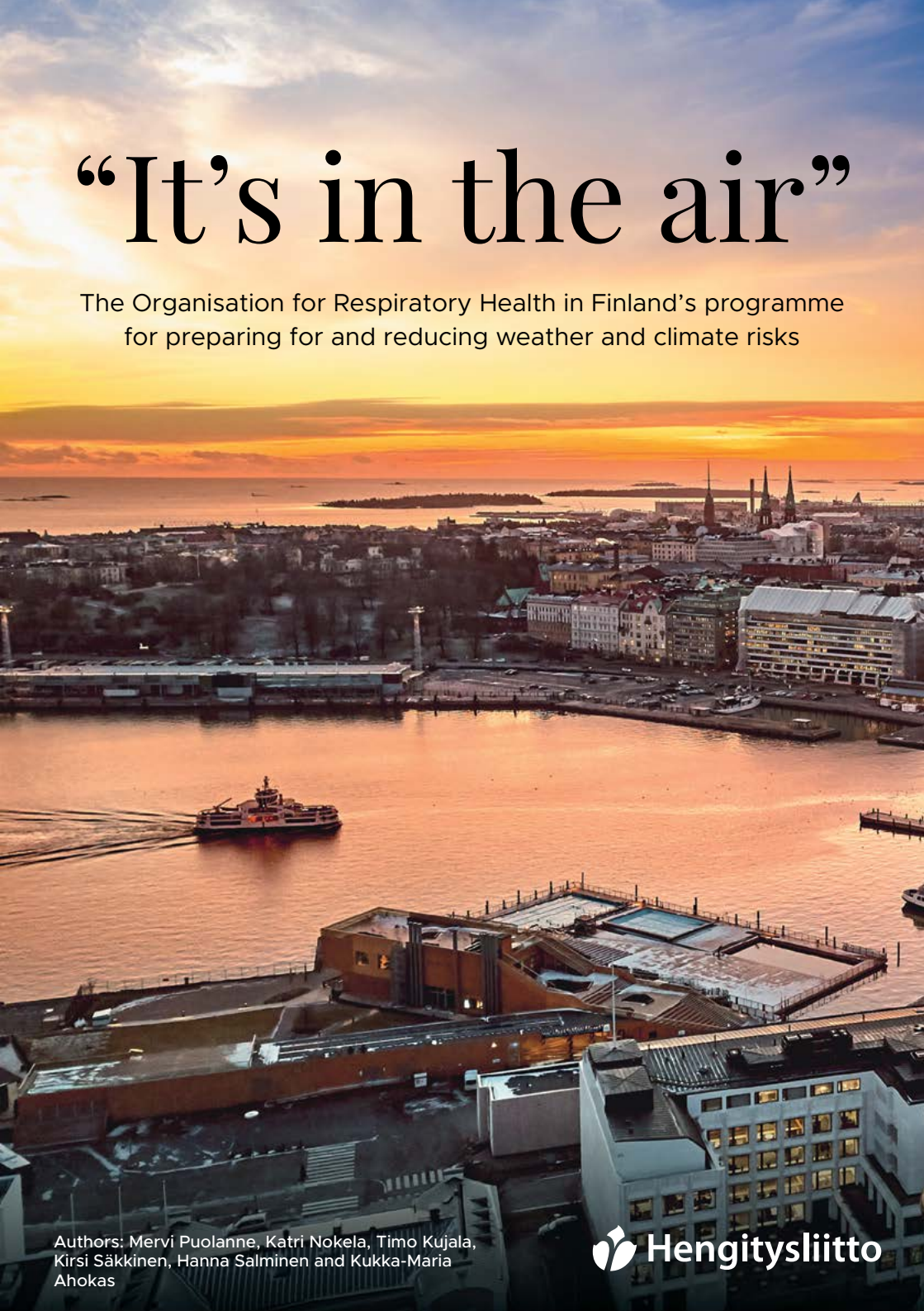
“It’s in the air”

The Organisation for Respiratory Health in Finland’s programme for preparing for and reducing weather and climate risks



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Hengitysliitto

Contents

Hengitysliitto

Starting points

The changes arising from global warming are affecting our living environment and health in a number of different ways. In an ageing population, climate change will also become a public health issue: the adverse health effects of global warming will be felt most strongly by the elderly and those with long-term ill health. Global warming must be limited to a maximum of 1.5°C. Now is the time to prepare for the direct health risks being brought about by climate change.

The Organisation for Respiratory Health in Finland has already been taking a stand on issues relating to outdoor air quality for several decades.

Our latest approach to creating awareness is *The Organisation for Respiratory Health in Finland's programme for preparing for and reducing weather and climate risks* (2019–2022). This programme provides information about the impact of climate change on respiratory health, analyses the potential for self-care through exercise, and considers the impacts of urbanisation and an ageing population on these issues.

On a global scale, Finland is still a clean country with minimal air pollution. However, we Finns will not be protected from the effects of climate change, as the atmosphere does not respect national borders. Particulate matter is carried to Finland in industrial emissions from both neighbouring regions and all across Europe. During heatwaves, smoke from extensive wildfires also lowers the air quality in Finland.

Lengthening heatwaves and animal-borne diseases are also taxing people's health. Urbanisation reduces our direct contact with nature and weakens our immune systems. Warmer and rainier weather is also causing moisture problems in buildings.

Finland has already woken up to climate change, which can be seen in the government report "Weather and Climate Risks in Finland – National Assessment" and the launch of the National Air Pollution Control Programme 2030. The Organisation for Respiratory Health in Finland recommends that we all start reacting to and preparing for the health risks caused by climate change now. This is why our organisation is increasingly raising awareness of weather and climate risks, and providing information for people who are interested in their respiratory health or have respiratory diseases.

Together, we will be able to achieve more, so everyone can breathe more easily – both now and in the future.

The Organisation for Respiratory Health in Finland demands that we starting preparing for the risks caused by climate change now, by preventing health risks and regulating zoning, renovation and new construction.

The Organisation for Respiratory Health in Finland's programme for preparing for and reducing weather and climate risks consists of two parts. The first part answers the question 'How is climate change affecting people's respiratory health?' The second part answers the question 'How is climate change affecting the built environment?' Here, the 'built environment' refers in particular to the impacts of construction and the impacts of urbanisation on community planning. In both parts, we propose solutions and present the kinds of decisions that could positively impact respiratory health at both community and individual level. Everyone has the chance to do their bit towards achieving humankind's great common goal.

1. Health risk prevention must start now

Climate change is affecting Finnish nature, even though we are somewhat protected by our northern location. Global warming is causing long heatwaves and increasing other extreme weather phenomena. Both heat and subzero temperatures make it more difficult to breathe, especially for the elderly and those with long-term ill health. Diseases transmitted by animals, such as tick-borne encephalitis and Lyme disease, are becoming more common. The pollen season is both starting earlier and getting longer, which increases allergy symptoms. Non-native species are also on the rise, as new allergy-causing plants are being transported to Finland. Allergies and inflammatory diseases have become more common in industrialised countries, as biodiversity decreases and people have less contact with nature.

Solution 1:
Maintain and promote your contact with nature

Our immune systems will not develop sufficiently if we reduce our contact with nature. People living in towns and cities have much less contact with the natural microbes that are beneficial to health. As a result, we may become allergic to some natural and usually harmless things.

What can you do?

» Spend time in nature. Even in towns and cities, you will often find parks, recreational areas, trees, bushes and beaches. Spending time in nature also reduces your stress levels and has a positive impact on your mood.
» Make sure that children spend time in nature and in other natural environments. The bacteria found in a traditional farmhouse reduce the risk of developing childhood asthma. So it's good to let children play in the yard and with animals, regardless of any minor mess.
» It's also worth getting your fingers dirty. Gardening is a great way to boost your immune system.

Recommendations for decision-makers!

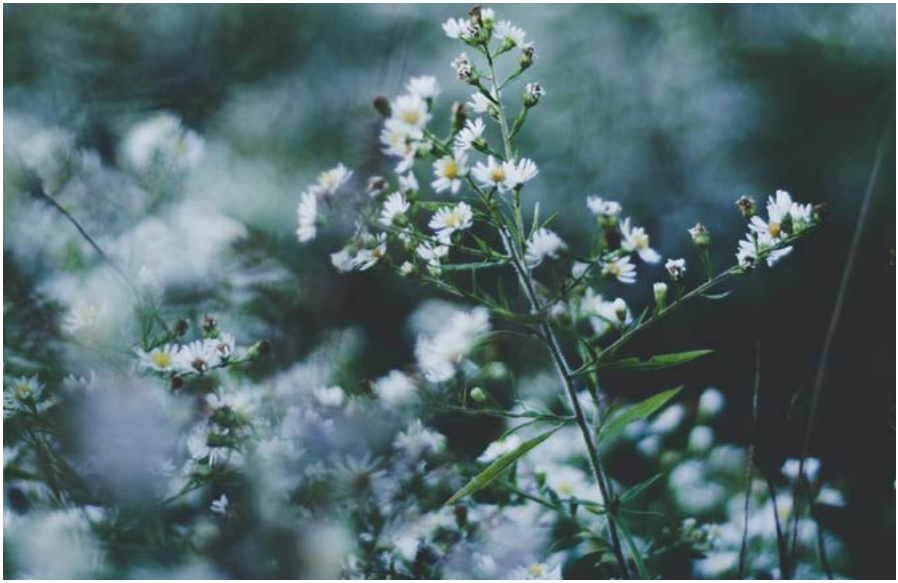
✓ Make zoning decisions that consider the need for human contact with nature. During area planning, think whether a lawn could be replaced by a meadow left in its natural state. Make sure to leave wildflower meadows next to lawns.
✓ Consider biodiversity when planning yards for daycare centres, schools, and housing for the elderly and disabled. Yards can have forest climbing frames in trees, a forest floor shrub-land transplant, green walls, grassy areas, cultivation boxes, berry bushes and fruit trees.

Solution 2: Foster biodiversity

Urbanisation, denser construction and the growing size of towns and cities are reducing and fragmenting natural areas, and thereby reducing biodiversity. Microbes that are beneficial to health are disappearing or becoming rarer. Flora and fauna are more diverse and abundant in forests that have been left in their natural state than they are in artificial green spaces.

What can you do?

- In both residential and other yards, you can plant berry bushes and fruit trees, and install cultivation boxes and forest floor shrub-land transplants. Plant wildflower meadows next to, or instead of, lawns. Protect indigenous species. Make sure that your housing company pays attention to biodiversity in its yard areas.
- Engage in outdoor nature pursuits, both locally and further afield. Avoid busy roads – take nature trails when commuting for work or hobbies.
- Adopt a more healthy diet. Eat root and other vegetables, berries, fruit and wild herbs. Favour Finnish alternatives.
- Prepare for the allergy season as best you can with desensitisation and, if necessary, also medication.

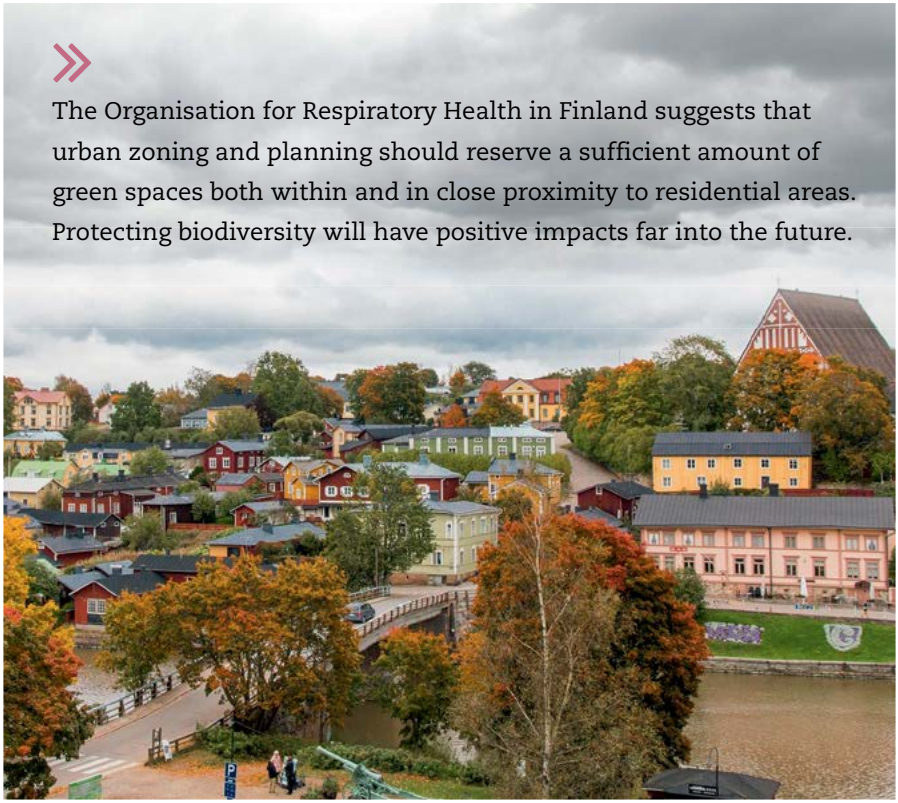


Solution 3:
Foster urban nature during zoning

Nature and the city do not have to be opposites. You can include urban nature when planning and zoning urban areas. Urban nature should be located next to residential areas and heavily frequented routes. Zoning should ensure that green spaces and areas for children and the elderly are not built next to heavily trafficked roads.

In Finland, traffic is a major cause of particulate matter and air pollution. That's why it's important to plan routes for light traffic and public transport.

Easy transport connections are required to biodiverse natural areas, such as forests, archipelagoes and sparsely populated suburbs. Mushrooming and berry picking are excellent ways to foster a connection with nature. These activities must be accessible to everyone, including children, young people and those who are less mobile. Nature and fitness trails can be tailored to the needs of different users by adjusting their length, width and condition.



The Organisation for Respiratory Health in Finland suggests that urban zoning and planning should reserve a sufficient amount of green spaces both within and in close proximity to residential areas. Protecting biodiversity will have positive impacts far into the future.

Recommendations for decision-makers!

- ✓ Make decisions that consider self-care and fitness for the elderly and those with long-term ill-health: routes are needed for pedestrians and cyclists, without forgetting benches and other resting places.
- ✓ Ensure that managed fitness trails always have a route that is safely accessible to people with various levels of mobility.

Solution 4:
Take precautions against animal-borne diseases

Infections transmitted by animals are increasing as a result of global warming and increased rainfall. Ticks and insects (mosquitoes, fleas, flies) in particular are spreading to new areas. Their populations are growing and their active periods are lengthening. The movement of both people and goods also impacts the prevalence of these insects.

The impact of climate change may also be reflected in changes in the reproductive conditions and prevalence of other creatures that spread diseases (such as moles, birds and small predators).

The Organisation for Respiratory Health in Finland is working to increase people's awareness of animal-borne diseases and how to protect ourselves from them. The Organisation for Respiratory Health in Finland challenges other social and healthcare organisations – and healthcare professionals – to help us in this work!

What can you do?

- Keep your vaccinations up to date. If necessary, supplement public vaccination programmes by having certain vaccinations at your own expense, for example, against tick-borne encephalitis.
  When travelling abroad, check the vaccination recommendations for your destination and also protect yourself with appropriate clothing.
- Protect yourself from ticks when spending time in nature. Wear long trousers and long-sleeved clothing. Check yourself for ticks when you get home.
- Protect your pets from ticks as well. Regularly inspect them for ticks. Ticks can be transferred from animals to people when, for example, a pet sleeps in the same bed as you.

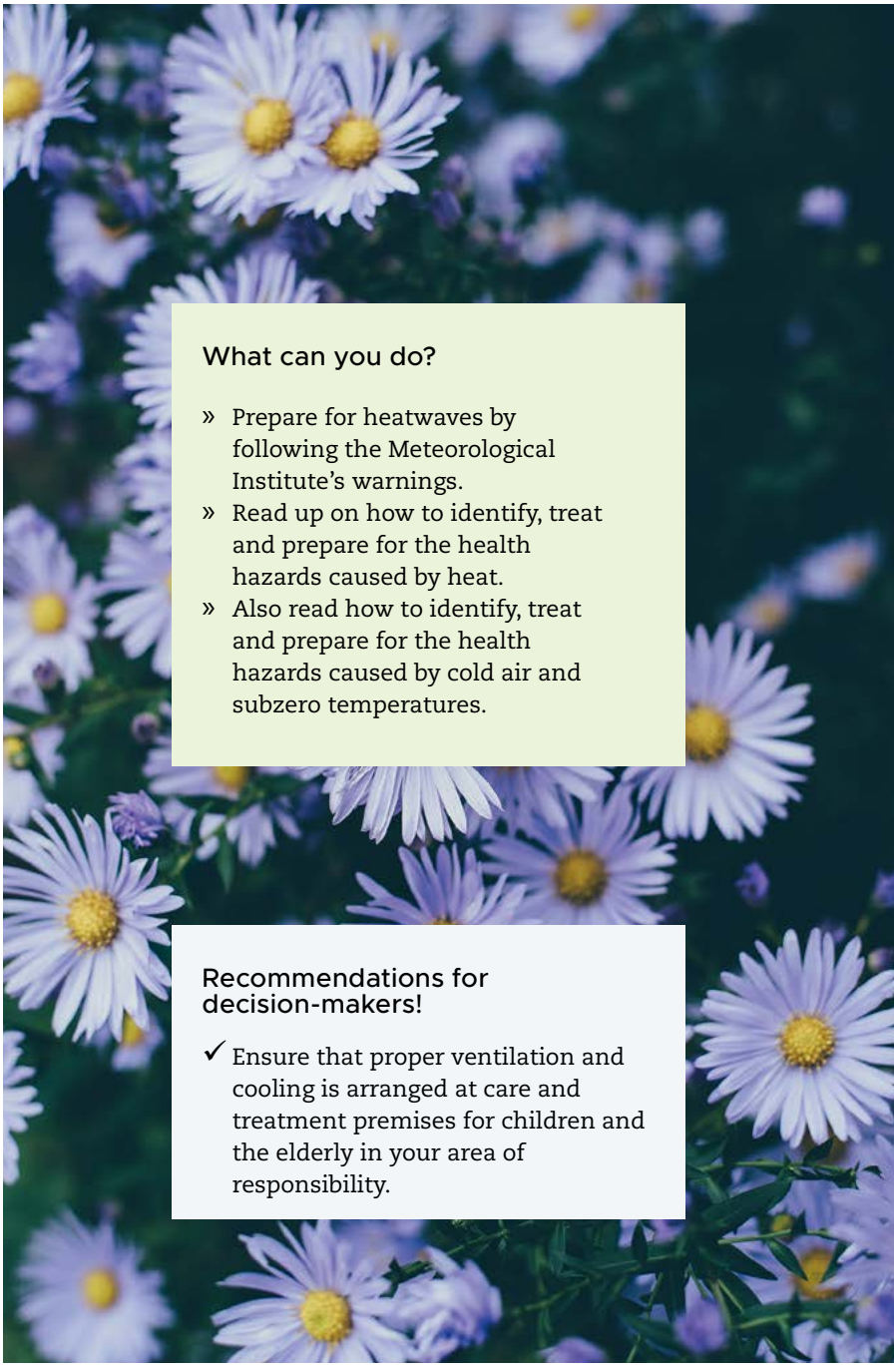
Solution 5:
Prepare for weather risks, particularly heatwaves

As a result of global warming, heatwaves are becoming more common, longer and more intense. Heat places a great burden on our respiratory and circulatory systems. For many people, heat also causes tiredness, poor concentration, disturbed sleep, muscle weakness, and reduced stamina.

The health hazards caused by heat increase when the temperature exceeds +23–25°C. Those with long-term ill health will already notice increased and worsening symptoms at around +20°C. Heatwaves will increase the need for hospital care and doctor's appointments, particularly for the elderly and those with long-term ill health.

When the temperature exceeds 30°C, mortality will increase among the elderly both at home and in care facilities. During the 2010s, heatwaves in Finland have caused about 300–400 premature deaths a year among the over-65s and those with long-term health problems, particularly respiratory diseases (asthma, COPD) and cardiovascular diseases (infarctions, arrhythmia).

Healthcare professionals have varying levels of awareness when it comes to the health effects of weather risks (heatwaves and subzero temperatures).



What can you do?

» Prepare for heatwaves by following the Meteorological Institute's warnings.
» Read up on how to identify, treat and prepare for the health hazards caused by heat.
» Also read how to identify, treat and prepare for the health hazards caused by cold air and subzero temperatures.

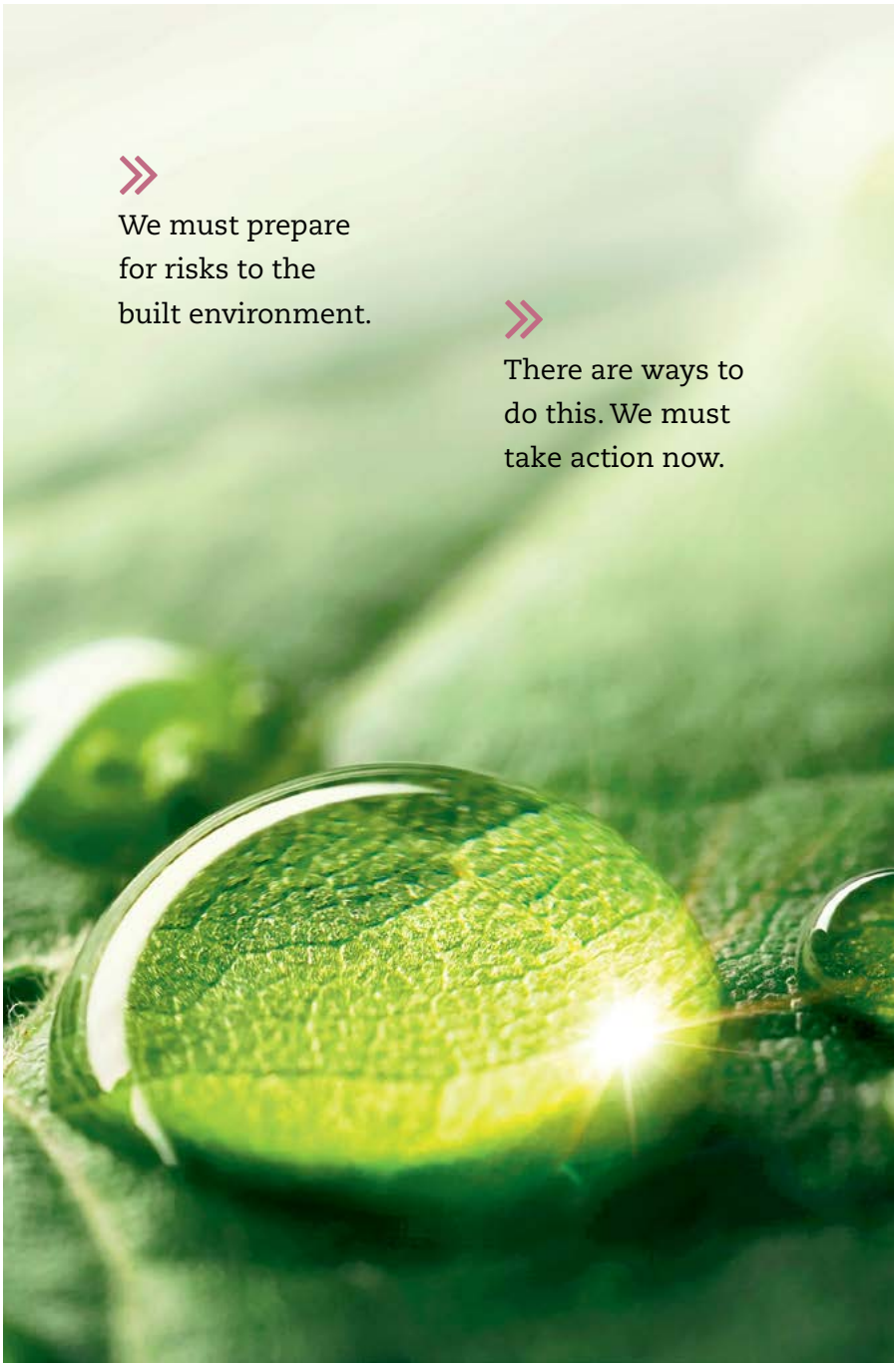
Recommendations for decision-makers!

✓ Ensure that proper ventilation and cooling is arranged at care and treatment premises for children and the elderly in your area of responsibility.

2. We must prepare for risks to the built environment

As 70 per cent of Finns live in urban areas, more and more people are being affected by the challenges of urbanisation and the risks that climate change poses on the built environment. It is predicted that climate change will affect Finland in many ways: higher temperatures, increased rainfall and increased cloud cover.
A variety of extreme weather phenomena (such as torrential rain, floods, storms and droughts) will also increase. All this must be considered in community planning, construction and housing.

Climate change is already affecting existing buildings and will also impact new construction in the future. Regular maintenance and repair is required in order to prevent damage to building stock. The risks brought by climate change must also be considered in zoning, renovation and the design of new buildings.


We must prepare for risks to the built environment.
There are ways to do this. We must take action now.

Solution 6: Construction must consider changing weather conditions

As the climate warms, warmer periods will become longer and more common during all seasons (such as summer heatwaves). Heatwaves increase the need to cool buildings.

Long-term cooling may lead to the risk of moisture and mould damage in structural elements, particularly in older buildings without controlled ventilation. Cooling also requires energy and increases costs. It has been estimated that the need for cooling in buildings in Southern Finland will increase by up to 5–6 times the current level.

Higher temperatures will also lead to increased precipitation, particularly in autumn and winter months.
Rain and snow will place external elements, such as facades and roofs, under increasing stress from moisture. Higher temperatures and moisture-induced stress will cause microbial damage to structural elements, and this may have an impact on indoor air quality.

The increased cloud cover caused by climate change may lead to structures drying out more slowly. Wind-driven rain exposes concrete structures to frost damage – if increased cloud cover and moisture-induced stress prevent structures from drying, they will freeze instead. The risk of steel corrosion in concrete structures is also increasing. Other concrete structures, such as bridges and parking facilities, are also susceptible to damage.

Stormwater resulting from increased rainfall and localised torrential rain may cause considerable damage in urban areas. Stormwater can build up in densely populated areas with many impermeable surfaces (such as surfaced roads and parking spaces). If this is not taken into consideration, there will be an increased risk of damp and extensive structural damage.

Climate change will also bring extreme weather phenomena, such as heavier snowfall. Buildings' snow-bearing capacity (the weight of snow that their structures can carry) must therefore be checked.

What can you do?

» When developing an area, ensure adequate stormwater drainage for your plot during the design phase, and also consider how to prevent and reduce stormwater.
» When designing structures and ventilation, consider the need for increased and long-term cooling.
» Load-bearing structures must be reinforced to withstand loading from increased snowfall.

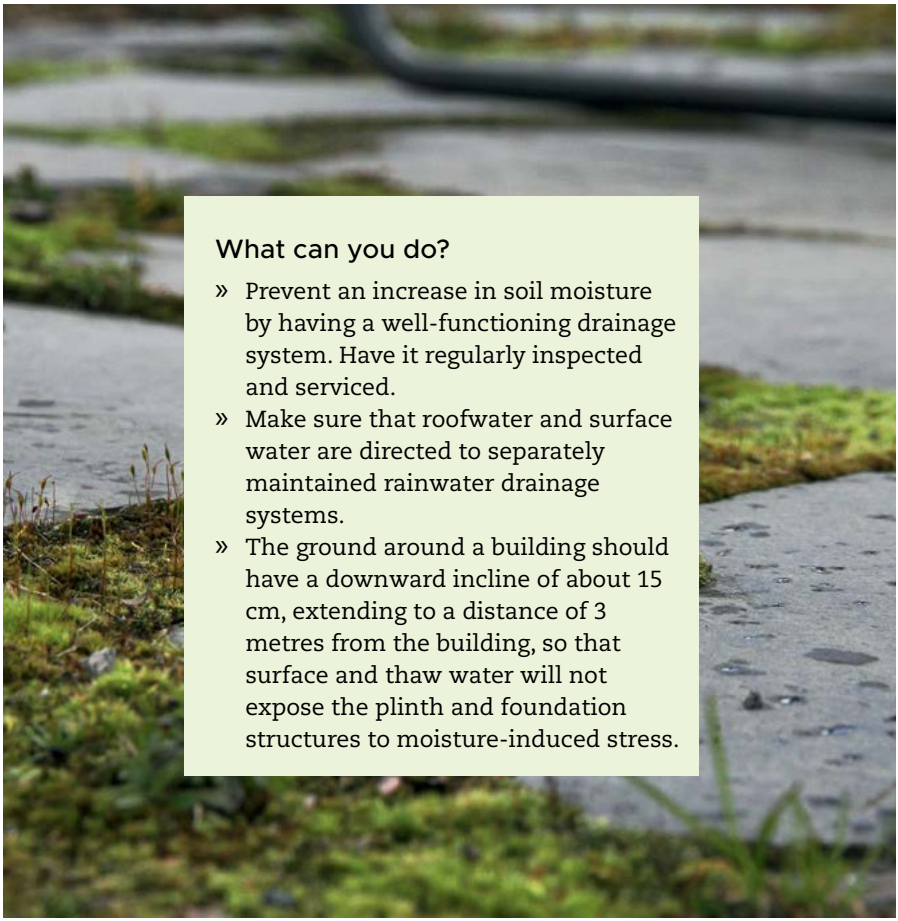
Recommendations for decision-makers!

✓ New built-up areas must have sufficient green spaces that will not only be pleasant places, but will also act as carbon sinks. Green spaces will also act as absorption fields for increasing rainfall, surface moisture and stormwater; and they can be used to store snow during the winter. This solution will work in the best interests of both buildings and respiratory health!
✓ Make sure that fewer large parking areas are zoned in the future. Extensive surfaced areas require more drains and larger sewer pipes. These kinds of areas hinder stormwater management and the creation of a denser urban structure. The number of private cars is also expected to decline in urban areas in the future.
✓ When planning the stormwater network in new residential areas, consider water volumes arising from increased rainfall and floodwater. Provisions can also be made for potential stormwater flooding in existing residential areas by checking and, where necessary, increasing the capacity of the stormwater network. If stormwater sewers need to transport stormwater uphill, a drain will not be enough – pumps will be required. The system must also be properly maintained.

Solution 7:
Construction must consider changes in soil moisture

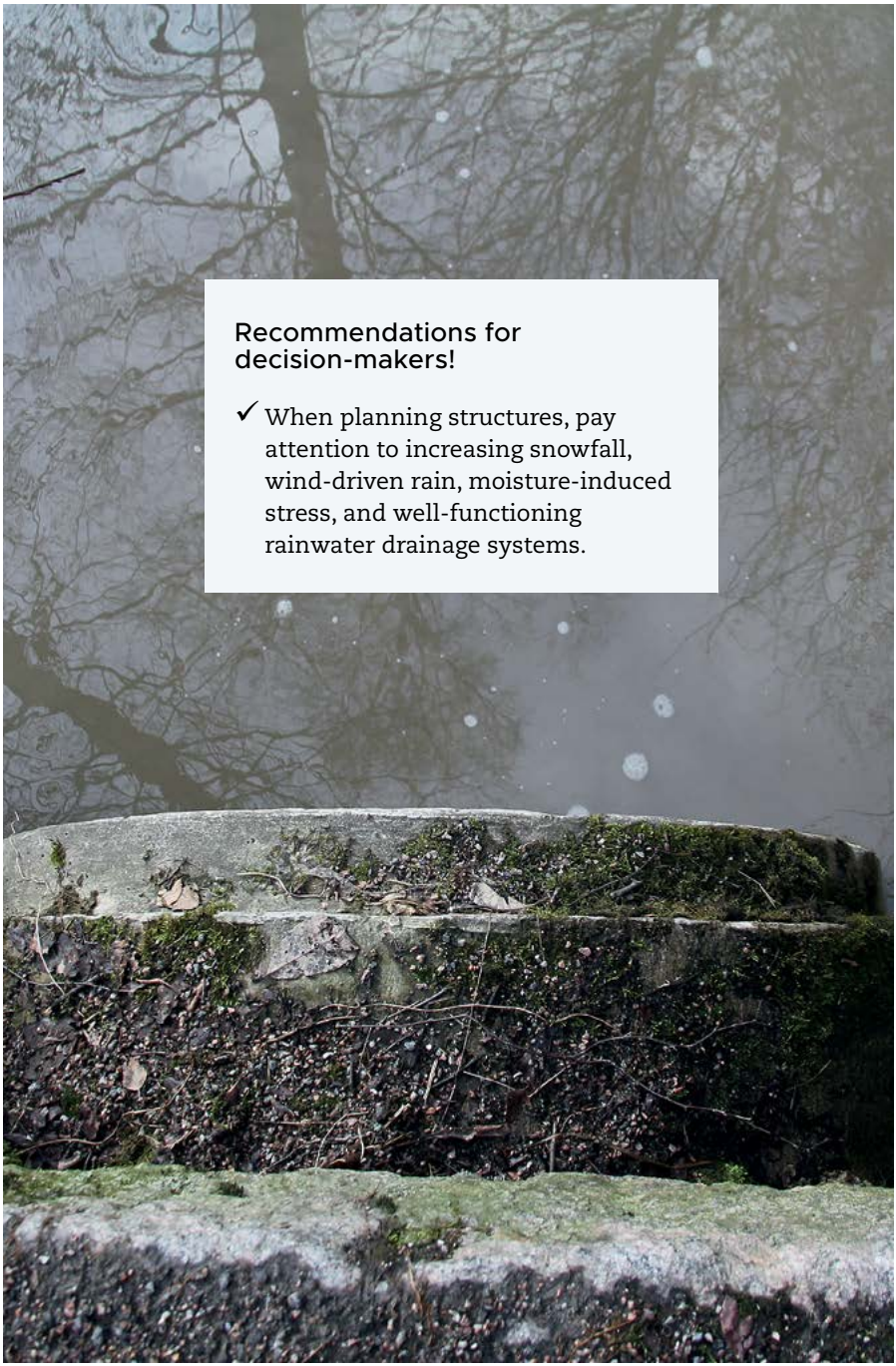
Climate change causes changes in soil moisture, which in turn causes changes to the ground's load-bearing capacity. Long dry spells cause the soil to dry out, leading to subsidence and potential damage to building foundations. Increased rainfall will increase the water content of the soil, and this will also reduce the ground's load-bearing capacity. Increased soil moisture also damages basement and foundation structures, particularly in older buildings that lack proper drainage and a base-floor capillary break layer.

Increased soil moisture causes moisture damage to foundation structures, and also increases the risk of the foundation soil freezing. In other words, when the ground under a building freezes, it may cause the foundations to move or be damaged.



What can you do?

- Prevent an increase in soil moisture by having a well-functioning drainage system. Have it regularly inspected and serviced.
- Make sure that roofwater and surface water are directed to separately maintained rainwater drainage systems.
- The ground around a building should have a downward incline of about 15 cm, extending to a distance of 3 metres from the building, so that surface and thaw water will not expose the plinth and foundation structures to moisture-induced stress.



Recommendations for decision-makers!

- ✓ When planning structures, pay attention to increasing snowfall, wind-driven rain, moisture-induced stress, and well-functioning rainwater drainage systems.

Solution 8:
Demand a reduction in fine-particle emissions

In Finland and the EU, the annual limit value for PM2.5 particulate matter is 25 micrograms per cubic metre of air (25 µg/m³). The World Health Organisation (WHO) has a stricter recommendation: 10 µg/m³ per annum. The risk of mortality and the risk of developing asthma both rise steadily as fine particle concentrations rise. The majority (up to about 70 per cent) of fine particles are airborne emissions that originate outside of Finland (from air pollution and forest fires). The remaining particulate matter present in our outdoor air originates from industrial emissions, energy production, small-scale domestic wood-burning, vehicle exhaust gases, and street dust.

The Organisation for Respiratory Health in Finland demands that Finland starts complying with the World Health Organisation's recommendations of 10 µg/m³ per annum.

As the amount of air pollution and particulate matter decreases, the risk of childhood asthma also decreases. Up to a third of all childhood asthma in Europe would be preventable if European countries adhered to the WHO's limit values for fine-particle emissions.

The annual cost of air pollution in Finland is approximately EUR 2 billion and 500,000 lost working days. Fine particles are the most significant environmental exposure agent affecting health. They have direct impacts on allergies, immunology and toxicity. When they enter the bloodstream and other organs, fine particles increase a person's risk of developing cardiovascular diseases. It has been estimated that fine particles cause 1,600 premature deaths per year.

A recent British study (Doiron et al. 2019) discovered that human lung functionality has decreased in areas with high levels of particulate matter and air pollution. The condition of the subjects' lungs corresponded to the lung condition of people in other areas who were two years older.

Particulate matter in outdoor air will be one of the most significant future health hazards for people with respiratory diseases. In addition to the elderly, other risk groups include children, people with long-term ill health, and those with cardiovascular diseases. For people with respiratory diseases (particularly asthma and COPD) even short-term exposure to fine particles will increase their symptoms and weaken their condition. The extent of this problem will most likely increase as the population ages.

Solution 9: Burn wood cleanly – particularly in the winter and in urban areas

In the winter, up to 40 per cent of the particulate matter in urban areas dominated by detached housing may originate from wood burning. This figure is expected to increase by 2030. The health hazards arising from wood-burning in urban areas have the greatest impact on children, people with respiratory diseases and elderly people in poor physical condition. These health effects will manifest themselves as symptoms, and they will have an impact on the development of respiratory and cardiac diseases. Respiratory symptoms and infections will increase in small children.

Fine particles are released into the air from fireplaces and wood-burning sauna stoves.

» The Organisation for Respiratory Health in Finland would like to remind you that, in order to reduce health hazards, the fine-particle emissions caused by wood-burning need to be reduced.

Unless intake air is filtered, fine particles are easily transported from outdoor to indoor air through ventilation systems and windows.

What can you do?

» Filter intake air, and regularly maintain your ventilation equipment, ducts and vents in accordance with the manufacturer's instructions.
» Burn clean dry wood. Don't burn rubbish. Store your wood in a dry building. Read the Organisation for Respiratory Health in Finland's guide on how to "Burn wood more cleanly".
» Keep your fireplaces and their chimneys and flues in good condition, and carry out regular maintenance (sweeping, condition inspections). Choose a low-emission, heat-storing fireplace.
» When renovating, replace your sauna stove with a new model that emits less soot and fewer harmful particulate and gaseous compounds. Favour electric sauna stoves if you live in a densely built-up area.

Recommendations for decision-makers!

✓ Make sure that zoning and planning reserve spaces for storing firewood.
✓ Take action that increases awareness about the health effects of particulate matter.

Solution 10:
Reduce street dust and its health risks

Fine particles in the air we breathe are hazardous to health. Particulate matter and street dust also find their way indoors. Indoor exposure depends on the proximity of the emission source.

In the spring, street dust lowers the quality of outdoor air for an average period of 3–6 weeks. The exact duration varies across Finland. Street dust contains powdered traction sand and road salt, mineral particles from the erosion of road surfaces, rubber particles from vehicle tyres, and metal particles from vehicle brakes, clutches, engines and studded tyres. Street dust also contains soot particles, bacterial compounds, finely ground vegetation, and soil particles. Particles from construction sites also contribute to the volume of particulate matter in the air.

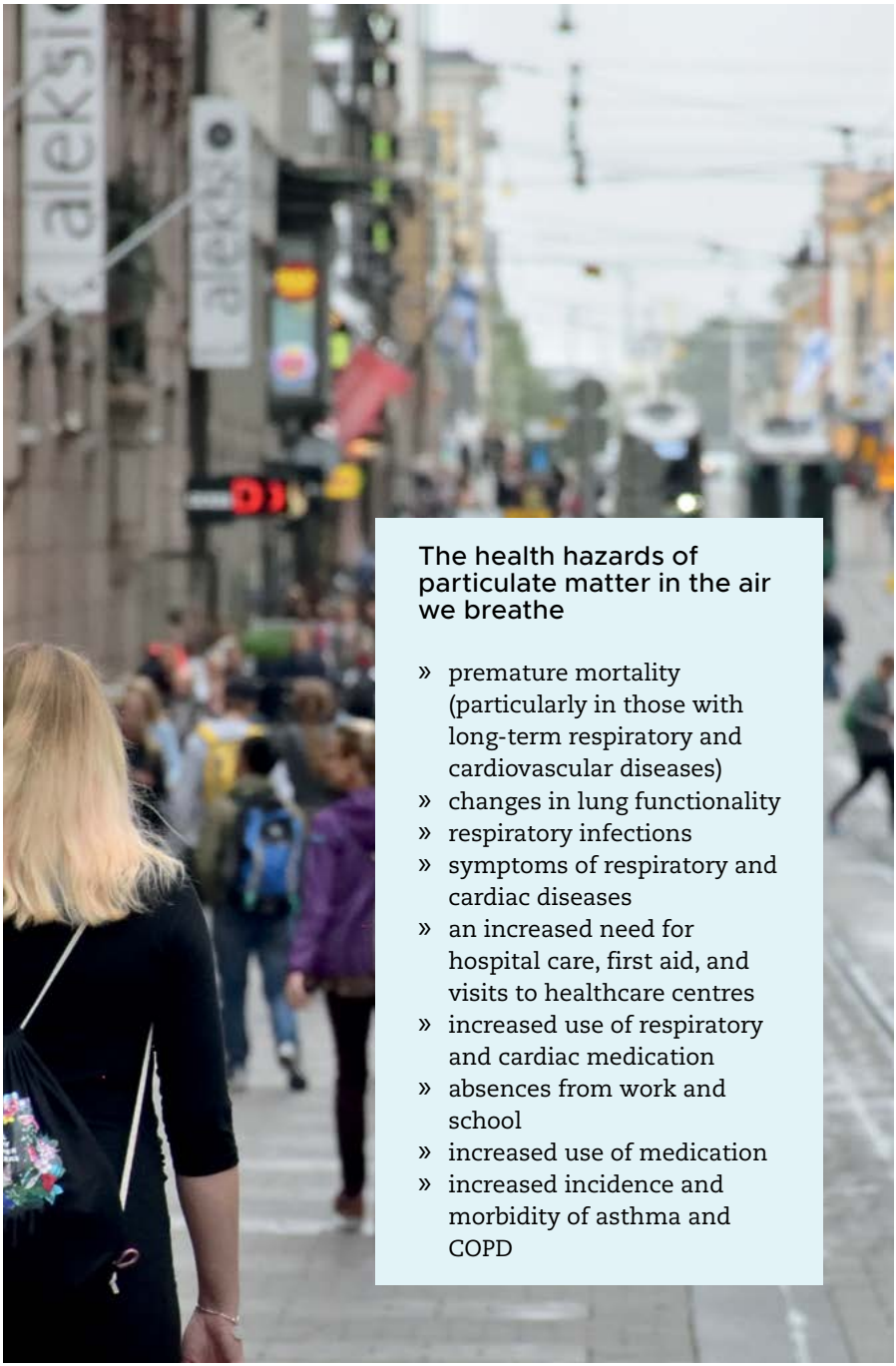
A significant proportion of street dust consists of coarse PM10 particles, which increase the risk of childhood asthma. The diameter of coarse PM10 particles is less than 10 micrometres. According to current knowledge, PM2.5 particles (less than 2.5 micrometres in diameter) are the most hazardous category of particle. They increase respiratory diseases in both children and adults, the use of healthcare services, and absences from school and work.

Street dust has been proven to have a stronger connection to respiratory symptoms (shortness of breath, mucus, coughing, wheezing, runny nose) than vehicle exhaust gasses. It has also been proven to increase the need for medication. Dust increases inflammation and pneumonia, which cause 50–60 premature deaths every year in those with respiratory and cardiovascular diseases.

In those with allergies, respiratory symptoms are further exacerbated by the simultaneous appearance of airborne pollen and the flowering of birch, alder and hazel. Athletes who have problems with their respiratory health should avoid strenuous physical activity outdoors when the air quality is poor.

About a third of the people who responded to a survey conducted by the Organisation for Respiratory Health in Finland in 2019 said that they avoided outdoor activities during the street dust season. There were a total of 1,094 respondents.

The Organisation for Respiratory Health in Finland recommends proactive dust removal to reduce the health hazards arising from street dust. Everyone can also do their bit to reduce the formation of street dust.



The health hazards of particulate matter in the air we breathe

- premature mortality (particularly in those with long-term respiratory and cardiovascular diseases)
- changes in lung functionality
- respiratory infections
- symptoms of respiratory and cardiac diseases
- an increased need for hospital care, first aid, and visits to healthcare centres
- increased use of respiratory and cardiac medication
- absences from work and school
- increased use of medication
- increased incidence and morbidity of asthma and COPD

What can you do?

- Walk or cycle short distances. Avoid unnecessary car journeys – favour public transport and rideshares.
- Avoid busy roads and rush hours when commuting for work and recreational activities, or going into town on errands. This is particularly important in dry weather during the dustiest periods.
- Follow weather forecasts, so you know when to prepare for any potential symptoms. If necessary, use a respiratory mask while you are outdoors. Take more effective medication if you have a respiratory disease. You can ease irritation symptoms by moisturising the mucus membranes in your eyes and respiratory tract using appropriate sprays and drops.
- Avoid any unnecessary sanding of streets in winter. Use washed macadam as traction sand. Do not use a leaf blower to remove traction sand. Try to ensure that your housing company removes traction sand from the street while it is damp or along with snow. Clean your own section of the street before the city's cleaning vehicles pass by.
- If you have a car, move it from any streets that are being cleaned in good time. Favour friction tyres. Favour a defensive driving style and make sure that your vehicle's fresh air filter is working properly.
- Install fine-particle filters in air intake vents and ventilation equipment at home, in your car and at your workplace. Prevent street dust from entering indoor areas by regularly changing ventilation filters in accordance with the instructions, and especially before the start of the street dust season. Install filter fabrics in ventilation windows. Avoid opening windows during the street dust season, or open them less frequently.

Recommendations for decision-makers!

- ✓ Only sand required areas during winter. Use good-quality traction sand. Make investments in winter snow and sand removal. When tendering out sand removal in your municipality, remember to categorise roads and streets according to their traffic levels, and also define different periods for sand removal in these categories. Aim for sand removal to last for a maximum of two weeks. Correctly schedule, and allocate sufficient resources for, this cleaning work. Make sure that traction sand is removed and streets washed at the earliest possible opportunity. Use water to prevent the formation of dust during sand removal. If necessary, you can also use calcium chloride as a 'first-aid solution' to dust prevention. Make sure that the streets are washed after cleaning.
- ✓ Make decisions that will encourage the use of public transport. Make sure that public transport and light traffic is considered during zoning. Organise car-free days during dusty periods.
- ✓ Make sure to impose speed limits on heavily trafficked roads near daycare centres, schools, and housing and care services for the elderly. This is especially important when a street is surrounded by an unbroken line of high buildings.

Summary

The Organisation for Respiratory Health in Finland's programme seeks to influence community decision-making , so that respiratory health perspectives are visible in both healthcare policies and decisions on zoning and construction. The Organisation for Respiratory Health in Finland also wants to provide information about the choices that everyone can make to mitigate the risks of climate change.

The Organisation for Respiratory Health in Finland demands that

- health risk prevention must start now
- risks to the built environment must be prepared for by regulating zoning, renovation and new construction.

Adults breathe about 15 m^3 of air every day. Although air pollution is invisible, it can have serious consequences on respiratory health, the heart and other organs. Some of the most common side-effects include a variety of irritation symptoms and breathing difficulties. Those with respiratory diseases will have an increased risk of an asthma attack, and the risk of premature deaths during heatwaves will also rise. According to the WHO, exposure to air pollution reduces the lifespan of every European by an average of one year. The harmful effects of this exposure can be compared to passive smoking – the only difference is that you can't choose whether or not to breathe.

Finland cannot solve air-quality issues alone, but there is a lot that we can do to promote respiratory health in Finland. The *European Respiratory Society* (ERS) recommends that every EU country shoulders its responsibility for clean air. This means paying attention to air quality in transport, industrial and energy policies, and issuing national regulations and local government guidelines to supplement international regulations. The Organisation for Respiratory Health in Finland's programme takes into consideration the ERS's policies on clean air and air pollution, and their associated health effects.

The changes that global warming will bring must be prepared for in good time. There are already ways to do this – we must take action now. Difficult political decisions must be made. However, we all have the opportunity to make an impact. We can all raise these issues for debate with decision-makers. We can all do something that has at least local impact. Together we can achieve more. If we act in time, we will have time to adapt to the changes and protect future generations.

Sources

» Doiron, D., de Hoogh, K., Probst-Hensch, N., et al.: Air pollution, lung function and COPD: results from the population-based UK Biobank study. European Respiratory Journal 2019; DOI:10.1183/13993003.02140-2018. https://doi.org/10.1183/13993003.02140-2018

» Duodecim: Terveellinen ruokavalio vähentää ilmansaasteiden terveyshaittoja (2019) https://www.terveysportti.fi/terveysportti/uutismaailma.duodecimapi.uutisarkisto?p_arkisto=1&p_palsta=10&p_artikkeli=uux23240

» ERS European Respiratory Society, several sources: Spotlight on Clean Air and Health, Air Pollution and Health Facts & Myths, Healthy Lungs for Life, 10 Principles for Clean Air. www.ersnet.org

» García, E., Berhane Kiros T. et al. (2019) Association of Changes in Air Quality With Incident Asthma in Children in California, 1993-2014. JAMA. 2019;321(19):1906–1915. doi:10.1001/jama.2019.5357 www.terveysportti.fi/terveysportti/uutismaailma.duodecimapi.uutisarkisto?p_arkisto=1&p_palsta=10&p_artikkeli=uux23435

» Hanski, I., von Hertzen, L., et al. (2012) Environmental biodiversity, human microbiota, and allergy are interrelated. Proceedings of the National Academy of Sciences PNAS. May 22, 2012, p. 109. https://www.pnas.org/content/109/21/8334

» Hänninen, O, Korhonen, A. et al. (2016): Ilmansaasteiden terveysvaikutukset. REPORTS OF THE MINISTRY OF THE ENVIRONMENT 16, 2016 http://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/74861/YMra_16_2016.pdf?sequence=1&isAllowed=y

» Keet, C. A., Keller, J. A., Peng, R. D. The Long Term Coarse Particulate Matter Exposure Is Associated with Asthma among Children in Medicaid, AJRCCM Issues, Vol. 197, No 6, Mar 15, 2018 https://www.atsjournals.org/doi/full/10.1164/rccm.201706-1267OC

» Kirjavainen, P. et al. (2019) Farm-like indoor microbiota in non-farm homes protects children from asthma development. Nature Medicine. 17 June 2019 https://www.nature.com/articles/s41591-019-0469-4

» Kreis H., Cirach M. et al.: Outdoor Air Pollution and the Burden of Childhood Asthma across Europe. European Respiratory Journal 2019; 10.1183/13993003.02194-2018. https://erj.ersjournals.com/content/early/2019/07/08/13993003.02194-2018

» Künzli, N., Perez, L. & Rapp, R (2010) Air quality and Health, European Respiratory Society. https://www.ersnet.org/pdf/publications/air-quality-ENG.pdf

» Kuumainfo.fi, a website administered by the Northern Ostrobothnia Hospital District and the University of Oulu. http://www.kuumainfo.fi/

» Lanki T.: Katupölyn vaikutukset terveyteen (2013). Final Report, April 2013. https://asiakas.kotisivukone.com/files/nastatutkimus.kotisivukone.com/tiedostot/tutkimusraportit/lanki_thl_katupolyn_terveysvaikutukset.pdf

» Leppänen, Paula-Kaisa (2011): Suunniteltu biodiversiteetti maisemasuunnittelussa. Tapaustutkimus: luonnonmukainen hulevesien hallinta Korkeasaaressa. Häme University of Applied Sciences 2011 https://www.theseus.fi/handle/10024/29798

» Ohjeet hoitohenkilökunnalle: terveydenhuollon kylmä- ja kuumaopas. Toimintamalli kokeilualueiden toimijoiden käyttöön 2011-12. Hassi, J., Ikäheimo, T. ja Kujala, V. (ed.) Northern Ostrobothnia Hospital District's federation of municipalities. University of Oulu. The Center for Environmental and Respiratory Health Research (CERH)

» Savolahti, Kangas, Karppinen, Karvosenoja, Kukkonen, Lanki, Nurmi, Palamarchuk, Paunu, Sofiev, Tiittanen: Ilmansaasteiden haittakustannusmalli Suomelle. Publications of the Government's analysis, assessment and research activities 26/2018.

» Savolahti, Karvosenoja, Tissari, Kupiainen, Sippula, Jokiniemi (2016) Black Carbon and fine particle emissions in Finnish residental wood combustion: Emission projections, reduction measures and the impact of combustion practices. Atmospheric Environment 140 (2016) 495-505.

» Salo-Asikainen, Sirpa (2018) Ilmanlaadun tutkimusseminaari. Ministry of the Environment. https://www.hsy.fi/fi/asiantuntijalle/tapahtumat/seminaarit/tutkimusseminaari/Documents/Ilmanlaadun%20tutkimusseminaari%202018/ilmanlaadun_tutkimusseminaari_08112018_sirpa_salo_asikainen_ym.pdf

» Siponen, T, Yli-Tuomi, T, Tiittanen, P, et al. Wood stove use and other determinants of personal and indoor exposures to particulate air pollution and ozone among elderly persons in a Northern Suburb. Indoor Air. 2019; 29: 413– 422. https://doi.org/10.1111/ina.12538

» Reports of the Finnish Environment Institute SYKE (35/2014): Luonto lähelle ja terveydeksi. Ekosysteemipalvelut ja ihmisen terveys Argumenta-hankkeen (2013–2014) tulokset ja toimenpidesuositukset.

» National Institute for Health and Welfare THL (2016): Astma ja hengitystieallergiat ovat lisääntyneet Suomessa – allergiaohjelma pyrkii taittamaan kasvun. Summary. https://www.julkari.fi/bitstream/handle/10024/130532/URN_ISBN_978-952-302-651-3.pdf?sequence=1

» Tuomenvirta, H., Haavisto, R., Hilden, M., et al. (2018) Weather and Climate Risks in Finland – National Assessment. Publications of the Government's analysis, assessment and research activities 43/2018. http://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/161015/43-2018-Saa%20ja%20ilmastoriskit%20Suomessa.pdf?sequence=1&isAllowed=y

» Ministry of the Environment (2019): National Air Pollution Control Programme 2030. Publications of the Ministry of the Environment 2019:7. https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/161467/Kansallinen%20ilmansuojeluohjelma%202030.pdf?sequence=4&isAllowed=y

» Qian D., Yan, W, Zanobetti, A. et al. Air Pollution and Mortality in the Medicare Population (2017), New England Journal of Medicine June 29, 376:2513-2522, DOI: 10.1056/NEJMoa1702747 https://www.nejm.org/doi/full/10.1056/NEJMoa1702747t=abstract

The Organisation for Respiratory Health in Finland

10 solutions

SOLUTION 1

Maintain and promote contact

SOLUTION 2

Foster biodiversity

SOLUTION 3

Foster urban nature during zoning

SOLUTION 4

Take precautions against animal-borne diseases

SOLUTION 5

Prepare for weather risks, particularly heatwaves

SOLUTION 6

Construction must consider changing weather conditions

SOLUTION 7

Construction must consider changes in soil moisture

SOLUTION 8

Demand a reduction in fine-particle emissions

SOLUTION 9

Burn wood cleanly – particularly in the winter and in urban areas

SOLUTION 10

Reduce street dust and its health risks

The Organisation for Respiratory Health in Finland's programme for preparing for and reducing weather and climate risks

The Organisation for Respiratory Health in Finland

Photos: Shutterstock, Unsplash, Niina Anttila

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Together we can achieve more

At the Organisation for Respiratory Health in Finland, we are working towards a world in which we can all breathe more easily. Read more about our activities, respiratory health and respiratory diseases, and find your own way to get involved.

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