



EUROPE

Contaminated soil in cities

Children playing
outside



EUROPEAN HEALTH21 TARGET 11
HEALTHIER LIVING

By the year 2015, people across society should have adopted healthier patterns of living
(Adopted by the WHO Regional Committee for Europe at its forty-eighth session, Copenhagen, September 1998)

Abstract

City parks, public play areas and private gardens often contain contaminated soil. Children, especially very young ones, are particularly sensitive to contamination and adults therefore have a special duty to protect them. In order to eliminate health risks in areas where children play we must be aware of how to act when children play in even slightly contaminated areas. This pamphlet is written primarily for principals and teachers of day care institutions and parents of young children. It contains advice about daily precautions regarding children and their play and provides basic background information on pollution and its effects.

Keywords

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The soil in cities may be contaminated – this calls for special consideration for children

When we walk in the city parks, public play areas and private gardens we may, unaware, walk on contaminated soil.

Children, especially very young ones, are particularly sensitive to contamination. Therefore adults have a special duty to protect children. This applies to everything which children are exposed to on a daily basis: the food they eat; the air they breathe; the things they play with; and the soil on which they play.

We have become more aware of chemicals in the environment that can be harmful to health. We are better at judging whether illnesses are due to contamination, however we do not always know what effect small amounts of chemicals can have on people.

The goal is to eliminate health risks in areas where children play, by first addressing the issue in the most contaminated areas. This implies long-term examination of many places in the city to better educate ourselves about how to act when children play on the slightly contaminated areas.

Care should be taken when in contact with contaminated soil/ground, particularly with young children as they often get dirt on their fingers and in their mouths when they are playing.

We neither can nor should prevent children from coming into contact with soil. On the other hand we can limit the contact children have with ground when they are outside – whether it be in the play area of an institution, the garden at home, the neighbourhood or the city parks. This pamphlet was written primarily for principals and teachers of day care institutions and parents of young children. It contains good advice about daily precautions regarding children and provides basic background information on pollution and its effects.

We are surrounded by pollution every day

All big cities are polluted. In some cities, for example Copenhagen, people are comparatively better off as most of the old contaminated land has been identified and pollution is limited in most new areas.

Pollutants such as sulfur, soot and tar from boilers and stoves, as well as lead from cars, have been discharged into the atmosphere for generations. Although the problem can be remedied by using district heating and lead-free petrol, resulting in reduced air pollution, still pollutants remain: tar decomposes very slowly and binds to the soil; lead and other heavy metals do not decompose and also stay in the ground. Therefore the soil is still polluted with lead and tar. Furthermore, studies demonstrate that traces of air pollution dating from generations ago can remain in the soil in cities.

In many cities, Departments of Environment are systematically cleaning out the most heavily polluted areas, caused by old industry, rubbish dumps and petrol stations. The priority areas are those that are most threatening to people's health, especially children's, or that can potentially contaminate the groundwater.

Despite such efforts, air pollution and contaminated land fills (city dumps) can cause general surface soil pollution in cities. This is called diffuse pollution and is the type of pollution against which we should take precautions.



Concerted efforts to make the air cleaner in cities, such as Copenhagen, is starting to bear fruit. Cleaner diesel and more district heating results in less soot, tar, sulphur and acid rain pollution. Unleaded petrol has markedly reduced lead pollution. However, the long-standing ground pollution is not disappearing.



Studies have also shown a clear connection between lead contamination in the soil and levels of lead in the blood. Results show that two-year-olds have the highest levels of lead in the blood; however this decreases with age. These findings may be explained by the fact that older children have a lesser tendency to put dirty objects in their mouth. It could also relate to the fact that lead is absorbed in the bone as infants grow into young children.

Tar

One can be exposed to tar through breathing, absorption from the intestines and skin contact. The most significant exposure for nonsmokers is from food. Other sources include outside and inside air pollution (passive smoking), as well as skin contact with or (in the case of young children) ingestion of contaminated earth.

Tar is carcinogenic and has the lesser effect of causing skin irritation, rash and allergies.

Lead

Lead levels in the air have been reduced due to the increase in lead-free petrol used for road vehicles and so most of the lead ingested by children usually stems from food.

It is not yet clear whether lead in the soil, when in contact with skin, is as readily absorbed by the body as is lead in food, but we must assume that there are potential health hazards for children when they play on contaminated soil and ground.

Children are particularly vulnerable to lead poisoning, which damages the brain and nervous system. Studies have demonstrated a direct correlation between high levels of lead in the blood and impaired concentration, language skills and learning capacity.



Children are especially vulnerable – we must therefore limit the risk

Children are especially vulnerable to contamination – both because of their physique and their behaviour. In relation to their size, they eat more and breathe more air than adults. They do not have the necessary experience to identify dangers and sources of harm, and often investigate things, such as dirt, by putting them into their mouths.

Earth is also part of ordinary household dust because we bring it in on our shoes. Children are therefore also exposed to contaminated soil indoors.

Potential health problems for children and adults can be limited by adhering to recommendations provided in this booklet.

Wash hands – this cannot be done too often

Children respond well to regular daily routines such as those in day care institutions and nursery schools. As a parent or teacher, ensure that hands, both your own and those of the children, are washed now and then. Here is some good advice to incorporate into the children's routine:

- **Wash hands after playing outside**
- **Wash hands before meals**

Studies have shown that through good hand hygiene, pathogens and other harmful substances do not spread easily, limiting the risk of children contracting worms, impetigo, colds and stomach infections.





Wipe shoes – and change to slippers

The cleaning of an institution or day care facility includes vacuum cleaning and floor washing. However, dirt is already carried inside in the morning and remains there the whole day until the floor is cleaned again. Here are some suggestions to limit the amount of contaminated soil on the floor. This can be done in different ways, depending on how the institution is organized:

- **Lay mats or grating by the main doors for wiping feet after coming in from outside**
- **Wipe shoes and boots free of soil and sand before going inside**
- **Avoid small children crawling in common areas where people walk with outdoor shoes**
- **Change to slippers inside – including adults**
- **Ask parents to leave their dirty shoes in the cloakroom**

Cover the contaminated soil in playgrounds

Organize the playground so that children do not come into direct contact with polluted soil. The less children play directly on soil, the better. At the same time try to limit the amount of soil carried inside on shoes.

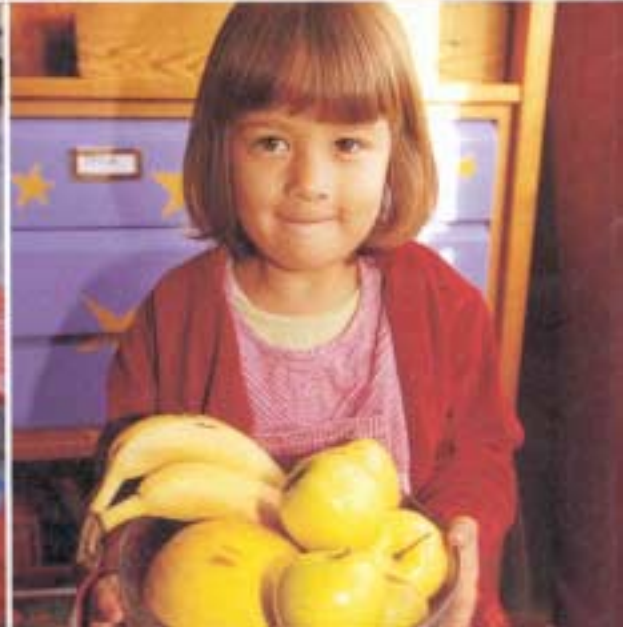
Children should ideally play in sandboxes where the sand is changed on a regular basis – at least once a year.

If a playground has to be reorganized, or if renovations are planned, these changes should include covering the soil. One could, for instance, build a little maze with paving stones or asphalt for older children to roller skate on. In this case, choose good quality asphalt that does not erode from the weather. If a nature play area with mounds, bushes and small hiding places is planned, make sure that only clean soil is used.

Here are some practical suggestions:

- **Add a solid bottom to the sandbox**
- **In places where there is only soil, lay a solid surface such as paving stones, sow grass or plant ground cover**
- **Put gravel or sand under swings and climbing frames**
- **Put clean soil in areas where children play on the ground**





If you grow fruit or vegetables

It is both fun and educational for children to grow their own vegetables and this should be encouraged where possible.

It is uncertain to what degree crops absorb heavy metals and tar from the soil but soil dust can contaminate the surface of vegetables and fruit. Therefore, health authorities advise to grow vegetables, fruit and herbs in clean soil and to rinse them thoroughly before eating.

It is not enough to place a layer of clean soil on the top of contaminated soil in any garden. Soil moves continually and the contaminated soil eventually mixes with the clean soil. Therefore, there should be a layer of plastic sheeting between the clean and the polluted soil. Vegetables and herbs can also be grown in plant bags or in pots with clean soil. Alternatively a raised bed can be made with a plastic net in the bottom and sides and clean soil inside. The clean, non-contaminated soil layer or raised bed should be at least half a metre deep.

Still not enough is known about the possible contamination content in fruit and berries that are grown in contaminated soil. Analyses of fruits and berries from bushes grown in strongly contaminated areas show there is not a great problem as long as the fruits and berries are rinsed thoroughly so that soil and earth dust are removed.

- **Grow vegetables and herbs, but in clean soil and rinse them before eating**

Include these simple guidelines as part of your daily routine. This will help to reduce the amount of soil taken inside and limit the contact of children with soil in the playground.

- Wash hands after playing outside
- Lay mats or grating by the main doors for wiping feet after being outside
- Avoid small children crawling in common areas where people walk with outdoor shoes
- Ask parents to leave their dirty shoes in the cloakroom
- In places where there is only soil, lay a solid surface such as paving stones, sow grass or plant ground cover
- Put clean soil in areas where children play on the ground

- Wash hands before meals
- Wipe shoes and boots free of soil and sand before going inside
- Change to slippers inside – including adults
- Add a solid bottom to the sandbox
- Put gravel or sand under swings and climbing frames
- Grow vegetables and herbs in clean soil and rinse them before eating

This booklet has been translated and revised using the booklet "Forurennet jord i København – om børns udendørsleg", produced by the Environmental Control Agency in Copenhagen. Thanks are extended to this Agency for permission to translate and revise their booklet.

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