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# NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

## Guideline

### Indoor air quality at home

#### Draft for consultation, June 2019

This guideline covers indoor air quality in residential buildings. It explains how to reduce indoor air pollution. Strategies include controlling indoor pollution sources, ensuring good ventilation and achieving effective property maintenance. It also includes raising awareness of the importance of good air quality in people's homes and how to achieve this.

#### Who is it for?

- Environmental health practitioners, building control, housing and maintenance staff
- Healthcare professionals
- Public health professionals
- Planners and regulators involved with residential developments
- Architects, designers and builders
- Private property managers, private landlords
- Housing associations
- Voluntary sector
- Members of the public

This draft guideline contains:

- the draft recommendations
- recommendations for research
- rationale and impact sections that explain why the committee made the recommendations and how they might affect practice and services.
- the guideline context.

Information about how the guideline was developed is on the [guidelines page](#) on the NICE website. This includes the evidence reviews, the scope, and details of the committee and any declarations of interest.

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## 1 Recommendations

[Making decisions using NICE guidelines](#) explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

### 2 **Box 1 People who may be particularly vulnerable and factors that increase the** 3 **risk of ill health due to exposure to indoor air quality**

People who may be particularly vulnerable to ill health as a result of exposure to poor indoor air quality include:

- people with a pre-existing health condition such as asthma, allergies and cardiovascular disease
- pregnant women
- older people
- people who live in poor-quality housing
- people who may have increased exposure to poor air quality at home (such as disabled people or pre-school children because they may spend long periods at home; tenants who may have to wait for a landlord to make repairs or renovations).

Housing conditions that put people at increased risk of exposure to poor indoor air include:

- location (external factors such as high levels of outdoor air pollution, or where noise or security risks mean residents do not open windows)
- physical infrastructure (such as small room size, inadequate ventilation and the building's layout and orientation)
- standard of housing (for example, with damp and mould or physical disrepair including flood damage)
- overcrowding.

#### 4 **1.1 Prioritising indoor air quality in local strategy or plans**

5 These recommendations are for local authorities.

- 1 1.1.1 Embed a plan for improving indoor air quality in an existing strategy or  
2 plan to improve people's health. This could be a general air quality  
3 strategy if one exists. Otherwise, for example, include it in a strategy on  
4 housing, health and wellbeing or inequalities.
- 5 1.1.2 Ensure the strategy or plan takes account of the housing conditions that  
6 put people at increased risk of exposure to poor indoor air quality and  
7 especially people who are particularly vulnerable to ill health as a result of  
8 such exposure (see [box 1](#)).
- 9 1.1.3 Emphasise the need for a balanced approach to ventilation, insulation and  
10 heating for good indoor air quality. (See NICE's guideline on [winter deaths  
11 and illness and cold homes](#).)
- 12 1.1.4 Encourage joint working between local authority departments, across  
13 different local authorities and with local health and social care providers to  
14 improve air quality in people's homes.
- 15 1.1.5 Encourage the use of local inspection protocols to identify poor indoor air  
16 quality. This may include visual inspections, checklists and sensors to  
17 measure pollutant levels. Use this information to identify other homes that  
18 may be at increased risk of poor indoor air quality.
- 19 1.1.6 Encourage the use of existing home visits to identify poor indoor air  
20 quality. For example, visits to people's homes by housing officers,  
21 environmental health practitioners, midwives, social workers and care  
22 workers.
- 23 1.1.7 Encourage working with external organisations to identify home  
24 improvement programmes and grants to combat poor indoor air quality.
- 25 1.1.8 Monitor progress against the goals of the strategy. Use audit data (see  
26 recommendation 1.1.5) plus the lists in box 1 to identify people who may  
27 be vulnerable and properties that are at risk.

To find out why the committee made the recommendations on prioritising indoor air quality in local strategy or plans, and how they might affect practice, see [rationale and impact](#).

## 1 **1.2 Referrals for a housing assessment**

2 These recommendations are for local authorities.

3 1.2.1 Develop a structured process so that health and social care professionals  
4 and housing and local authority staff can use existing referral pathways for  
5 a housing assessment if, by using the factors in box 1, poor indoor air  
6 quality has been identified or is suspected.

7 1.2.2 Advise health and social care professionals and housing and local  
8 authority staff on how to refer someone for a housing assessment if, using  
9 the factors in [box 1](#), poor indoor air quality is identified or suspected.

To find out why the committee made the recommendations on referrals for a housing assessment, and how they might affect practice, see [rationale and impact](#).

## 10 **1.3 Raising awareness of poor indoor air quality in the home**

11 These recommendations are for local authorities.

12 1.3.1 Use existing communication strategies to ensure members of the public  
13 and relevant professionals (those involved in planning, designing,  
14 building, renovating and maintaining homes) are aware of:

- 15 • the causes of poor indoor air quality
- 16 • how residents' activities can affect air quality
- 17 • how health is affected by poor indoor air quality
- 18 • who is particularly vulnerable (see [box 1](#)).

- 1 1.3.2 Use existing professional development opportunities to ensure local  
2 authority staff who visit people in their homes (such as housing,  
3 healthcare and social care professionals):
- 4 • can give general advice on how to avoid activities that increase the  
5 level of indoor air pollutants (see sections 1.4 and 1.5)
  - 6 • can give general advice on how to improve ventilation if the source of  
7 the pollutant cannot be controlled (see sections 1.4 and 1.5)
  - 8 • are aware that affordability may be a barrier to effective and efficient  
9 heating and ventilation
  - 10 • know that tenants may not be allowed to repair or alter building fabric,  
11 fixtures or fittings
  - 12 • know who can provide help with repairs and necessary improvements  
13 (for example, the local authority or a home improvement agency)
  - 14 • can refer them for a housing assessment (see section 1.2).

To find out why the committee made the recommendations on raising awareness of poor indoor air quality, and how they might affect practice, see [rationale and impact](#).

## 15 **1.4 Advice and information for the general population**

16 These recommendations are for local authorities.

- 17 1.4.1 Advise people how to reduce damp and condensation. For example, by:
- 18 • using background ventilation (such as trickle vents, or whole-house  
19 mechanical ventilation systems)
  - 20 • using mechanical ventilation systems (such as extractor fans), and  
21 opening windows where possible and safe
  - 22 • avoiding moisture-producing activities (such as air-drying clothes)  
23 indoors if possible, or improving ventilation if these cannot be avoided
  - 24 • repairing sources of water damage and ensuring that residual moisture  
25 is removed.
- 26 1.4.2 Advise people to keep trickle vents open and unblocked.

- 1 1.4.3 Advise people to increase ventilation (by using extractor fans in the  
2 bathroom or kitchen, or opening windows if possible and safe) when:
- 3 • using cookers, especially gas cookers
  - 4 • using open solid-fuel fires
  - 5 • using candles
  - 6 • using free-standing gas heaters
  - 7 • using cleaning products, household sprays or aerosols and paints
  - 8 • having a bath or shower
  - 9 • air-drying clothes in the home.
- 10 1.4.4 Advise private and social tenants to contact their landlord if:
- 11 • ventilation is not adequate (for example, if the ventilation system is not  
12 working, trickle vents are blocked or damaged, or extractor fans in the  
13 kitchen or bathroom are not working)
  - 14 • repairs are needed, including improvements to heating or removal of  
15 residual moisture from water damage.
- 16 1.4.5 Advise private and social tenants to contact their local authority if no  
17 action is taken to improve ventilation or carry out repairs (see the  
18 government guides on [private renting](#) and [council housing](#), and the [Guide  
19 for tenants: Homes \[Fitness for Human Habitation\] Act 2018](#)).
- 20 1.4.6 Advise people not to use unflued paraffin heaters in the home.
- 21 1.4.7 Advise people to follow the product instructions when using, for example,  
22 candles, paints, glues and solvents, to minimise exposure to pollutants.
- 23 1.4.8 Advise people to choose low-emission materials (for example, products  
24 with a low volatile organic compound [VOC] or formaldehyde content and  
25 emissions) if furniture or flooring needs replacing.
- 26 1.4.9 When installing a new cooker, advise people about the need for  
27 ventilation, especially for gas cookers.



1 1.4.10 Encourage people not to smoke in the home (see NICE's guidelines on  
2 [stop smoking interventions and services](#) and [smoking: stopping in](#)  
3 [pregnancy and after childbirth](#)).

4 Also see the section on healthcare professionals' advice for women who are  
5 pregnant or who have given birth in the past 12 months and the section on advice for  
6 property managers and landlords.

To find out why the committee made the recommendations on advice and information for the general population, and how they might affect practice, see [rationale and impact](#).

## 7 **1.5 Healthcare professionals**

### 8 **People with asthma, other respiratory conditions or cardiovascular conditions**

9 1.5.1 Explain that indoor air pollutants (including nitrogen dioxide, damp, mould,  
10 [particulate matter](#) and VOCs) can trigger or exacerbate asthma, other  
11 respiratory conditions or cardiovascular conditions.

12 1.5.2 If a person has repeated or worsening respiratory symptoms such as a  
13 cough or wheezing, ask about their housing conditions. If these are a  
14 concern, request a housing assessment from the local authority (see the  
15 [section on referrals for a housing assessment](#)).

16 1.5.3 Advise people whose asthma is triggered by household sprays, air  
17 fresheners or aerosols to:

- 18 • avoid using them
- 19 • use non-spray alternatives.

20 Also see the advice and information section for recommendations about ventilation  
21 and controlling sources of pollution.

### 22 **People who are allergic to house dust mites**

23 1.5.4 Advise people who are allergic to house dust mites how to reduce their  
24 exposure to them. This includes:

- 1           • avoiding second-hand mattresses if possible
- 2           • using allergen barriers such as mattress and pillow covers
- 3           • washing bedding regularly.

4           Also see [NHS advice on allergen avoidance](#).

## 5   **Women who are pregnant or who have given birth in the past 12 months and** 6   **partners and people who live with them**

7   1.5.5     Ask about the person's housing conditions. If housing factors are a health  
8             concern, for example because of damp or lack of ventilation, request a  
9             housing assessment from the local authority (see the [section on referrals](#)  
10            [for a housing assessment](#)).

11  1.5.6     Advise women who are pregnant that they are at increased risk. Advise  
12             people who care for babies under 12 months old that the baby is at  
13             increased risk. Both groups should:

- 14           • reduce their use of household sprays, air fresheners and other  
15            aerosols, and always follow product instructions
- 16           • if possible, avoid or reduce activities that produce particulate matter  
17            such as using open solid-fuel fires or candles
- 18           • always keep the room well ventilated during these activities.

19           See also recommendations 1.4.3, 1.4.4 and 1.4.6.

20  1.5.7     Explain that other people's tobacco smoke is a risk to a woman who is  
21             pregnant and her baby, before and after birth. Advise not smoking in the  
22             home or around the woman and her baby. (Also see NICE's guideline on  
23             [smoking: stopping in pregnancy and after childbirth](#).)

<p>To find out why the committee made the recommendations for healthcare professionals, and how they might affect practice, see <a href="#">rationale and impact</a>.</p>
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## 24  **1.6       Regulators and building control teams**

25  1.6.1     Update existing standards or develop new ones for indoor air quality.  
26             Base them on existing safe limits set for pollutants in residential

1 developments. See for example, World Health Organization guidelines on  
2 [selected pollutants](#) (2010) and [dampness and mould](#) (2009).

3 1.6.2 Use existing building regulation enforcement activities to improve indoor  
4 air quality. Ensure enforcement takes place within the specified timelines.  
5 (See the government's [Building regulations, Housing health and safety](#)  
6 [rating system operating guidance](#) and the Planning Portal's [Failure to](#)  
7 [comply with the building regulations.](#))

To find out why the committee made the recommendations for regulators and building control teams, and how they might affect practice, see [rationale and impact](#).

## 8 **1.7 Architects and designers**

### 9 **Avoiding sources of pollutants**

10 1.7.1 Consider specifying building materials and products that only emit a low  
11 level of formaldehyde and VOCs. Use existing labelling schemes or other  
12 available information on product emissions (for example, on product  
13 labels) to make these specifications.

14 1.7.2 Design or specify heating systems that minimise exposure to [particulate](#)  
15 [matter](#).

### 16 **Heating and ventilation**

17 1.7.3 Adopt a whole-building approach to heating and ventilation to ensure  
18 indoor air quality is maintained while achieving standards for energy use.  
19 (Also see NICE's guideline on [winter deaths and illness and cold homes.](#))

20 1.7.4 Ensure design strategies include provision for removing indoor air  
21 pollutants, for example by:

- 22 • specifying kitchen extractor or cooker hoods that extract to the outside
- 23 • specifying that windows must open where possible and safe to do so.

- 1 1.7.5 Design ventilation systems to reduce or avoid exposure to outdoor air  
2 pollution. For example:
- 3 • ensure windows that open face away from sources of outdoor air  
4 pollution, such as busy roads
  - 5 • fit mechanical systems with filtration. (Also see the [Clean air strategy](#)  
6 [2019](#).)
- 7 1.7.6 When building or refurbishing dwellings to improve heating efficiency,  
8 ensure there is permanent, effective ventilation.

To find out why the committee made the recommendations for architects and designers, and how they might affect practice, see [rationale and impact](#).

## 9 **1.8 Builders, contractors and developers**

10 These recommendations apply both to building new homes and renovating or  
11 refurbishing existing homes.

12 1.8.1 Ensure products and materials comply with building regulations, design  
13 specifications and the manufacturer's guidance on installation and  
14 commissioning.

15 1.8.2 Use materials that emit a low level of formaldehyde and VOCs as  
16 specified. If materials need to be substituted, only use products with the  
17 same or lower emission levels.

18 1.8.3 Ensure all heating and ventilation is installed and commissioned in  
19 accordance with the manufacturer's instructions and meets building  
20 regulation requirements.

21 1.8.4 Ensure any variations to the heating and ventilation specification comply  
22 with design specifications and building regulations (see [the Ministry of](#)  
23 [Housing, Communities & Local Government advice on ventilation](#)).

To find out why the committee made the recommendations for builders, contractors and developers, and how they might affect practice, see [rationale and impact](#).

## 1 **1.9 Rental properties**

2 These recommendations are for local authorities.

### 3 **Regulations**

4 1.9.1 Use existing regulatory powers to:

- 5 • reduce people's exposure to pollutants in their homes by ensuring
- 6 identified problems such as damp and mould are fixed promptly
- 7 • ensure homes have suitable and efficient heating and ventilation (see
- 8 the [Ministry of Housing, Communities and Local Government's](#)
- 9 [ventilation: approved document F](#) and [Housing health and safety rating](#)
- 10 [system operating guidance](#), and NICE's guideline on [winter deaths and](#)
- 11 [illness and cold homes](#)).

### 12 **Property management**

13 1.9.2 Ensure private and public rented housing has:

- 14 • heating appliances and ventilation systems that:
  - 15 – comply with design and performance requirements
  - 16 – are correctly installed and tested
  - 17 – keep properties warm and ventilated without excessive heat loss or
  - 18 draughts
- 19 • ventilation that prevents the build-up of pollutants, including:
  - 20 – trickle vents
  - 21 – working extractor fans in bathrooms and kitchens
  - 22 – windows that open (but not onto busy roads or other major sources
  - 23 of outdoor air pollution)
- 24 • cooking appliances that:
  - 25 – comply with design and performance requirements
  - 26 – are correctly installed and tested.

- 1 1.9.3 Ensure property managers and landlords:
- 2       • develop and undertake maintenance programmes for heating and
- 3       ventilation systems
- 4       • provide clear, easy-to-understand instructions telling occupants how to
- 5       use the heating and ventilation systems effectively
- 6       • repair any water damage as soon as possible and ensure the property
- 7       has properly dried out.
- 8 1.9.4 Advise private and public sector landlords about:
- 9       • the health risks associated with poor indoor air quality
- 10      • methods to control and minimise identified sources of indoor air
- 11      pollution (see the [section for architects and designers](#))
- 12      • their responsibilities for maintaining the property.
- 13 1.9.5 Advise property managers and landlords to:
- 14      • use low-pollutant-emission items when replacing furniture or flooring
- 15      (for example, furniture or flooring with a low formaldehyde content and
- 16      emission)
- 17      • ensure rooms are well ventilated and that the manufacturer's guidelines
- 18      for use of materials are followed
- 19      • ensure there is sufficient ventilation if installing a new gas cooker.

To find out why the committee made the recommendations on rental properties, and how they might affect practice, see [rationale and impact](#).

## 20 ***Terms used in this guideline***

21 This section defines terms that have been used in a particular way for this guideline.

22 For other definitions, see the [NICE glossary](#) or, for public health and social care

23 terms, the Think Local, Act Personal [Care and Support Jargon Buster](#).

1 **Particulate matter**

2 Particulate matter (also referred to as PM or particle pollution) is a complex mixture  
3 of solid or liquid particles suspended in air. These particles can vary in size, shape  
4 and composition. Indoor particulate matter can be generated through cooking,  
5 combustion (including candles, open solid-fuel fires, unvented space heaters or  
6 paraffin heaters and smoking).

7 **Recommendations for research**

8 The guideline committee has made the following recommendations for research.

9 ***Key recommendations for research***

10 **1 Health impact of particulate matter at home**

11 What are the health risks associated with exposure to sources of [particulate matter](#)  
12 in the home?

13 To find out why the committee made the research recommendation on the health  
14 impact of indoor sources of particulate matter see the [rationale and impact sections](#)  
15 [on raising awareness of poor indoor air quality](#) and the [rationale and impact section](#)  
16 [on advice and information for the general public](#)

17 **2 Effective interventions to improve indoor air quality for people without**  
18 **pre-existing health conditions**

19 What is the effectiveness and cost effectiveness of interventions to improve indoor  
20 air quality at home for people without pre-existing health conditions?

21 To find out why the committee made the research recommendation on effective  
22 interventions to improve indoor air quality in healthy population see the [rationale and](#)  
23 [impact section on advice and information for the general public](#) and the [rationale and](#)  
24 [impact section on healthcare professionals](#).

25 **3 Air exchange rate and the quality of indoor air at home**

26 What is the minimum air exchange rate to minimise the health effects of poor indoor  
27 air quality in the home?

1 To find out why the committee made the research recommendation on air exchange  
2 rate and good air quality see [rationale and impact](#).

### 3 **4 Impact of building materials on indoor air quality and health**

4 What are the health risks associated with indoor air pollutants released from building  
5 materials in the home?

6 To find out why the committee made the research recommendation on the health  
7 impact of building materials see [rationale and impact](#).

### 8 **5 Raising awareness of the health risks of damp and mould at home**

9 What interventions are effective and cost effective at raising awareness of the health  
10 risks of damp and mould in the home?

11 To find out why the committee made the research recommendation on effective  
12 strategies for raising awareness see [rationale and impact](#).

### 13 ***Other recommendations for research***

#### 14 **Damp and mould in the home**

15 How is the problem best identified and fixed?

16 How can a recurrence be prevented?

17 How can tenants best be made aware of whose responsibility it is to make any  
18 changes?

### 19 **Rationale and impact**

20 These sections briefly explain why the committee made the recommendations and  
21 how they might affect practice. They link to details of the evidence and a full  
22 description of the committee's discussion.

### 23 ***Prioritising indoor air quality in local strategy or plans***

24 [Recommendations 1.1.1 to 1.1.8](#)



1 **Why the committee made the recommendations**

2 ***Local authority strategies***

3 The committee noted that local authorities have a duty of care to ensure both public  
4 sector and private homes are maintained to a 'decent' standard. The committee also  
5 noted that local authorities are responsible for ensuring people's health and  
6 wellbeing.

7 Good evidence showed that exposure to poor indoor air quality is linked to a range of  
8 health problems. These include respiratory conditions such as a cough, wheezing or  
9 asthma, and allergic symptoms such as a runny nose or eye irritation.

10 Local authorities that have been declared an 'air quality management area' must  
11 have an air quality action plan ([government Clean air strategy 2019](#)). The committee  
12 agreed that indoor air quality would fit within this plan, where it exists. Otherwise,  
13 they agreed it could be embedded within one of several existing, health-related local  
14 authority strategies.

15 ***Vulnerable groups and factors that affect indoor air quality***

16 Poor indoor air quality is a risk to everyone's health. But evidence showed that some  
17 groups are more at risk than others.

18 For example, people living in poor-quality housing – including housing with damp or  
19 that may need remedial work – are at increased risk. They may not have the  
20 resources to carry out the necessary work or may have to wait a while for landlords  
21 or property managers to carry it out. This could leave them exposed to pollutants for  
22 longer.

23 Good evidence showed that homes with damp and those in need of repair are both  
24 linked to an increased risk of health problems. (Homes with serious damp and mould  
25 are classified as having a category 1 hazard by the Housing Health and Safety  
26 Rating System.)

27 There was no evidence on the effect of poor indoor air quality on older people. But  
28 the committee agreed, based on their experience, that people in these groups may  
29 spend longer than average at home and so may be at increased risk of exposure.

1 People with existing health problems are also more likely to be affected by poor  
2 indoor air quality.

3 Pregnant women, those who have recently given birth, and young children are also  
4 at increased risk from damp and other indoor pollutants. This is partly because  
5 people in these groups may have compromised immune systems, and also because  
6 young children are likely to be at home for longer than average periods of time.

7 The committee agreed that location is a risk factor because if the property is near a  
8 busy road, for example, then opening windows to improve ventilation may be  
9 counterproductive.

10 Evidence also showed that overcrowding increases moisture in the air from everyday  
11 activities such as cooking and washing. This creates damp conditions. In addition, in  
12 properties where rooms are used for both living and sleeping (for example, in bedsits  
13 or studio flats), poor indoor air quality can have a greater impact. That is because  
14 occupants are exposed to it for a greater proportion of time and smaller dwellings  
15 have less space in which to dilute pollutants.

16 Heating and ventilation can help to maintain good air quality. But the committee  
17 wanted to stress that the balance has to be right. For example, insulating the home  
18 to prevent cold without thinking of ventilation might lead to increased humidity and  
19 condensation, which in turn results in damp. But they agreed that because buildings  
20 vary so much (for example, in terms of age, type, location and state of repair) it  
21 wouldn't be practical to make any specific recommendations in this area.

### 22 ***Joint working, inspection protocols, home visits***

23 There was evidence on the benefits of home visits by healthcare professionals to  
24 prevent or reduce indoor air pollution.

25 There was a lack of evidence on the benefits of joint working and local inspection  
26 protocols to prevent or reduce indoor air pollution. But the committee agreed to  
27 recommend these actions because:

- 28 • Staff who visit vulnerable people in their homes are ideally placed to report on  
29 poor housing conditions, particularly if there are inspection protocols in place.

- 1 • Sharing this information, subject to local data-sharing arrangements, would speed  
2 up the process of assessment and remedying the poor housing conditions.
- 3 • Experts told the committee that low-cost sensors to measure pollutant levels were  
4 increasingly common and could be used alongside visual inspections and  
5 checklists. Information on health risks could then be shared (subject to national  
6 and local data-sharing arrangements).

### 7 ***Home improvements***

8 Based on their knowledge of current practice in England, the committee agreed that  
9 local authorities would benefit from working with local home improvement agencies  
10 and other similar organisations. Not only would it free up resources. But it would also  
11 allow them work with local partners to emphasise the importance of maintaining  
12 good air quality in the home.

### 13 ***Collecting data and monitoring progress***

14 Based on their experience, the committee agreed that it would be helpful if local  
15 authorities regularly checked existing and new strategies to ensure air quality in the  
16 home is being given priority.

17 This could include checking whether data collected during home visits and local  
18 inspections identifies vulnerable people and other neighbouring or similar types of  
19 properties that may be at risk.

### 20 ***How the recommendations might affect practice***

21 Local authorities regularly update their strategies. But additional resources (in terms  
22 of staff time and meetings) may be needed to include indoor air quality in an existing  
23 strategy and ensure it is implemented.

24 Because making indoor air quality a public health priority will improve people's  
25 health, this will lead to resource savings elsewhere. (For example, by reducing the  
26 need for enforcement teams to intervene.)

27 Local health and wellbeing boards are already in place to review current and future  
28 health and social care needs. So the costs of staff time and meetings associated  
29 with multi-agency working are expected to be minimal. Also, increased collaboration

1 with home improvement agencies could mean that local authority resources set  
2 aside for issues related to indoor air quality could be reallocated.

3 Staff who visit people in their homes may need training to identify problems with  
4 indoor air quality and give advice on how to prevent or resolve such problems.  
5 Incorporating this training into existing continuous professional development could  
6 help minimise costs. But the visits may result in additional enforcement activities.

7 Using building control or enforcement teams to collect and use performance data  
8 may have resource implications. For example, staff time, communication, and  
9 meetings for cross-team working. But improved health outcomes and resource  
10 savings elsewhere in the system (for example, by reducing the need for enforcement  
11 teams to intervene) might offset costs.

12 There were limited data on the link between someone who was at high risk and their  
13 level of exposure, so the committee had to estimate this.

14 Some benefits that were identified could not be quantified. So the overall benefits are  
15 likely to have been underestimated. The committee concluded that interventions  
16 could offer good value for money, but that this will depend on local factors.

17 Full details of the evidence and the committee's discussion are in [evidence review 1:  
18 associations between individual or building characteristics and exposure levels;](#)  
19 [evidence review 2: exposure to pollutants and health outcomes; evidence review 4:  
20 strategies for raising awareness.](#)

21 [Return to recommendations](#)

## 22 ***Referrals for a housing assessment***

23 [Recommendations 1.2.1 and 1.2.2](#)

### 24 **Why the committee made the recommendations**

25 There are several ways tenants can request a housing assessment:

- 26 • Tenants in local authority housing can follow their complaints procedure, take  
27 action themselves or go to the Housing Ombudsman.

1 • Tenants in housing association housing can follow their complaints procedure and  
2 can contact Environmental Health.

3 • Tenants in private rented properties can contact Environmental Health.

4 Private homeowners can also contact the local authority for advice if they are worried  
5 about the condition of their home. In the committee's experience, many people –  
6 including professionals working in housing services – don't know about these  
7 processes. They also agreed that health and social care staff who visit people in  
8 their homes need to be able to request a housing assessment on their clients' behalf.

9 There was no evidence on how effective this would be. But the committee agreed  
10 this would ensure staff can make every contact count and could improve people's  
11 health.

## 12 **How the recommendations might affect practice**

13 Housing assessment pathways already cover some of the causes of poor indoor air  
14 quality. For example, professionals such as heating engineers are given instructions  
15 on how to identify signs of poor ventilation (see NICE's guideline on [winter deaths  
16 and illness and cold homes](#)).

17 Minimal additional resources would be needed to extend this to health and social  
18 care professionals who visit people in their homes.

19 If more professionals are made aware of how to make referrals, this could lead to  
20 more housing assessments and more remedial work or legal actions. But local  
21 authorities have budgets for regular maintenance and upkeep of their properties. In  
22 addition, if legal action is taken to enforce standards in private properties, these  
23 costs will be recovered if the action is successful.

24 Full details of the evidence and the committee's discussion are in [evidence review 1:  
25 associations between individual or building characteristics and exposure levels and  
26 evidence review 2: exposure to pollutants and health outcomes](#).

27 [Return to recommendations](#)

1 ***Raising awareness of poor indoor air quality***

2 [Recommendations 1.3.1 and 1.3.2](#)

3 **Why the committee made the recommendation**

4 Good evidence showed that exposure to poor indoor air quality is linked to a range of  
5 health problems. This includes respiratory conditions such as a cough, wheezing or  
6 asthma, and allergic symptoms such as a runny nose or eye irritation. Certain groups  
7 are more vulnerable, either because of their personal circumstances or because of  
8 where they live.

9 In their experience, committee members agreed that professionals and the public  
10 alike are generally unaware of the factors affecting indoor air quality. This includes  
11 private and social landlords, and those who regulate them.

12 Similarly, the committee agreed that not all professionals who see people in their  
13 home know who is likely to be most vulnerable to poor indoor air. And they will not  
14 necessarily know how to get help for those who cannot afford repairs or  
15 modifications.

16 Evidence showed that advice given on sources of poor indoor air quality could  
17 reduce people's risk of exposure. This includes general advice on using ventilation  
18 systems, barriers to heating and ventilation, and more specific advice about  
19 particular situations and activities, including how to get a housing assessment.

20 The committee noted that people on a low income, particularly in poorly insulated  
21 homes, may not be able to afford effective heating and may try to make their homes  
22 airtight to keep heat in. This, in turn, can mean the ventilation is less effective. They  
23 also may not be able to afford to heat all rooms to a constant temperature, or may  
24 only use heating occasionally (for example, when expecting a home visit). Both  
25 approaches can cause damp and condensation.

26 The committee was also aware of the increased risk for those who cannot afford  
27 remedial work or have to rely on landlords or property managers to do the work. In  
28 both cases this could leave them exposed to pollutants while they wait for it to be  
29 done. The committee pointed out that there are enforcement powers that local  
30 authorities can use to ensure compliance with regulations. (See recommendation

1 1.6.2 and also [the Ministry of Housing, Communities & Local Government 's Housing](#)  
2 [health and safety rating system operating guidance.](#))

3 Most of the evidence focused on homes where a problem had already been  
4 identified. The committee agreed that research is needed on how people can identify  
5 the sources of the problem in the first place – in particular, damp and mould. (See  
6 [research recommendations 1 and 5.](#))

### 7 **How the recommendations might affect practice**

8 The [Clean air strategy 2019](#) already outlines how the government and local  
9 authorities need to raise awareness of poor indoor air quality. These  
10 recommendations support the strategy and should have minimal additional impact.

11 Tenant satisfaction from improved health outcomes should result in resource savings  
12 elsewhere in the system and will offset costs. For social landlords, improved tenant  
13 satisfaction reduces both the time properties are left vacant and the likelihood of  
14 compensation claims.

15 We do not expect that any extra resources would be needed. Staff may need training  
16 on raising awareness of poor indoor air quality. But incorporating this into existing  
17 general training and continuous professional development could minimise costs.  
18 Improved health outcomes leading to potentially fewer hospital visits, GP visits, or  
19 visits from community nurses should result in resource savings elsewhere in the  
20 system and will offset costs.

21 Full details are in [evidence review 4: strategies for raising awareness.](#)

22 [Return to recommendations](#)

### 23 ***Advice and information for the general population***

24 [Recommendations 1.4.1 to 1.4.10](#)

### 25 **Why the committee made the recommendations**

26 The committee looked at evidence for specific interventions such as air filtering  
27 systems or air purifiers. But they agreed that buildings vary so much that it wouldn't  
28 be practical to make any specific recommendations in this area.

1 Evidence showed that giving people advice on specific pollutants and their sources  
2 can help them reduce the pollution levels in their homes and improve their health.

3 Evidence also showed that giving people advice on how to reduce or prevent indoor  
4 air pollution is cost effective for people who are already ill, because it can prevent  
5 their condition worsening. So this can lead to savings for the NHS.

6 The committee agreed that local authority staff are in a good position to give this  
7 advice because they are in contact with members of the public who use their  
8 services, including social housing. (They also have a regulatory responsibility for  
9 privately rented properties.)

10 There is clear evidence of a link between gas cookers and increased levels of  
11 nitrogen dioxide and between open solid-fuel fires and [particulate matter](#). Exposure  
12 to these is linked to poor health, especially if there isn't sufficient ventilation to  
13 prevent the build-up of pollutants. Based on their experience, the committee also  
14 agreed that rooms should be well ventilated during cooking to prevent moisture and  
15 condensation.

16 There was insufficient evidence on the health effects of sources of particulate matter  
17 in the home and how it affects people's health. The committee agreed that research  
18 on this would help give people better information to help them understand and avoid  
19 harms associated with sources of particulate matter (see [research recommendation](#)  
20 [1](#)).

21 Evidence showed that poor housing in need of repair (for example houses with  
22 damp) puts people's health at risk. Again, the committee agreed it was important to  
23 emphasise the significance of ventilation not only when washing or cooking, but also  
24 during other moisture-producing activities, for example air-drying clothes indoors.  
25 The committee agreed that it is important for the local authority to take action if  
26 landlords do not carry out repairs or improve ventilation.

27 Evidence shows that paraffin heaters are linked with respiratory symptoms such as  
28 wheezing. These appliances are not in widespread use in England. But the  
29 committee agreed, based on their experience, that it was important to avoid using  
30 them at all indoors. They also agreed that paraffin heaters are more harmful than



1 open solid-fuel fires, for example, because the latter are flued. So in theory, any  
2 harmful fumes are extracted outdoors.

3 Based on their experience, the committee were aware that many people do not know  
4 how and when to use ventilation systems. Ensuring a room is adequately ventilated  
5 is usually a key part of reducing exposure to VOCs while painting, renovating or  
6 decorating and using household products such as cleaning sprays and aerosols. The  
7 committee also agreed that it is worth reminding people to read the manufacturer's  
8 instructions.

9 The evidence showed that flooring and older furniture that contains flame retardants  
10 are often sources of volatile organic compounds (VOCs) or formaldehyde. Based on  
11 the evidence, the committee agreed it was important that these dangers were  
12 highlighted to property managers and landlords, because both can damage people's  
13 health.

14 Smoking and passive smoking is always a health risk. The committee agreed it was  
15 important to encourage people not to smoke in their homes and so they referred  
16 readers to NICE guidance on [smoking](#).

17 The committee agreed that research is needed on ways to improve indoor air quality  
18 for people who do not have pre-existing health conditions that put them at risk from  
19 poor indoor air quality. (See [research recommendation 2](#).)

## 20 **How the recommendations might affect practice**

21 Local authorities will need to develop or update existing practice to provide people  
22 with information on how to improve indoor air quality and where to go for help. Staff  
23 might need training, but incorporating this into existing continuous professional  
24 development could help minimise costs.

25 Improved health outcomes leading to higher tenant satisfaction should result in  
26 resource savings elsewhere in the system and will offset costs. For example, by  
27 reducing the need for enforcement teams to intervene if a problem develops.

1 Full details are in [evidence review 1: associations between individual or building](#)  
2 [characteristics and exposure levels; evidence review 2: exposure to pollutants and](#)  
3 [health outcomes; evidence review 3.1: material and structural interventions](#).

4 [Return to recommendations](#)

## 5 ***Healthcare professionals***

6 [Recommendations 1.5.1 to 1.5.7](#)

### 7 **Why the committee made the recommendations**

8 Healthcare professionals frequently see people with pre-existing health conditions  
9 and women who are pregnant (or have young children). The committee agreed that  
10 this puts them in an ideal position to give advice on how air pollutants, as well as  
11 damp and mould, can affect their health.

### 12 ***People with respiratory or cardiovascular conditions***

13 Evidence showed that people with respiratory or cardiovascular conditions or  
14 allergies are particularly affected by poor indoor air quality, including pollutants from  
15 damp and from open solid-fuel fires.

16 Good evidence showed that exposure to poor indoor air quality is linked to a range of  
17 health problems. This includes respiratory conditions such as a cough, wheezing or  
18 asthma, and allergic symptoms such as a runny nose or eye irritation.

19 Based on the evidence, the committee agreed that if people keep getting these type  
20 of symptoms – or they are getting worse – then they might be linked to the home  
21 environment.

### 22 ***People who are allergic to house dust mites***

23 Evidence showed that allergen barriers like mattress and pillow covers can reduce  
24 exposure to house dust mite allergens. Evidence also showed that second-hand  
25 mattresses were associated with increased levels of house dust mites.

1 ***Women who are pregnant or who have given birth in the past 12 months and***  
2 ***partners and people who live with them***

3 Good evidence showed that damp homes and those in need of repair are both linked  
4 to an increased risk of health problems. (Homes with serious damp and mould are  
5 classified as having a category 1 hazard by the Housing Health and Safety Rating  
6 System.)

7 Pregnant women, those who have recently given birth, and young children are at  
8 increased risk from damp and other indoor pollutants. This is partly because these  
9 groups have lower immune systems, and also because young children are likely to  
10 be at home for longer than average periods of time. So the committee agreed that it  
11 was important to make sure they are living in a 'healthy' home that is well ventilated.

12 Women who are pregnant and babies under 12 months may be particularly  
13 vulnerable to pollutants such as VOCs. In addition, evidence suggested that  
14 exposure to VOCs during pregnancy was linked with coughing, wheezing and other  
15 health issues in the first years of the child's life. VOCs are found in products like  
16 aerosol sprays, paint and glue.

17 Women who are pregnant and babies under 12 months may be also particularly  
18 susceptible to the effects of particulate matter – released from, for example, open  
19 solid-fuel fires. Based on this evidence, the committee agreed that using proper  
20 ventilation to disperse these pollutants is very important – as is reducing use of such  
21 products when this is feasible.

22 The committee did not look at evidence on environmental tobacco smoke (passive  
23 smoking) because any level is considered unsafe. Instead they agreed to adapt  
24 recommendations from, and refer readers to, NICE's guidance on smoking during  
25 pregnancy.

26 ***People without pre-existing health conditions***

27 There was a lack of evidence on how indoor air pollutants affect people without  
28 pre-existing health conditions and how to improve air quality in their homes. So the  
29 committee made a research recommendation on this group (see [research](#)  
30 [recommendation 2](#)).

## 1 **How the recommendations might affect practice**

2 Most healthcare professionals will need training on how poor indoor air quality  
3 affects health and how to mitigate it. Incorporating this training into existing general  
4 training and continuous professional development could help minimise costs.

5 Asking about housing conditions and making requests for a housing assessment  
6 may increase consultation times. But this will be offset by future healthcare savings.

7 Full details of the evidence and the committee's discussion are in [evidence review 1:  
8 associations between individual or building characteristics and exposure levels;](#)  
9 [evidence review 2: exposure to pollutants and health outcomes and evidence review  
10 3.2: occupant behaviour interventions.](#)

11 [Return to recommendations](#)

## 12 **Regulators and building control teams**

13 [Recommendations 1.6.1 and 1.6.2](#)

## 14 **Why the committee made the recommendations**

15 There are no national regulations or guidelines to determine 'safe' levels of indoor air  
16 pollutants. But based on members' experience, the committee agreed that  
17 international standards such as the World Health Organization guidelines could be  
18 used.

19 Building regulations are generally used to enforce standards in new housing. Other  
20 local standards may be used for existing homes, for example standards on repairs  
21 and property condition or room size. Using these regulations will ensure existing and  
22 new buildings meet air quality standards.

23 The committee noted that enforcement and prosecution practice may vary across  
24 local authorities. They agreed to highlight the importance of meeting the government  
25 [Building Regulations 2010](#) legislation and [Housing health and safety rating system  
26 operating guidance](#) because this can improve people's health.

1 **How the recommendations might affect practice**

2 Using existing international guidelines will minimise the resource impact of  
3 developing new standards or updating existing ones.

4 Full details of the evidence and the committee's discussion are in [evidence review 1:  
5 associations between individual or building characteristics and exposure levels and  
6 evidence review 2: exposure to pollutants and health outcomes](#).

7 [Return to recommendations](#)

8 ***Architects and designers***

9 [Recommendations 1.7.1 to 1.7.6](#)

10 **Why the committee made the recommendations**

11 ***Avoiding sources of pollutants***

12 Evidence showed that some building materials can emit high levels of pollutants.  
13 There was no evidence on building materials and products that emit a low level of  
14 volatile organic compounds and formaldehyde. The committee agreed that  
15 specifying low-emission materials could help protect people's health. But because of  
16 the lack of evidence, they could only suggest professionals consider their use on a  
17 case-by-case basis when drawing up specifications.

18 The committee also noted that there are no national labelling schemes for building  
19 materials or consumer products in England (apart from a scheme for paints). They  
20 also noted government plans to set up a voluntary labelling scheme in England, as  
21 outlined in the [Clean Air Strategy 2019](#).

22 The committee noted the Department for Education's [Building bulletin BB101:  
23 ventilation, thermal comfort and indoor air quality 2018](#) and considered that its  
24 recommended performance levels may also be applied to homes.

25 Evidence showed that open solid-fuel fires emit particulate matter and are a major  
26 cause of poor indoor air quality. This evidence was limited, but the committee agreed  
27 that designing heating options that avoid them will help protect people's health.

1 ***Heating and ventilation***

2 Ventilation affects indoor air quality, and its role in removing potential pollutants is  
3 critical.

4 Evidence showed a clear link between cooking with gas and pollutant levels – these  
5 are higher in the kitchen when cooking using gas than outdoor pollutant levels unless  
6 there is an air quality alert.

7 Evidence also showed that some causes of poor indoor air quality, such as  
8 condensation, are the result of high moisture levels combined with poor ventilation.  
9 The current focus on draught proofing and energy efficiency can add to the problem.

10 Because buildings vary so much, the committee were unable to recommend specific  
11 types of ventilation or heating strategies. But they agreed it is important that design  
12 strategies achieve the correct balance between ventilation, energy efficiency and  
13 heating.

14 Outdoor pollutants entering through windows can contribute substantially to poor  
15 indoor air quality. This is particularly the case in deprived areas where housing is  
16 likely to be close to busy roads (see [Clean air strategy 2019](#)). The committee agreed  
17 that if opening windows is not safe or lets in more outdoor pollutants, for example if  
18 the window faces a busy road, then other methods of ventilation are needed.

19 Building or refurbishing homes to improve heating without taking ventilation into  
20 consideration can affect the health of people who live in them. So the committee  
21 stressed the importance of balancing the need for heating and ventilation, and taking  
22 into account all factors affecting indoor air quality.

23 They noted that the British Standards Institute standards for [domestic retrofits and](#)  
24 [energy efficiency](#) could be a useful source of information for architects and  
25 designers.

26 The committee agreed that more research is needed about the benefits and harms  
27 of different air exchange rates, and the health risks associated with pollutants  
28 released from building materials. This would improve understanding of the minimum

1 ventilation thresholds and appropriate building materials that designers and builders  
2 should use. (See [research recommendations 3 and 4.](#))

### 3 **How the recommendations might affect practice**

4 The recommendations will reinforce current best practice. Architects and building  
5 designers should already be aware of the potential risks of the products and  
6 materials that they specify.

7 Balancing ventilation, insulation and heating is already best practice to maintain  
8 good air quality so there should be no additional resource impact.

9 Full details of the evidence and the committee's discussion are in [evidence review 1:  
10 associations between individual or building characteristics and exposure levels;  
11 evidence review 2: exposure to pollutants and health outcomes; evidence review 3.1:  
12 material and structural interventions and evidence review 3.3: ventilation design and  
13 use.](#)

14 [Return to recommendations](#)

### 15 ***Builders, contractors and developers***

16 [Recommendations 1.8.1 to 1.8.4](#)

### 17 **Why the committee made the recommendations**

18 In the UK, materials specified for use by builders, contractors and developers have  
19 to comply with existing building regulations and should be used according to the  
20 manufacturer's instructions on pollutant emissions. The same is true for heating and  
21 ventilation systems. Based on their collective experience, the committee felt that  
22 compliance with regulations and instructions can be variable, so they agreed it was  
23 important to highlight them.

24 There are regulations on pollutant threshold levels but information on the level of  
25 emissions from different materials is limited. Few regulations exist to guide the  
26 choice of materials according to their effect on indoor air quality.

27 In the committee's experience it is common practice for builders to use substitute  
28 materials if the specified ones are not available. Members agreed that emission

1 levels need to be taken into account in such cases, whether working on a new  
2 building or a refurbishment.

3 Evidence showed that people's health is affected if best practice and standards are  
4 not complied with during home renovations. This is most likely during works that do  
5 not require building regulation approval.

6 In the committee's experience building regulation enforcement may vary across local  
7 authorities. The committee stressed the particular need for enforcing compliance  
8 with heating and ventilation regulations, because any imbalance can have a  
9 disproportionate effect on indoor air quality.

### 10 **How the recommendations might affect practice**

11 The recommendations reinforce current best practice and will help local authorities  
12 meet their obligations to improve people's health and reduce health inequalities.

13 Ensuring compliance will lead to cost savings in healthcare, because it will reduce  
14 the number of homes with poor indoor air quality and, in turn, improve occupants'  
15 health.

16 Building regulations and standards already exist for enforcement teams. But building  
17 control teams may need to monitor their activities more closely, unless building work  
18 is under the control of an approved inspector. This may incur costs for local  
19 authorities and home owners, particularly if issues are identified that need to be  
20 fixed. (Only local authorities have the power to enforce standards if things go wrong.)

21 Training on specifications and compliance will involve costs and time away from  
22 work. Incorporating this training into existing continuous professional development  
23 could help minimise costs. For small contractors and companies that do not run  
24 continuous professional development programmes, the cost will be offset by  
25 reducing the risk of future litigation that may arise from building 'unhealthy' homes.

26 Full details of the evidence and the committee's discussion are in [evidence](#)  
27 [review 3.1: material and structural interventions](#).

28 [Return to recommendations](#)



1 ***Rental properties***

2 [Recommendations 1.9.1 to 1.9.5](#)

3 **Why the committee made the recommendations**

4 ***Regulations***

5 Local authorities have a duty of care to ensure public sector homes are maintained  
6 to a decent standard. This duty extends to private housing with category 1 hazards.  
7 (Homes with serious damp and mould are classified as having a category 1 hazard  
8 by the Housing Health and Safety Rating System.)

9 Local standards may be used for existing homes, for example landlord legislation or  
10 standards on repairs and property conditions or room size.

11 The committee was also aware of the increased risk for tenants who cannot afford  
12 remedial work or have to wait for landlords or property managers to do repairs  
13 (including to heating and ventilation systems). This could leave them exposed to  
14 pollutants while they wait for the work to be done. The committee pointed out that  
15 there are enforcement powers that local authorities can use to ensure compliance  
16 with regulations. (See [Housing health and safety rating system operating guidance](#).)

17 ***Property management***

18 Based on their experience, the committee agreed that if properties are properly  
19 equipped and maintained this will control and reduce sources of indoor air pollution.

20 The committee were aware that it is best practice to have heating and ventilation  
21 systems that meet performance requirements and are regularly maintained. But they  
22 agreed that this does not always happen – and so this needs to be stressed to all  
23 landlords.

24 The committee agreed that best practice also involves repairing any water damage  
25 and removing its cause as soon as possible, to prevent mould and damp developing.  
26 But they were concerned that property managers and landlords might not be aware  
27 of how mould, damp and other indoor air pollutants affect people's health. So they  
28 made a recommendation to advise on this and their general responsibilities to safely  
29 maintain their properties.

1 The evidence showed that flooring and older furniture that contains flame retardants  
2 are often sources of VOCs or formaldehyde. Based on the evidence, the committee  
3 agreed it was important that these dangers were highlighted to property managers  
4 and landlords, because both can damage people's health.

## 5 **How the recommendations might affect practice**

### 6 ***Regulations***

7 The recommendations will reinforce current best practice and the need to use  
8 existing regulatory powers to ensure homes are safe (see [Renting out your property](#)  
9 [\(England and Wales\)](#)). Because many people on a low income live in rented  
10 accommodation this will help address health inequalities. It will also help improve the  
11 health of other vulnerable groups and others who live in rented accommodation.

### 12 ***Property management***

13 These recommendations will reinforce current best practice.

14 Property managers are legally obliged to carry out maintenance checks and the  
15 following have to be embedded in tenancy agreements:

- 16 • checks and maintenance of ventilation systems (including filters)
- 17 • gas and electricity safety checks.

18 So the impact on practice and resources should be minimal, although there may be  
19 costs for repair of any problems found during the checks.

20 Housing has an important effect on health and health inequalities, particularly when  
21 properties need repairs. These recommendations will help meet local authorities'  
22 obligation to tackle health inequalities.

23 Full details of the evidence and the committee's discussion are in [evidence review 1:](#)  
24 [associations between individual or building characteristics and exposure levels;](#)  
25 [evidence review 2: exposure to pollutants and health outcomes; evidence review 3.1:](#)  
26 [material and structural interventions, evidence review 3.2: occupant behaviour](#)  
27 [interventions and evidence review 4: strategies for raising awareness.](#)

28 [Return to recommendations](#)

## 1 **Context**

2 People spend up to 90% of their lives indoors and 60% of that time at home.

3 Indoor air pollutants come from many sources, including:

- 4 • building materials (including fittings and flooring)
- 5 • furniture and furnishing
- 6 • consumer products, including household and personal care products
- 7 • activities such as cooking and smoking
- 8 • biological sources, including mould, house dust mites, bacteria, pests and pet
- 9 dander.

10 Exposure to indoor air pollutants including, for example nitrogen dioxide, carbon  
11 monoxide, particulates, biological agents and VOCs is widespread and can cause  
12 respiratory and other conditions and premature death in some people. A common  
13 respiratory condition is asthma. Indoor air pollutants such as dust mite allergens,  
14 nitrogen dioxide and particulate matter are small enough to get into the lungs,  
15 making the airways inflamed and swollen. This can exacerbate asthma symptoms  
16 and trigger asthma attacks.

17 It is best practice to reduce pollutant sources and reduce emissions as much as  
18 possible, especially for those who are more vulnerable to health problems caused by  
19 poor indoor air quality. This includes children and people with respiratory and  
20 cardiovascular conditions (Committee on the Medical Effects of Air Pollutants  
21 guidance on the [health effects of air pollutants](#)).

22 Usually the most effective way to deal with indoor pollutants is to either remove the  
23 source or reduce emissions from it. If these are not possible the pollutant can be  
24 diluted by ventilation (for example, opening windows) to reduce exposure. But  
25 outdoor pollutants also enter through windows or gaps in the structure and are a  
26 significant contributor to indoor air quality, particularly in deprived areas (see [Clean](#)  
27 [air strategy 2019](#) Department for Environment, Food and Rural Affairs).

1 The guideline covers the whole population. But special consideration has been given  
2 to those at increased risk of exposure to or adverse effects from poor indoor air  
3 quality.

#### 4 **Finding more information and resources**

5 To find out what NICE has said on topics related to this guideline, see our web page  
6 on [environment](#).

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