

Thirdhand smoke and indoor smoking bans

Who is this fact sheet for?

This fact sheet discusses how to protect children and non-smokers from all sources of tobacco smoke pollution.

Sources of tobacco smoke pollution include:

- thirdhand smoke from indoor smoking
- smoky breath
- thirdhand smoke on the clothing, skin and hair of smokers.

This information may be useful for:

- people who look after children such as parents, grandparents, and carers in childcare centres or family day care
- health professionals working in nursing, midwifery and neonatal intensive care units
- workers in aged care facilities and disability or mental health services.

What is thirdhand smoke (THS)?

Secondhand smoke (SHS) refers to the smoke in the air during or soon after someone has smoked a cigarette.¹ When a cigarette is smoked indoors, secondhand smoke rapidly spreads and particles of smoke can stay airborne for several hours.^{2,3} The smoke undergoes further chemical reactions, and evidence shows that it becomes more toxic as it ages.⁴

Thirdhand smoke (THS) refers to the chemicals and particles from SHS that settle onto and coat walls, furniture, carpet, clothes, toys, dust and other objects. There, they can react with other chemicals to form new ones, and they can be released back into the air hours or months after they were first deposited.^{2,3,5} Thirdhand smoke builds up over time in the homes and cars of people who smoke, and can persist for months to years even if tobacco is no longer smoked.^{2,5-10}

Many studies measure nicotine in order to estimate how much thirdhand smoke is present in household dust and on indoor surfaces.⁷ Nicotine in dust has been found in the homes of people who smoke at levels 12 to 21 times those in non-smokers' homes.¹¹ Dust can easily become airborne and be breathed in. Nicotine can also react with gases normally present in homes to form cancer-causing chemicals.¹⁰ Cleaning may reduce but not entirely remove nicotine and other thirdhand smoke pollutants.^{2, 4, 11-13} Nicotine levels largely decrease after people who smoke vacate their house and it's cleaned and/or renovated, but they are still higher than in homes of non-smokers.¹¹

Health effects of thirdhand smoke

Human tissue studies and animal experiments show that thirdhand smoke can have a range of health effects. These include reduced birthweight, slower wound healing, hyperactivity and damage to DNA that could lead to cancer. Tests also show increased fat levels in the liver, unhealthy changes to cholesterol, higher blood sugar levels, problems with insulin, and lung problems including increased inflammation and damaged air sacs. Long term these effects may contribute to an increased risk for cirrhosis and cancer of the liver, lung diseases such as chronic obstructive pulmonary disease (COPD) and asthma, and metabolic syndrome (which predisposes people to stroke, heart disease, and type 2 diabetes).^{2, 6, 7, 14}

Who is most at risk?

Infants and very young children are more likely to be exposed to thirdhand smoke than older children and adults and to be at risk from its potential health effects. Very young children are more exposed to thirdhand smoke in house dust, on surfaces and when it's re-emitted into the air. They spend more time indoors and in contact with contaminated objects such as floors, carpets and blankets, and close to any caregivers who may smoke. They have thinner skin which may make it easier to absorb more thirdhand smoke. They place their hands and contaminated objects in their mouths and breathe in more dust as they are closer to the floor. Also, their smaller size and faster breathing rate means that relative to their weight, they breathe in more air than adults do.^{2, 3, 5}

Recommendation

To reduce thirdhand smoke, keep all indoor spaces totally smokefree. The best way someone who smokes can protect others is by always smoking outdoors after closing doors and windows, and to smoke away from others, especially children, when outdoors.

Smoky breath

A minor source of secondhand smoke is smoky breath, that is, the tobacco smoke coming from the lungs of a person after they finish a cigarette.¹⁵ Studies show that the levels of fine particles of smoke and volatile organic compounds (VOCs) on the breathe of smokers drop quickly within the first two to three minutes after finishing a cigarette.¹⁵⁻¹⁷

By itself, the levels of chemicals from tobacco smoke from smokers' breath after a finishing a cigarette are very low and may not affect people's health. However, it may be a concern for some particularly sensitive persons if they are in immediate contact with the smoker after they have a cigarette. Also, smoky breath can contribute to indoor pollution where many smokers come indoors soon after smoking.^{15, 16, 18}

Recommendation

In cases where people want to reduce exposure to secondhand smoke as much as possible, we recommend that someone who smokes wait at least two minutes before coming indoors to clear the smoke from their breath.¹⁵

Thirdhand smoke on persons who smoke

Thirdhand smoke is found on the clothing, skin and hair of people who smoke.^{2, 8, 12, 16, 19}

Clothing

A variety of clothing fabrics including wool, linen, cotton, rayon and acetate tend to absorb cigarette smoke. One study showed that washing cotton fabric reduces the amount of thirdhand smoke on it.⁸ Polyester fabrics have been found to take up and release significantly less thirdhand smoke than other tested cloths.^{8, 16, 19}

Recommendation

In cases where people want to reduce exposure to thirdhand smoke as much as possible, we suggest that when having a cigarette, smokers wear a jacket or other covering to protect their clothes from smoke and remove it and store it outside before going indoors.

Thirdhand smoke on the hands of people who smoke

When people smoke, nicotine and tar coat their fingers that hold the cigarette.^{3, 20} These substances may then rub off onto surfaces they touch or handle, and this would include other people. However, there is a lack of research on whether thirdhand smoke exposure through hand contact has any health effects.²⁰⁻²² Hand washing helps reduce nicotine, but it is unclear how effective it is for reducing tar.^{8, 23}

Also, people who smoke are more likely to be carriers of meningococcal disease and smoking is also a risk factor for pneumonia and developing viral-related symptoms (the common cold and influenza).²⁴⁻²⁶ Therefore hand washing may benefit people who smoke, their workmates and persons in their care by reducing the risk of cross infection.

Recommendation

In Victorian guidelines for control of infectious diseases, there is a requirement that health workers must wash their hands before attending to the people in their care.²⁷ This would include after having a cigarette break. Managers could check if this requirement extends to their workplace. Otherwise, health or care workers who smoke could be encouraged to wash their hands by their managers as a best practice.

Bedsharing with babies

Babies who sleep with a parent who smokes have a much higher risk of sudden unexpected death in infancy (SUDI or SIDS), even when their parents don't smoke near them.²⁸⁻³⁰ Research shows that infants who bed share with parents who smoke have higher levels of exposure to tobacco smoke pollutants. This may be because they have close contact with parents' smoke-contaminated clothing, hair and skin over many hours each night.³¹

Recommendation

To reduce the risk of SUDI, recommendations include that babies sleep separately in a cot in their parents' room.³² More recommendations to keep babies safe in a smokefree environment are at the end of this fact sheet.

How effective are total indoor smoking bans?

Whether people smoke and where they smoke makes a difference to other people's tobacco smoke exposure and health risk.

HIGH. In homes and buildings where smoking is allowed inside, non-smokers' exposure to tobacco smoke is high, which can cause serious illness in both children and adults. In some cases, this leads to death.

LOW. The lowest exposure to tobacco smoke pollutants is in homes or buildings where all persons are non-smokers.

IN-BETWEEN. In a building with a total indoor smoking ban where non-smokers and people who smoke live or work together, non-smokers' exposure to pollutants from tobacco smoke is low, but still higher than places where all persons are non-smokers.^{3, 33-35} Levels of chemicals from tobacco smoke in the air tend to be low, but levels of thirdhand smoke deposited on surfaces or dust are often higher – sometimes as high as that in homes which have no smoking restrictions.^{3, 22, 35-37}

This is likely to be due to a few reasons:

- Smoke pollutants can come into a building in the air or dust, or on smokers' breath, skin, hair and clothes.^{3, 18, 21, 37} Smoke drift into indoor areas from outdoor smoking areas that are near open doors and windows is a common problem, which may be reduced by closing them.^{33, 38, 39}
- Thirdhand smoke can persist for a long time once it's in an environment. Past indoor smoking, time passed since becoming a smokefree space, and cleaning or renovating may affect the level of thirdhand smoke.^{3, 9-11, 21, 36, 40}

It is unknown what the health risks are from the low level of exposure to tobacco smoke pollutants where an indoor smoking ban is place.^{2, 21} However, any potential health effects are probably most likely to be more significant among groups of sensitive people, such as babies as they have underdeveloped lungs and immune defences, and people with health conditions such as asthma, cystic fibrosis or cardiovascular disease.^{1, 2, 41} Of most concern are the potential effects on premature, low birthweight babies because they already have high rates of illness and death.^{21, 22}

Summary of recommendations

The best way to protect children and non-smokers from tobacco smoke is for parents, family members or workers to stop smoking completely.

However, if a person is not yet ready to stop smoking, the next best option is to always smoke outdoors after closing doors and windows, and to smoke away from others, especially children, when outdoors.

To protect babies from sudden unexpected death in infancy (SUDI) it's important that they sleep separately in a cot in their parents' room.

To keep tobacco smoke pollution as low as possible, particularly if people who smoke are living or working with babies, young children or adults vulnerable to ill health, we recommend that when people smoke they:

- wait at least two minutes before coming indoors to clear the smoke from their breath.
- wear a jacket or other covering to protect their clothes from smoke and remove it and store it outside before going indoors.
- wash their hands before attending to the people in their care.

Help to stop smoking

Workplaces can visit our website to see how they can support people who smoke when they are ready to quit. <https://www.quit.org.au/resources/#10>

For your best chance of stopping smoking, talk with Quitline and use stop smoking medications.

Your doctor or pharmacist can talk with you about which stop smoking medications would suit you best. These include prescribed stop smoking tablets, and nicotine patches, lozenges, mouth spray, inhalator or gum. Some of these medications are cheaper with a script from your doctor.

Call the Quitline 13 7848

Quitline is a free telephone support service that works with you to help you stop smoking. Your Quitline counsellor is trained to listen carefully and give support suited to your needs. Your call is private and confidential. You can call the Quitline for the usual cost of a local call from your phone or ask us to call you at no cost (Quitline callback). Or send a text to 13 7848 (normal text cost applies) and we'll call you back during Quitline hours: 8am to 8pm Monday to Friday.

Quitline is an inclusive and culturally safe space for all, including the LGBTIQ+ community. An interpreter service is available for people who speak a language other than English.

Aboriginal Quitline

The Aboriginal Quitline (13 7848) is a culturally safe space for callers to have a yarn about smoking and quitting with an Aboriginal Quitline counsellor.

Go online: www.quit.org.au

Build your personal quit plan with easy-to-find information suited to you. You'll find tips, distractions, a tool that adds up the money you'll save and stories from people who have quit. Find out more about QuitCoach, our tailored online advice program, and QuitTxt, our SMS-based service.

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