NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Guideline scope

Indoor air quality at home

The Department of Health in England has asked NICE to develop guidance on indoor air pollution. NICE has worked with Public Health England to develop this scope.

The guideline will be developed using the methods and processes outlined in developing NICE guidelines: the manual.

This guideline will be used to develop the NICE quality standard for indoor air pollution. It will complement NICE's existing guideline on air pollution: outdoor air quality and health.

1 Why the guideline is needed

Key facts and figures

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

Indoor air pollutants come from building materials (including fittings and flooring), furnishing, consumer products such as those used for cleaning, candles or diffusers and activities such as cooking and smoking. They also come from biological sources, for example, mould, house dust mites, bacteria, pests or pet dander.

Outdoor pollutants enter through windows or gaps in the building structure and are a significant contributor to indoor air quality, particularly in deprived areas (see The air quality strategy for England, Scotland, Wales and Northern Ireland [volume 2], Department for Environment, Food and Rural Affairs).

Exposure to indoor air pollutants including nitrogen dioxide, carbon monoxide, particulate matter, biological agents and volatile organic compounds (VOCs) is widespread. It is associated with respiratory and other diseases and premature death.

Children and people with respiratory conditions are susceptible to health problems caused by poor indoor air quality (COMEAP's guidance on the effects on health of indoor air pollutants Public Health England).

Current practice

Currently no single government department is responsible for indoor air quality. The regulation of air quality indoors and outdoors involves the Department for Communities and Local Government, Department of the Environment, Food and Rural Affairs, the Department of Health, Public Health England, the Health and Safety Executive and the Department for Transport. The Department for Business Energy and Industrial Strategy is responsible for product safety and legislation, which may have an impact on indoor air pollution.

Policy, legislation, regulation and commissioning

This guideline will complement various directives, regulations and guidelines from the World Health Organization and the European Union on indoor air quality and UK guidance and regulations, including the following:

- The Smoke and carbon monoxide alarm (England) regulations 2015.
- The Department for Communities and Local Government addresses indoor air quality through its Housing health and safety rating system (HHSRS) and its Ventilation: approved document F.
- The Housing Act 2004 (part 1) covers hazards including indoor air quality.
- The air quality strategy for England, Scotland, Wales and Northern Ireland (volume 1) focuses mainly on outdoor air quality. But measures I and J (advocating gas and oil for domestic combustion and listing product standards for domestic boilers) are specific to domestic dwellings.

- The Department for Education's Building bulletin BB101: Guidance on ventilation, thermal comfort and indoor air quality in schools refers to the World Health Organization indoor air quality guidelines.

2 Who the guideline is for

This guideline is for:

- Local authority staff working in:
  - environmental health, housing and the wider public health sector
  - building planning or building control.
- Private and social landlords, and housing associations.
- People working in the voluntary housing sector and non-governmental organisations.
- Health and social care professionals who visit people in their homes or who see people whose symptoms may be affected by air quality.
- Facilities managers in housing and residential settings.

It may also be relevant for:

- Local government elected members.
- The construction industry, including developers, architects, surveyors and planners and their professional bodies.
- Product and appliance manufacturers, of both building materials and consumer products.

The public will be able to use the guideline to find out more about what NICE recommends and to help them improve indoor air quality in their own home.

NICE guidelines cover health and care in England. Decisions on how they apply in other UK countries are made by ministers in the Welsh Government, Scottish Government, and Northern Ireland Executive.

Equality considerations

NICE has carried out an equality impact assessment during scoping. The assessment:

- lists equality issues identified, and how they have been addressed
- explains why any groups are excluded from the scope.

The guideline will look at inequalities relating to the impact of indoor air pollution on: children, older people, people with disabilities, pregnant women, people with pre-existing medical conditions (for example, respiratory and cardiovascular conditions) and disadvantaged groups.

3 What the guideline will cover

3.1 Who is the focus?

The whole population. But special consideration will be given to those at increased risk of exposure to high levels of indoor air pollution or adverse effects from indoor air pollutants. This includes:

- people living in deprived areas, for example as measured by the index of multiple deprivation
- older people
- people with disabilities
- pregnant women
- children and young people
- people with conditions associated with or exacerbated by indoor air pollution, such as stroke, heart disease and asthma.

3.2 Settings

Settings that will be covered

- Indoor places where people live, including:
  - homes, for example houses, mobile homes used as a permanent residence, hostels and university accommodation

- residential care, for example nursing homes, care homes and children's homes.

Settings that will not be covered

- Living accommodation in prisons and secure environments.

3.3 Activities, services or aspects of care

Key areas that will be covered

We will look at evidence in the areas below when developing the guideline, but it may not be possible to make recommendations in all areas.

1 Risk stratification:
   - Population exposure and groups at increased risk.
   - Dwellings (type, age, structure) and associated pollutants.

2 Signs and symptoms, and referral by health and social care professionals:
   - Signs and symptoms of exposure to indoor air pollution.
   - Referral pathways and other processes for managing exposure and remedial action (for example, referral to local environmental health team for a Housing health and safety rating system [HHSRS] assessment).

3 Interventions to change the structure of, ventilation of, and materials used in new and existing homes including:
   - Removing indoor sources of pollution (for example, hazardous building materials).
   - Using construction materials and consumer products with low VOC emissions.
   - Installing extractor fans.
   - Reducing high humidity levels (using dehumidifiers) to prevent mould and house dust mites.
   - Installing air filtering systems to remove biological agents (for example, dander and dust) and particulate matter.

- Installing insulation to change the dew point (the temperature at which condensation appears) and prevent mould growth.
- Making the building more airtight (for example, by insulating, draught proofing or installing double glazing).
- Making buildings more 'breathable' using vapour-permeable or hygroscopic materials.
- Installing new heating systems.
- Installing mechanical ventilation with heat recovery systems.
- Installing ventilation systems in new buildings.
- Retrofitting ventilation units in existing buildings.
- Use of soft furnishings and other interior design factors, including flame-retardant and stain-resistant treatments.

4 Interventions to change people’s knowledge, attitude and behaviour in relation to a range of actions to reduce their exposure to indoor air pollution including:

- How best to use ventilation, both mechanical and passive.
- Using heating systems effectively.
- Using building materials with low VOC emissions.
- Household cleaning products, hygiene products (such as deodorants), indoor pesticides and odourisation products (such as plug-in air fresheners and candles).
- Cooking activities (for example, emissions from gas and electric cookers), combustion appliances and the burning of wood or coal for heating or cooking.

Areas that will not be covered

1 Preventing exposure to radon.

2 Preventing acute exposure to carbon monoxide from malfunctioning combustion appliances.

3 Reducing outdoor air pollution.

4 Preventing infection.

5 Work-related indoor air pollution.

6 Smoke-free legislation or policy

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Related NICE guidance

Published

- Air pollution: outdoor air quality and health (2017) NICE guideline NG70.
- Smoking: harm reduction (2013) NICE guideline PH45.
- Smoking: stopping in pregnancy and after childbirth (2010) NICE guideline PH26.
- Cardiovascular disease prevention (2010) NICE guideline PH25.

In development

- Asthma management. Expected to publish October 2017.
- Smoking cessation interventions and services. Expected to publish March 2018.
- Chronic obstructive pulmonary disease in over 16s: diagnosis and management. Expected to publish November 2018.
- Housing: planning to improve health and wellbeing. Expected to publish April 2019.

3.4 Economic aspects

We will take economic aspects into account when making recommendations. We will develop an economic plan that states for each review question (or key area in the scope) whether economic considerations are relevant and, if so, whether this is an area that should be prioritised for economic modelling and analysis. We will review the economic evidence and carry out economic analyses using a public sector and any other perspective, as appropriate. It is unlikely that health outcomes will be reported in the research literature, so these will need to be modelled. Resource use may also be included if it contributes to outcomes.

3.5 Key issues and questions

While writing this scope, we have identified the following key issues, and key questions related to them:

1 Exposure to pollutants:

1.1 What risk factors increase the likelihood of a person being exposed to indoor air pollutants?

1.2 How is that risk stratified by different populations, different types of dwelling and different pollutants?

2 Signs and symptoms, and referral by health and social care professionals:

2.1 What signs and symptoms should prompt healthcare professionals to consider exposure to an indoor air pollutant in people presenting to health services?

2.2 When is onward referral for environmental assessment (using, for example, the Housing health and safety rating system) appropriate?

3 Material and structural interventions:

3.1 What are the most effective material and structural interventions for preventing or reducing the health impacts of indoor air pollution? (For example, the installation or retrofitting of ventilation units, or use of low emitting materials.)

4 Interventions to change people's knowledge, attitude and behaviour in relation to actions that can reduce their exposure to indoor air pollution:

4.1 What are the most effective strategies for raising awareness of the risks of indoor air pollution, particularly in those at most risk?

4.2 What are the most effective interventions to reduce exposure to indoor air pollution? (This could include: products used, or how to use and maintain ventilation or filtration systems.)

4.3 How can people balance the need for energy efficiency and ventilation to manage indoor air pollution exposure (for example, balancing the cost of heating against opening the windows for ventilation)?

All the questions above will:

- consider whether the impacts of interventions vary for different populations and any adverse effects

- include a cost-effectiveness dimension and be considered for cost-effectiveness modelling.

The key questions may be used to develop more detailed review questions, which guide the systematic review of the literature.

3.6 Main outcomes

The main outcomes that will be considered when searching for and assessing the evidence are:

1 Health-related outcomes from exposure to indoor air pollutants including:
   - Mortality.
   - Still birth, infant mortality and low birth weight.
   - Hospital admissions and attendance at primary care related to ear, nose and throat problems, cardiovascular or respiratory disease.
   - Inflammatory response, respiratory or cardiac symptoms.
   - Rates of cardiovascular, respiratory disease, cancer and other conditions (for example, neurological conditions) associated with indoor air pollutants.

2 Levels and concentrations of indoor air pollutants within dwellings including:
   - Particulate matter (PM 2.5 and PM 10).
   - Carbon monoxide.
   - Nitrogen oxides.
   - Individual VOCs and total volatile organic compounds (TVOCs), including benzene, formaldehyde, trichloroethylene and tetrachloroethylene.
   - Polycyclic aromatic hydrocarbons (PAH), including naphthalene and benzo[a]pyrene.
   - Carbon dioxide (as a proxy measure for the effectiveness of ventilation).
   - Biological agents, for example mould and house dust mites.

3 Individual changes in behaviour (translated into action) to reduce indoor air pollutants within dwellings, including changes in people's:

- Intentions.
- Knowledge.
- Attitudes.

4 Levels and concentrations of environmental tobacco smoke[1] and levels of vapour that come from e-cigarettes, including:
   - vapour phase nicotine, respirable suspended particle mass, glycols, tobacco-specific nitrosamines.

5 Economic outcomes.

6 Health-related quality of life:
   - Cost per quality-adjusted life year/disability-adjusted life year.
   - Cost–benefit ratio.
   - Net present value.
   - Cost per case avoided.

4 NICE quality standards and NICE Pathways

4.1 NICE quality standards

NICE quality standards that may need to be revised or updated when this guideline is published

- Preventing excess winter deaths and illness associated with cold homes (2016) NICE quality standard 117
- Cardiovascular risk assessment and lipid modification (2015) NICE quality standard 100
- Hypertension in adults (2013) NICE quality standard 28
- Asthma (2013) NICE quality standard 25

[1] No level of environmental tobacco smoke is considered safe (Air quality guidelines for Europe World Health Organization), so the evidence on this as an indoor air pollutant will not be reviewed. However, the committee will consider recommendations from other published NICE guidelines and adopt, adapt or cross refer to them as applicable. The systematic review will also report on any environmental tobacco smoke outcomes that are identified in studies that report on interventions to remove pollutants from the indoor environment.

NICE quality standards that may use this guideline as an evidence source when they are being developed

- Indoor air pollution. Publication date to be confirmed

4.2 NICE Pathways

NICE Pathways bring together everything we have said on a topic in an interactive flowchart. When this guideline is published, the recommendations will be included in the NICE Pathway on indoor air quality at home (in development).

An outline based on the scope is included below. It will be adapted and more detail added as the recommendations are written during guideline development.

Indoor air quality at home overview

5 Further information

This is the final scope, incorporating comments from registered stakeholders during consultation.

The scope takes Public Health England priorities into account to ensure that associated areas of work carried out by the 2 organisations complement each other.

The guideline is expected to be published in August 2019.

You can follow progress of the guideline.

Our website has information about how NICE guidelines are developed.