental health benefits of nature.

5. Tailor to local contexts and work transdisciplinary

To improve mental health in relation to the urban environment, mental health care and urban planning should tailor to local contexts. One way to do this is through neighborhood-based care and planning.

Neighborhood-based care refers to the integration of local healthcare services into the neighborhood environment. Possible strategies include a strong **network between local healthcare and neighborhood services**, a good **overview of the neighborhood offer in medical centers**, and **opening healthcare facilities to the wider public**. Networks in which medical centers are in contact with community organizations and initiatives help to bring inhabitants closer to care, to adapt care to patients' needs and to better detect mental problems such as loneliness. Experts stated that a good overview

of the neighborhood offer in medical centers can provide low-threshold solutions for a large percentage of people who suffer from mental health problems and fail to reactivate themselves in society. Healthcare facilities themselves can contribute to the neighborhood offer by for example organizing healthy cooking workshops or making the garden more accessible, and as such informing inhabitants on health promotion and disease prevention.

By neighborhood-based planning we refer to planning that adapts neighborhood developments to the neighborhood context by **proactively involving local inhabitants and services** in the planning process and by **adapting developments**, also after realization, to meet local needs. A well-established neighborhood-based care network could support neighborhood-based planning by informing on local health needs and reaching a wide audience to participate in the planning process. Furthermore, the NAMED project learned us that opening the dialogue on spatial themes with health actors can help to introduce or strengthen the environmental theme on the medical agenda.

The NAMED project learned us that collaborating across different research disciplines and including both expert and citizen views helped to better comprehend the complex relationship between mental health and the urban environment.

Current health and environmental institutions that respectively inform health and environmental policies tend to work in silos because of the difficulty to access each other's data and often the lack of expertise to couple both data. **Joint project calls, study days and an exchange platform** would help to build a strategy towards knowledge and policy integration. This integration would be further motivated by a **political signal** underlining its importance and a **breakdown of administrative silos** to promote coalitions across different policy domains and levels.

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