Position Paper on Indoor Air Quality: Summary

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on behalf of the

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(HSE)

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Background

Air quality refers to the degree to which air is polluted/not polluted. Indoor air quality refers to the air quality within and around buildings. Poor indoor air quality is a risk to health.[1] In this position paper, the Health Service Executive (HSE) Public Health Medicine Environment and Health Group (PHMEHG), comprising public health doctors, aimed to describe the causes of poor indoor air quality in Ireland, their effects on health, and how these effects can be prevented. Although radon and environmental tobacco smoke are recognised by the HSE PHMEHG as harmful air pollutants, they are not discussed in this position paper because they are addressed under specific strategies.

Pollutants

Typical causes of household air pollution are shown in Figure 1. In Ireland, solid fuel burning is a common source of many pollutants[2] e.g., carbon monoxide (CO), nitrogen dioxide (NO_2) and particulate matter (PM), and is a particular risk to public health. Poor ventilation, blocked chimneys and flues, and poorly maintained appliances (e.g., boilers, heaters, and cookers) can increase the risk of poor indoor air quality. Other pollutants (e.g., volatile organic compounds (VOCs)) may arise from cleaning products, paints, solvents and even from the buildings and furnishings.

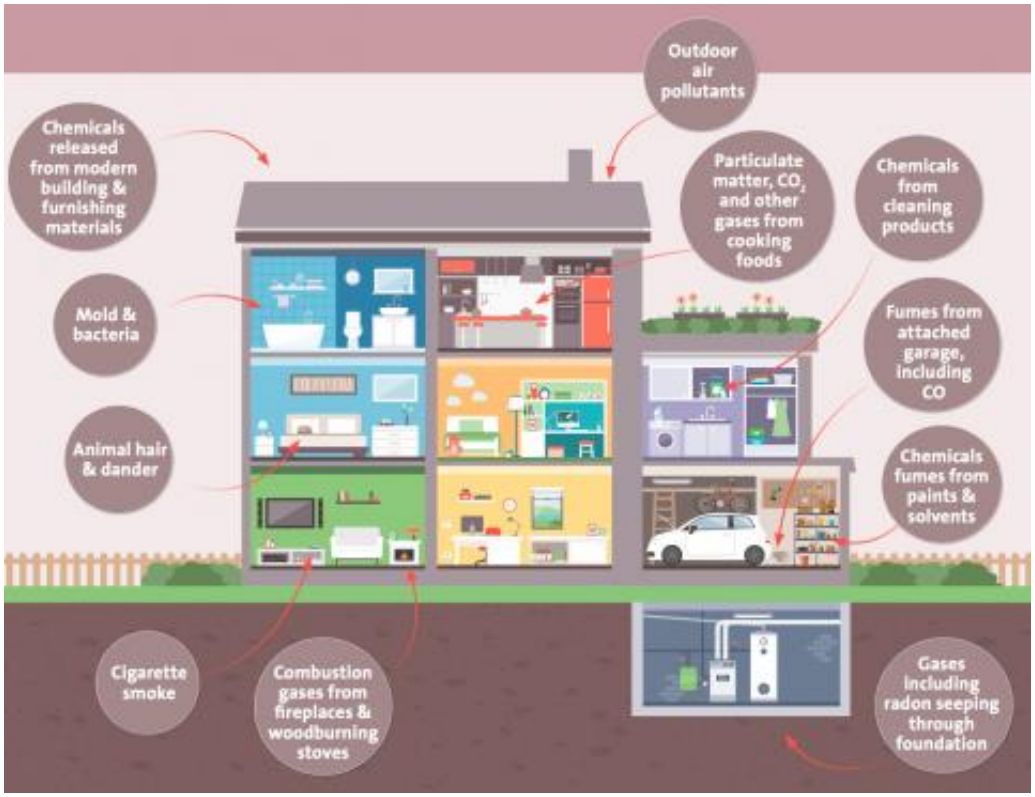

Figure 1. Common causes of poor indoor air quality

Source: Boquillod Y. (2020), Artificial intelligence and indoor air quality. *Journal of Field Action Science Reports*, 21, pp 60-63.
CO_2= Carbon dioxide, CO= Carbon Monoxide

Health Effects

Poor air quality is estimated to cause the deaths of 1,400 people per year in Ireland.[3] Solid fuel burning is thought to cause 1,300 of these.[3] Exposure to air pollutants can have acute (e.g., irritation of eyes) and long-term (e.g., heart or lung disease) health effects (Figure 2). Air pollution can harm health even at very low concentration levels. No level of exposure to air pollutants is safe. Children, pregnant women, older people, people with underlying chronic health conditions (e.g. cardiovascular or respiratory conditions), minority and ethnic groups and people with a low-income are more vulnerable to the health effects of air pollution.

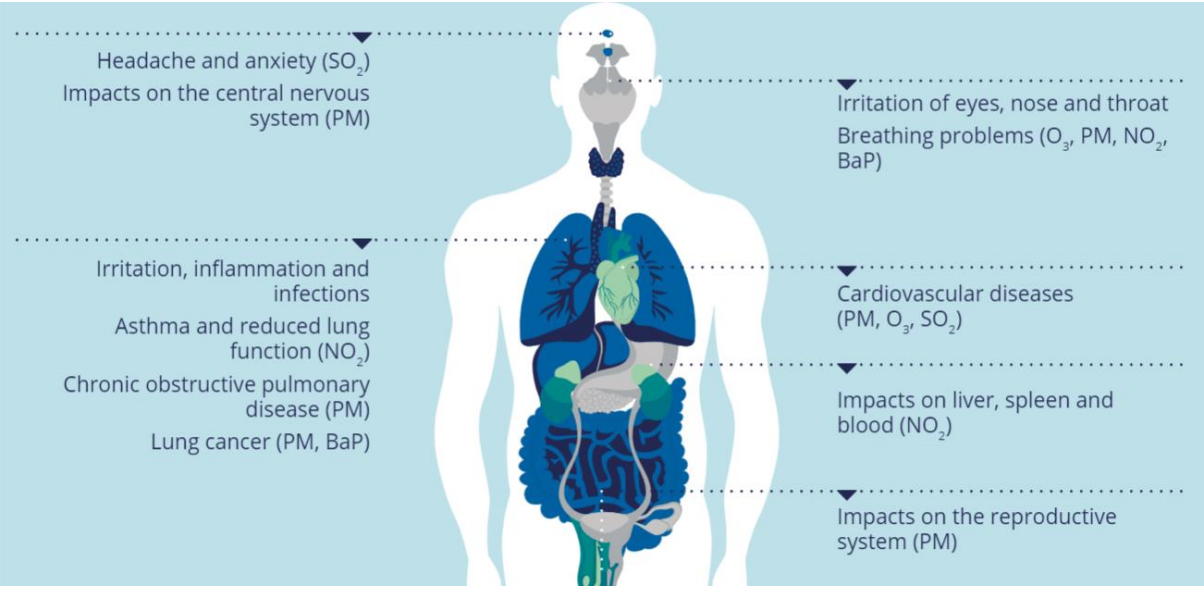

Figure 2. Health effects from poor indoor air quality and their causes

Source: European Environment Agency (2019), Healthy environment, healthy lives: how the environment influences health and well-being in Europe. Available at: https://www.eea.europa.eu/publications/healthy-environment-healthy-lives

BaP= benzo (a) pyrene (BaP), CO= carbon monoxide, NO_2= nitrogen dioxide, O_3= ozone, PM= particulate matter, SO_2= sulphur dioxide

Air Pollution from Solid Fuel Burning in Ireland

In 2015, the average dwelling in Ireland emitted 60% more energy-related carbon dioxide than dwellings in any other country in the European Union.[4] Coal and peat are two of the most polluting fuels. Nationally, 15% of energy used in households in Ireland is directly from coal and peat use.[5] Ireland uses more coal and peat per dwelling than all but one other country in the European Union. Research indicates that peat-burning households in Ireland had particulate matter concentrations six times the 2005 World Health Organization (WHO) recommended limit.[6] In 2021, the WHO recommended even lower limits, recognising there was still an unacceptable risk to health with the limit recommended in 2005.[7] As well as causing poor air quality indoors, residential heating with solid fuel is an important source of poor air quality outdoors. During the winter of 2021 in Ireland, around 62% of outdoor air pollution was caused by peat and 10% by wood despite only a small percentage of residential homes using these as their primary fuel.[2]

Prevention of Air Pollution from Solid Fuel Burning

The following strategies and recommendations of the HSE PHMEHG could improve air quality in Ireland.

1. Source Control

Switching to cleaner fuels can control indoor air pollution at its source (Figure 3). Specifically, in Ireland, eliminating wood and peat use would cut particulate matter pollution by at least half.

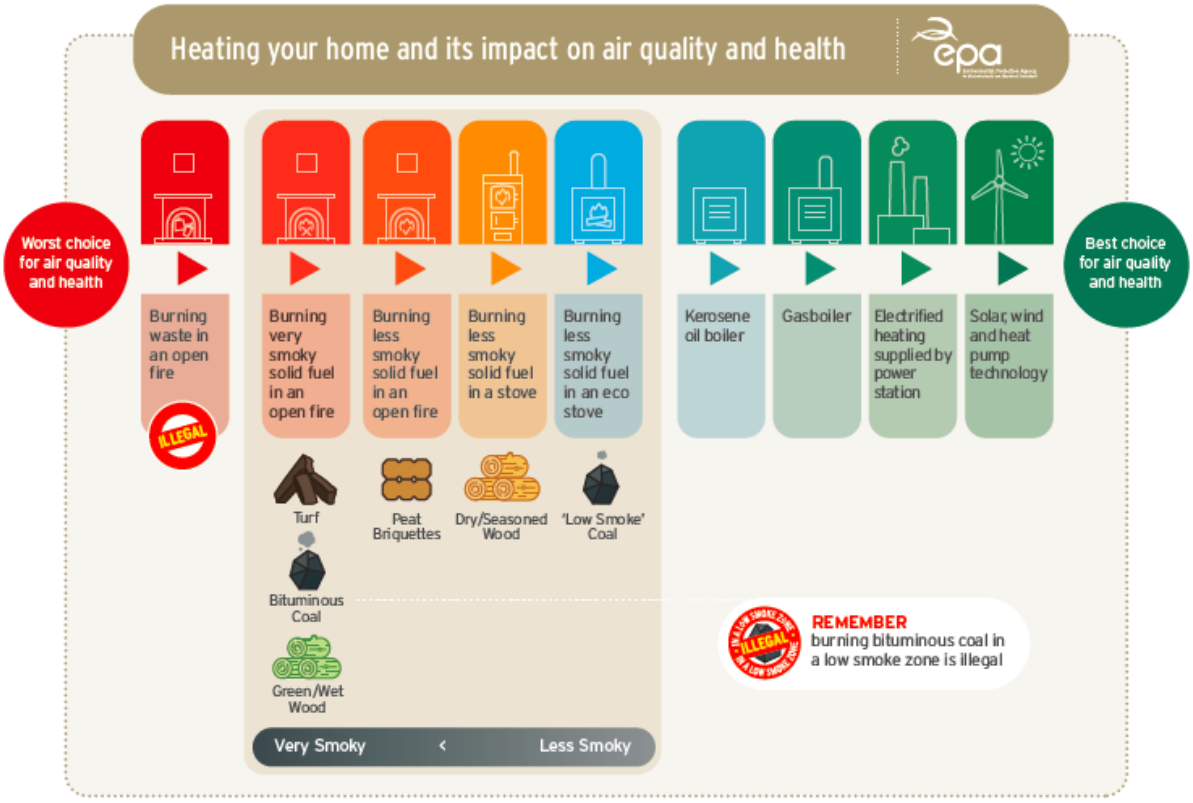

Figure 3. Fuel choices and their impact on air quality and health

Source: Environmental Protection Agency, resources, home-heating infographic. Available at: https://www.epa.ie/environment-and-you/air/resources/Home-heating-inforgraphic.pdf

2. Implementing an Energy Poverty Strategy and a Just Transition

According to the WHO, nearly one in five people had problems paying their energy bills in Ireland in 2016. With rising energy costs, the problem has worsened. Recently, the Economic and Social Research Institute (ESRI) reported that nearly 3 in 10 households are in energy poverty. Poorer household may buy solid fuels because they can be purchased on demand in

smaller amounts, and because of the heating system available to them.[8] In Ireland, most air pollution hotspots are in deprived areas that predominantly use coal or peat for heating. As a result, for these areas, the potential for negative health effects from air pollution is greater than in less deprived areas. On that basis, the Public Health Medicine Environment and Health Group recommend that:

i. The Government implement sustainable incentives for people to switch to less polluting fuels.
ii. Less polluting fuels should be affordable and easily available, particularly for those with fuel poverty.
iii. The Strategy to Combat Energy Poverty, 2016-2019, which sets out the national strategy to address energy poverty, should be implemented.
iv. The National Home Energy Upgrade Scheme should be implemented quickly.

Cutting turf has been a way of life for many people in Ireland. At present, those who relied on turf for income face an uncertain future. There has also been a loss of employment with the reduction in commercial peat production. Internationally, stakeholder engagement, financial support, and social safety nets can help those disproportionately affected by the transition away from turf. On that basis, the Public Health Medicine Environment and Health Group recommend that:

i. Stakeholders should work together to reduce household use of turf as a heating fuel without added financial cost to the household.
ii. If successful, the Government of Ireland's Just Transition programme for the Midlands should be extended to other areas where turf is harvested.

3. Increased Energy Efficiencies

Ecodesign means that, prior to product manufacturing, there is a greater focus on lifetime energy use and other environmental aspects. Ecodesign should be used to produce more efficient fuel heating devices that can reduce emissions. In the European Union, the Eco Design Directive 2009/125/EC covers all energy-related products sold in the domestic, commercial and industrial sectors.[9] In addition, the Energy Labelling regulation 2017/1369[10] complements the

Ecodesign Directive by providing information about the performance of the appliances. On that basis, the HSE PHMEHG recommend that:

i. The Eco Design Directive and Energy Labelling Directive should be considered as a means to reduce pollutants from solid fuel appliances for sale in Ireland.
ii. The resources required to enforce the requirements under these directives are put in place.

4. Communication

Householders must be made aware of policies that support the transition to cleaner fuels, increase energy efficiencies and reduce energy poverty through communication campaigns. On that basis, the Public Health Medicine Environment and Health Group recommend that:

i. To reduce domestic solid fuel-related pollution, educational campaigns are needed to raise awareness of the harms of poor air quality.
ii. In Ireland, the perception of an open fire as a welcoming sign and the heart? of the home should be changed. Research on how to do so is needed.
iii. In line with the Aarhus Convention, public participation in environmental decision making on these issues should be actively sought. https://ec.europa.eu/environment/aarhus/

5. Ventilation

Improved indoor ventilation can reduce the potential for harm on exposure to air pollutants. While poorer households may be exposed to outside pollutants entering through windows or gaps in the building structures, the Building Regulations mean, increasingly, new buildings are more dependent on mechanical systems to maintain adequate ventilation. Carbon dioxide monitors can be useful to identify areas that need improved ventilation. On that basis, the Public Health Medicine Environment and Health Group recommend that:

i. Measures are needed to ensure that the Building Regulations do not negatively impact indoor air quality.

ii. A certified carbon dioxide monitor should be in every household that uses solid or fossil fuel for heating or cooking. Economic assistance should be available for those at risk of fuel poverty to purchase carbon dioxide monitors.

4. Integrated Approach

An integrated package of measures is likely to be more effective in improving public health by reducing air pollution from solid fuel use for home heating. On that basis, the Public Health Medicine Environment and Health Group recommend that:

i. To reduce air pollution, health should be considered when developing and adopting all policies and public health doctors should be involved as key stakeholders.
ii. The Department of Communications, Climate Action and Environment national Clean Air Strategy should be published as soon as possible.

5. Improving Air Quality Standards and Monitoring Networks

The Public Health Medicine Environment and Health Group recommend that:

i. Timely strengthening and updating of air quality standards should occur and this should be made a legal requirement.
ii. Air quality standards should be set according to their health benefits rather than their costs.
iii. The ambient air quality network should extend to more residential settings to better identify air pollution 'hot spots'.

Conclusion

Poor indoor air quality is a harm to public health. In Ireland, solid fuel burning is a major source of air pollution. A transition to less polluting energy sources and improved energy efficiency is needed. It is important this transition protects the most vulnerable from air pollution and the most deprived from fuel poverty.

Additional Resources

1. World Health Organization Guidelines for Indoor Air Pollutants: Dampness and Mould, 2009.
2. World Health Organization Guidelines for Indoor Air Quality: Selected Pollutants, 2010.
3. World Health Organization Guidelines for Indoor Air Quality: Household Fuel Combustion, 2014.
4. World Health Organization Air Quality Guidelines: Particulate Matter, ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide: executive summary, 2021.

References

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2. Environmental Protection Agency. Air pollution sources in Ireland, 2021. Available at: https://www.epa.ie/publications/research/air/Research_Report_385.pdf [Accessed August 10th, 2022]

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4. Sustainable Energy Authority Ireland. Energy in the Residential Sector, 2018. Available at: https://www.seai.ie/data-and-insights/seai-statistics/key-publications/energy-in-residential-sector/ [Accessed August 10th, 2022]

5. Sustainable Energy Authority Ireland. Energy in the residential sector, 2017. Available at: https://www.seai.ie/data-and-insights/seai-statistics/key-publications/energy-in-residential-sector/ [Accessed August 10th, 2022]

6. Environmental Protection Agency. Indoor air pollution and health, STRIVE report, 2008. Available at: https://www.epa.ie/publications/research/environment--health/Indoor-Air-Pollution-and-Health.pdf [Accessed August 16th, 2022]

7. World Health Organization. Global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, 2021. Available at: https://apps.who.int/iris/handle/10665/345329 [Accessed August 16th, 2022]

8. Economic and Social Research Institute. Energy poverty and deprivation in Ireland, 2022. Available at: https://www.esri.ie/publications/energy-poverty-and-deprivation-in-ireland [Accessed August 10th, 2022]

9. European Parliament and Council of the European Union. Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products. Official Journal of the European Union 2009, L285/10.

10. European Parliament and Council of the European Union. Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU. Official Journal of the European Union 2017, L198/1