



Joint Action
on REspiratory
Diseases



Health-oriented planning and use of green and blue spaces



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Key message

Green and blue spaces provide substantial health, environmental, and social benefits. When properly designed and maintained, they support physical activity, mental well-being, and climate resilience. Potential risks - such as allergen exposure or water-related hazards - can be effectively minimized through appropriate planning and management.

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1. Introduction

The importance of urban green and blue spaces has been increasingly recognised in recent decades. Green spaces generally refer to areas dominated by vegetation, such as parks, forests, and gardens, whether publicly or privately accessible. Blue spaces include environments where water is a key feature, such as rivers, lakes, canals, fountains, wetlands, and coastal areas.

Modern urban lifestyles are often associated with chronic stress, low levels of physical activity, and frequent exposure to environmental stressors such as air pollution, noise, and heat. These factors can negatively affect both physical and mental health over time. Green and blue spaces play an important role in mitigating these effects by providing opportunities for relaxation, physical activity, and social interaction, while also improving environmental conditions.

Living near such spaces has been linked to improved mental well-being, increased physical activity, and a reduced risk of chronic diseases such as type 2 diabetes.

However, the relationship between green space exposure and respiratory health is complex. Evidence regarding allergies and asthma is mixed in both children and adults. On the one hand, exposure to natural environments - particularly in early life - may support immune system development and reduce the likelihood of developing respiratory diseases. On the other hand, green spaces may increase exposure to allergens, depending on plant species composition, potentially contributing to allergic sensitisation and triggering respiratory symptoms.

An important mechanism linking green spaces and respiratory health is the regulation of air quality. Vegetation can influence both the dispersion and deposition of air pollutants. While certain species - such as evergreen trees with needles or small leaves - are effective at capturing particulate matter, poorly designed vegetation (for example, overly dense planting near busy roads) can reduce airflow and trap pollutants. Effective urban planning therefore requires careful consideration of vegetation density, spatial arrangement, and local airflow patterns.

In addition to large parks, smaller green infrastructure elements - such as street trees, green roofs, and green walls - also contribute to urban health by improving microclimates and reducing heat exposure. Transport and urban planning are closely linked to these benefits, as promoting active mobility and reducing traffic emissions improves both access to green spaces and environmental quality.

This document provides practical, evidence-based recommendations to maximize the health benefits of green and blue spaces while minimizing potential risks through appropriate planning, design, and use.

2. Health benefits of green and blue spaces

Green and blue spaces contribute to health through multiple pathways. The main benefits can be grouped into physical, mental, environmental, and social domains.

They support physical health by encouraging regular physical activity such as walking, cycling, and outdoor play. Regular use of these environments is associated with lower risks of cardiovascular and respiratory diseases and supports healthy development in children.

They promote mental well-being by reducing stress, anxiety, and symptoms of depression, while improving mood, attention, and cognitive performance. Exposure to natural environments is often associated with faster recovery from mental fatigue. These spaces also support social and community well-being by promoting interaction, reducing loneliness, and encouraging healthier lifestyles.

From an environmental perspective, green and blue spaces contribute to improved local conditions by reducing urban heat, improving microclimates, and supporting air quality improvement when appropriately designed.

3. Potential drawbacks and risks

Despite their benefits, green and blue spaces may also present certain risks.

Exposure to pollen from certain plant species can trigger allergic reactions and exacerbate asthma in susceptible individuals. Vegetation can also interact with air pollution; dense planting near traffic sources may reduce airflow and trap pollutants, while some species emit compounds that contribute to secondary air pollution.

Poorly maintained spaces may expose users to mould, pests, or contaminated soil. In blue spaces, stagnant water can create breeding grounds for mosquitoes and increase the risk of vector-borne diseases. In addition, poorly designed or unmanaged environments may pose safety risks, including accidents or drowning near water bodies.

These risks can be effectively minimized through appropriate planning, design, and maintenance and are addressed in more detail in Sections 6 and 8.

4. Use of green and blue spaces

Regular and equitable access to green and blue spaces is essential to achieve health benefits. Frequent and meaningful interaction with these environments supports physical and mental well-being, while also contributing to healthier lifestyles.

Citizens

- ▶ Visit green or blue spaces regularly, preferably at least weekly, throughout the year.
- ▶ Even short visits (around 10 minutes) can improve well-being, while longer or more frequent visits provide greater benefits.
- ▶ During heatwaves, prioritise shaded green areas, such as parks and forested environments, which offer cooler conditions.
- ▶ During high-pollen seasons, individuals with allergies or asthma should monitor pollen forecasts and consider adjusting activities and medication in line with medical advice.

Daycare and school settings

- ▶ Integrate regular outdoor activities in nearby green spaces into daily routines.
- ▶ Encourage children to interact with natural elements (e.g. cones, sticks, leaves), while avoiding exposure to toxic plants.
- ▶ Promote environmental awareness by teaching children about the importance of green spaces and responsible behaviour.

Healthcare professionals

- ▶ Become familiar with “green prescriptions”, which may include recommending regular visits to green spaces or participation in nature-based group activities.
- ▶ Consider green prescriptions as a preventive measure and as a complement to conventional medical treatment.
- ▶ Raise awareness about the health benefits of natural environments among patients, colleagues, and the wider public.

Transport and traffic planning

- ▶ Minimise car traffic near green and blue recreational areas by promoting public transport and active mobility (e.g. safe walking and cycling routes).
- ▶ Reduce emissions from motorised traffic through measures such as speed limits and regulated vehicle access.

Property and facility management

- ▶ Incorporate vegetation coverage and quality into design and planning requirements.
- ▶ Preserve existing vegetation, particularly mature trees, during renovation or redevelopment of outdoor spaces.

5. Planning and design principles

Effective planning is essential to maximize the health benefits of green and blue spaces while minimizing risks.

Green and blue spaces should be sufficiently large, well distributed, and easily accessible. Their location should avoid proximity to industrial areas.

Urban planning should support active transport, including walking and cycling, and ensure safe access to recreational areas. Public transport connectivity is also important to improve accessibility for all population groups.

The 3-30-300 rule provides a useful benchmark for urban planning:

- ▶ at least three trees visible from each home,
- ▶ at least 30% tree canopy cover in neighbourhoods,
- ▶ access to a green space within 300 metres.

In areas where large green spaces are not feasible, smaller-scale solutions - such as street trees, green walls, and green roofs - can provide meaningful benefits.

In addition to spatial planning considerations, specific design features can further enhance the usability, inclusiveness, and overall value of green and blue spaces. The establishment of outdoor fitness areas and community gardens can increase public engagement and encourage more frequent use. Educational elements - such as biodiversity information boards, insect hotels, and pollinator-friendly planting - can promote ecological awareness and strengthen the connection between users and their environment.

User comfort is an important factor in supporting regular and prolonged use of these spaces. The provision of well-designed seating, shelters, and shading structures (such as benches and canopies) can improve comfort and accessibility for a wide range of users, including children and older adults. Basic infrastructure, including accessible drinking fountains, can further enhance usability by supporting hydration and enabling longer visits, particularly during warm periods.

6. Plant selection and allergen considerations

Careful plant selection is essential to reduce allergen exposure and support healthy urban environments. The choice and management of vegetation can significantly influence respiratory health, particularly for individuals with allergies or asthma. Well-planned planting strategies can help maximise the benefits of green spaces while minimising potential health risks.

In general, insect-pollinated species should be prioritised, as they release less airborne pollen, while highly allergenic wind-pollinated plants - such as birch or certain grass species - should be avoided, particularly in densely populated areas or locations used by vulnerable groups. Native and climate-adapted species are typically more suitable, as they are better integrated into local ecosystems and more resilient to environmental stressors.

Plant selection should also consider site-specific conditions. Urban environments present constraints such as limited space, soil compaction, and proximity to infrastructure. Trees and vegetation should therefore be selected not only for their ecological characteristics but also for their suitability to the built environment, including root behaviour, mature size, and tolerance to urban stress factors. Matching plant characteristics to available space is essential to ensure long-term sustainability and avoid conflicts with infrastructure.

The allergenicity of plants - defined as their potential to trigger allergic reactions - is determined by a combination of biological and environmental factors, including pollen production, dispersibility, and biological potency.

Urban planting strategies must also consider species distribution and density. Even moderately allergenic plants can contribute to significant exposure if widely planted. Monoculture planting - such as long rows of the same species - should be avoided, while diverse planting strategies can help reduce exposure and improve ecological resilience.

Environmental and climatic conditions further influence allergen exposure. Warm, dry, and windy weather promotes pollen release and dispersion, while climate change is expected to increase pollen production, extend pollen seasons, and potentially enhance allergenic potency.

Urban conditions can also modify allergenic effects. Air pollution may interact with pollen, increasing its irritative properties.

To reduce allergen exposure, urban planning and landscape design should prioritise plant diversity, avoid highly allergenic species in sensitive

locations, and consider long-term environmental and climatic changes. In some cases, systematic approaches - such as developing vegetation inventories and gradually replacing highly allergenic species - can support improved public health outcomes.

7. Green roofs and small-scale green infrastructure

Smaller green infrastructure elements - such as green roofs, green walls, and street vegetation - play an important role in promoting urban health and environmental sustainability. Although their scale is often limited compared to larger green spaces, they provide valuable opportunities to reduce heat exposure, improve local microclimates, and increase everyday contact with nature.

Green roofs, in particular, should be designed as integrated systems that balance structural requirements, vegetation, water management, and long-term maintenance. Their implementation requires careful planning, starting with an assessment of the building's capacity to support additional loads, including soil, vegetation, water, and snow. Both permanent (static) and variable (dynamic) loads should be considered to ensure structural safety.

A well-functioning green roof consists of multiple layers working together. These typically include a waterproof membrane, a root barrier, a drainage layer, a filter layer, a growing medium, and a vegetation layer. Proper design and installation of these components are essential to ensure durability, prevent water damage, and support plant growth.

Plant selection is a key factor in the performance and sustainability of green roofs. Drought-resistant and low-maintenance species - such as sedum or herbs - are often preferred, particularly for extensive green roofs. Species should be adapted to local climatic conditions and, where relevant, selected to minimise allergenic potential.

Effective water management is also essential. Green roofs should be designed to ensure adequate drainage while retaining a portion of rainwater, which can contribute to cooling and reduce stormwater runoff. In some cases, irrigation systems may be required, particularly during prolonged dry periods. Proper maintenance of drainage systems is essential to prevent water accumulation and reduce the risk of mosquito breeding.

From an environmental perspective, green roofs can improve thermal performance by reducing heat gain in summer and heat loss in winter. They also contribute to mitigating the urban heat island effect, provide some degree of noise reduction, and may have limited but positive effects on air quality.

Design should also account for local climatic conditions, including wind exposure, solar radiation, and temperature extremes. Materials and vegetation must be able to withstand these conditions, and installations should be secured to prevent erosion or displacement.

Maintenance is a critical component of long-term performance. Green roofs should be designed to allow safe and easy access for inspection and upkeep. Regular maintenance activities include checking drainage systems, monitoring plant health, and ensuring the integrity of protective layers.

Different types of green roofs may be selected depending on the intended function. Extensive green roofs are typically lightweight, require minimal maintenance, and are not designed for regular use. In contrast, intensive green roofs have deeper substrates, support more diverse vegetation, and may be designed as accessible recreational spaces, but require more intensive maintenance.

8. Blue spaces and water management

Blue spaces - such as rivers, lakes, canals, fountains, and other urban water bodies - provide important health, environmental, and social benefits.

Exposure to water environments is associated with reduced stress, improved mood, and increased opportunities for recreation, including walking and cycling. Blue spaces also play a significant role in regulating urban temperatures, helping to reduce heat-related health risks during warm periods. In addition, they can support biodiversity, improve local microclimates, and contribute to stormwater management and flood control when properly integrated into urban planning.

However, blue spaces may also pose health and safety risks if not adequately managed. Stagnant or slow-moving water bodies can become breeding grounds for mosquitoes, increasing the risk of vector-borne diseases. Poor water quality may expose users to harmful microorganisms or chemical contaminants. In addition, poorly designed or maintained water environments may create safety hazards, including the risk of drowning.

Preventing the accumulation of stagnant water is a key priority. This can be achieved by ensuring continuous water movement through pumps, fountains, or aeration systems, and by improving drainage to prevent water from collecting in depressions or poorly designed structures.

Water circulation and design features should also be carefully considered. For example, ponds and basins can be designed with adequate depth and water flow to reduce the formation of shallow, warm areas that favour mosquito development. In constructed wetlands, subsurface flow systems may be preferred over open stagnant water surfaces.

Biological control methods can complement these measures. Introducing natural predators - such as certain fish species or aquatic insects - can help regulate mosquito populations in an environmentally friendly way. Where necessary, targeted use of environmentally safe larvicides, such as biological agents, may be considered, ensuring that impacts on other species are minimized.

Regular maintenance and monitoring are essential components of effective management. This includes checking water quality, ensuring proper functioning of circulation systems, maintaining infrastructure, and identifying potential risks early - particularly during warmer periods when mosquito activity is higher.

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