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Indoor Air Quality: Current issues

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20/5/2020 - Webinar organised by SAQN (STFC Air Quality Network) in collaboration with UKIEG, AQNUK and the UKRI Clean Air Champions on: "Coordinating research action: air quality & CV-19".

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Factors affecting IAQ

Ambient air

Urban planning

Building and Construction Materials, Furnishing and Consumer products

Ventilation

Design and maintenance Of buildings

Occupant activities

Pollutants emitted from indoor sources

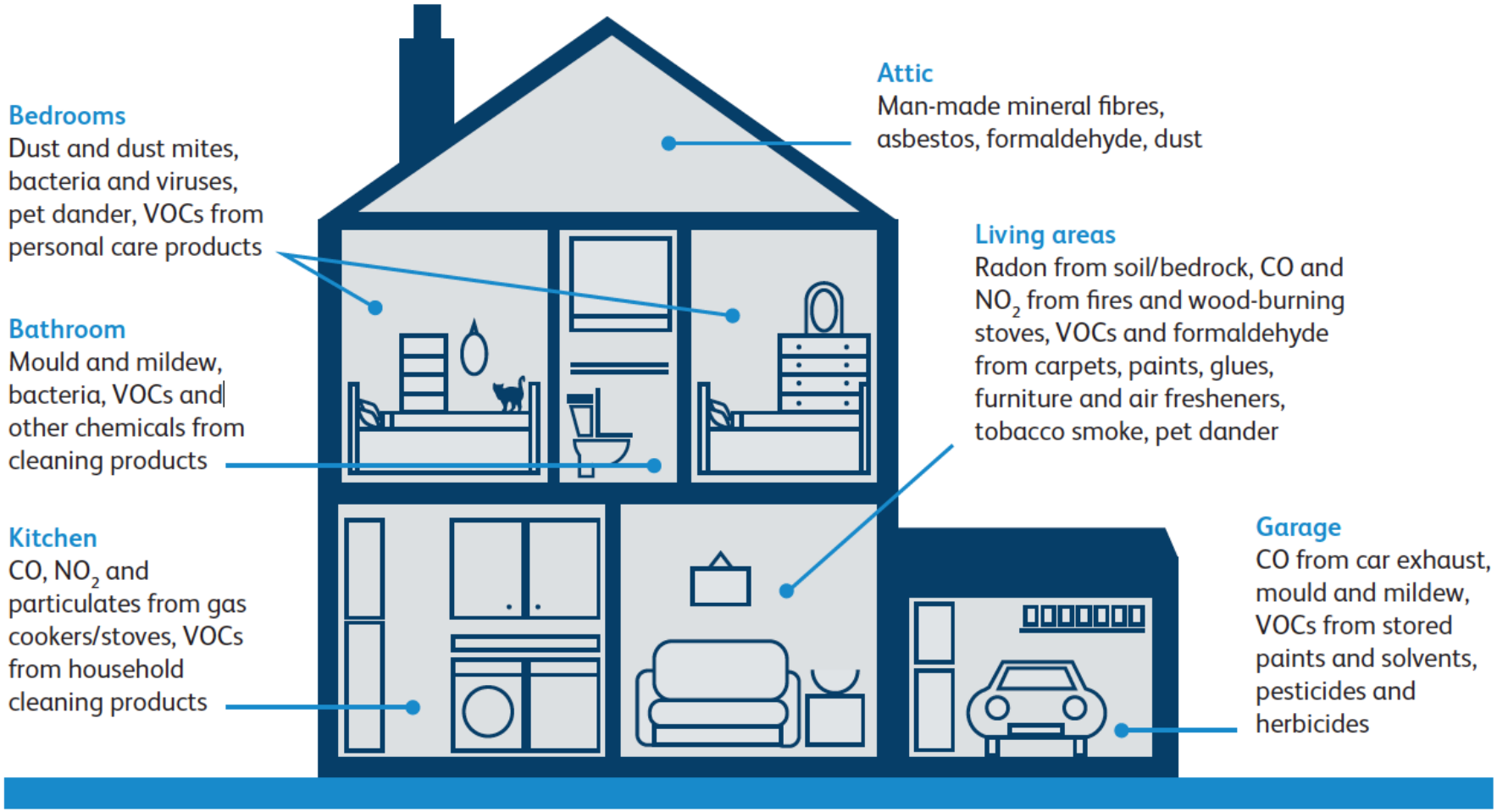

Fig 3. Sources and types of indoor pollution encountered in homes. VOCs = volatile organic compounds. Please note that these lists are not exhaustive and that the actual pollutants present, and their amounts, will vary from household to household.

RCP (2016); RCPCH / RCP (2020)

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PHE IAQ activities

PHE

- PHE IAQ guidelines for selected VOCs
- Impact of home air purifiers on IAQ and health
- CO_2: an indicator or a pollutant?

Government

- Cross Government Group On Gas Safety And Carbon Monoxide Awareness / All Fuels Action Forum / on-going
- MHCLG Revision of Building Regulations (Part L and Part F)
- Government Review into CO Alarm Requirements (England)
- CMO Cross Gov meeting on IAQ: Setting the scene (Feb 2020)

Other Organisations

- CIBSE TM40: Health Issues in Building Services (2020)
- NICE guidelines / standard on indoor air quality at home (PHE co-badged, 2019)
- RCP and RCPCH Systematic Review: “Effects of Indoor Air Quality on Children and Young People’s Health” (2020)
- WHO Experts Group on IAQ and children’s health

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RCPCH and RCP

Effects of indoor air quality on children and young people's health

Research project

Produced an evidence-based report on the impact of indoor air pollution

Birth and infancy

- Respiratory problems – wheeze, rhinitis, atopic asthma, respiratory infections
- Low birthweight and pre-term birth

Pre-school

- Respiratory problems – wheeze, allergies, asthma, risk of respiratory diseases and pneumonia
- Eczema and atopic dermatitis
- Greater hyperactivity, impulsivity and inattention

School age

- Respiratory problems – wheeze, rhinitis, asthma, throat irritation, nasal congestion, dry cough
- Eczema, dermatitis, conjunctivitis, skin and eye irritation
- Reduced cognitive performance, difficulty sleeping

RCPCH (2020) https://www.rcpch.ac.uk/sites/default/files/2020-01/the-inside-story-report_january-2020.pdf

Improving indoor air quality

NICE National Institute for Health and Care Excellence

Actions for local authorities

Checking people's homes and giving advice

Use inspections and home visits to identify poor indoor air quality.

Staff who visit people's homes should:

- know about sources of indoor air pollutants and their effects on health
- give advice on avoiding activities that increase pollutants and improving ventilation (see below)
- know who can provide help with repairs and necessary improvements
- give advice on requesting a housing assessment if poor indoor air quality is suspected.

Advise private and social tenants to contact their landlord if:

- ventilation is inadequate
- repairs are needed to prevent water from entering the home
- improvements are needed to heating or insulation to prevent condensation.

Advise tenants to contact their local authority if no action is taken to improve ventilation or carry out repairs.

Advice on reducing damp and condensation

- Use background ventilation (trickle vents or whole-house mechanical ventilation)
- Use extractor fans and open windows (if possible and safe)
- Avoid moisture-producing activities (such as air-drying clothes) or, if unavoidable, improve ventilation
- Repair sources of water damage and remove residual moisture

Advice on increasing ventilation

Use extractor fans in bathrooms and kitchens, or open windows (if possible and safe) when:

- using cookers, especially gas cookers
- using open solid-fuel fires or free-standing gas heaters
- using candles
- using cleaning products, household sprays or aerosols and paints
- having a bath or shower
- air-drying clothes

Other advice

- Do not use unflued paraffin heaters
- Follow product instructions if using, for example, paint, glue and solvents
- Choose low-emission materials if replacing furniture or flooring
- Ensure adequate ventilation when installing a new cooker, especially for gas cookers
- Do not use gas cookers to heat a room
- Avoid smoking in the home

Actions for healthcare professionals

Advice for people with breathing or heart problems

- Explain that indoor air pollutants can trigger or exacerbate asthma, other respiratory conditions and cardiovascular conditions
- If repeated or worsening cough or wheezing, ask about housing conditions and help request a housing assessment if concerned
- If household sprays or aerosols trigger asthma, advise avoiding them or using non-spray products

Advice for people allergic to house dust mites

Advise on how to reduce exposure to to house dust mites, including:

- avoiding second-hand mattresses if possible
- using allergen barriers such as mattress and pillow covers
- washing bedding regularly

Advice for pregnant women and babies under 12 months

- Advise on the increased risks from poor indoor air quality
- Explain the risks of tobacco smoke
- Ask about housing conditions and help request a housing assessment if concerned
- Advise on reducing use of household sprays and aerosols
- Advise on avoiding or reducing use of open solid-fuel fires or candles
- Advise on avoiding smoking in the home or around the woman and baby

Actions for architects, designers, builders and developers

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

Building materials and products

- Architects and designers should consider specifying materials and products that emit low levels of formaldehyde and volatile organic compounds (VOCs)
- Builders and developers should use materials as specified or substitute with products of the same or lower emission levels
- Builders and developers should ensure materials and products comply with building regulations, design specifications and the manufacturer's guidance

Designing heating and ventilation systems

- Adopt a whole-building approach to heating and ventilation, balancing indoor air quality with standards for energy use
- Use heating systems that minimise exposure to particulate matter
- Ensure there is permanent, effective ventilation
- Include provision for removing indoor air pollutants in designs, for example, windows that open and extractor fans that extract to outside
- Design ventilation to reduce exposure to outdoor air pollution, for example, with windows that face away from busy roads

Installing heating and ventilation systems

- Ensure heating and ventilation is installed and commissioned in accordance with the manufacturer's instructions and meets building regulation requirements
- When installing heating and ventilation systems, ensure they are easily accessible for regular maintenance
- Ensure any variations to the heating and ventilation specification comply with design specifications and building regulations

This is a summary of the recommendations on advice and information for the general population, healthcare professionals, architects and designers, and builders, contractors and developers in NICE's guideline on indoor air quality at home. See the original guidance at www.nice.org.uk/guidance/NG149

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IAQ and COVID-19

- We are actively reviewing evidence on indoor air and COVID-19 to inform PHE's guidance and advice.
- Currently attention is being paid on how COVID-19 is transmitted indoors and how building services should operate to prevent the spread.

Current evidence:

Coronaviruses are quite resistant to environmental changes and become inactive only to very high relative humidities above 80% and temperatures above 30 ˚C (Casanova et al., 2010; Doremalen et al., 2013).

Therefore, at typical UK indoor temperatures of 21-23 ℃ and relative humidity of 40-65%, coronaviruses may show stability.

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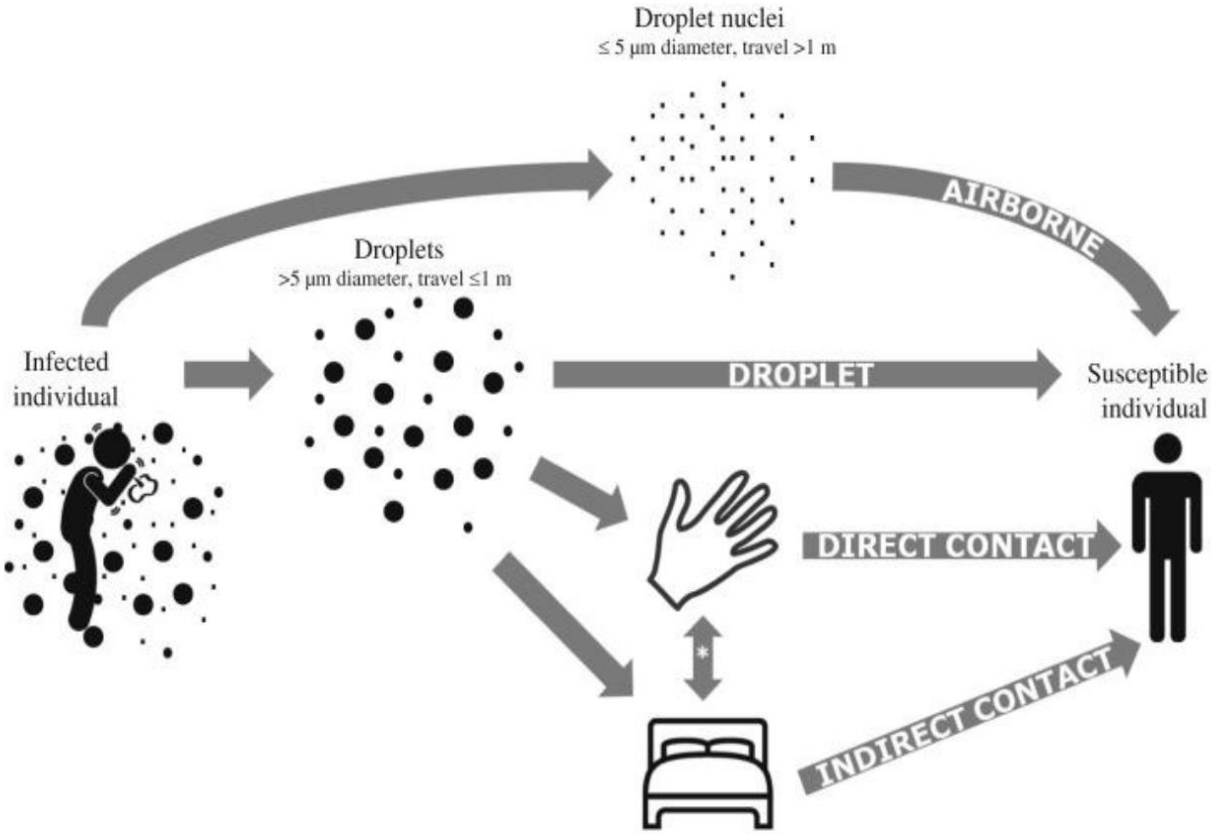
IAQ and COVID-19



* Transmission routes involving a combination of hand & surface = indirect contact.

Otter et al., 2016.
https://www.ncbi.nlm.nih.gov/pubmed/26597631

Guidance on buildings

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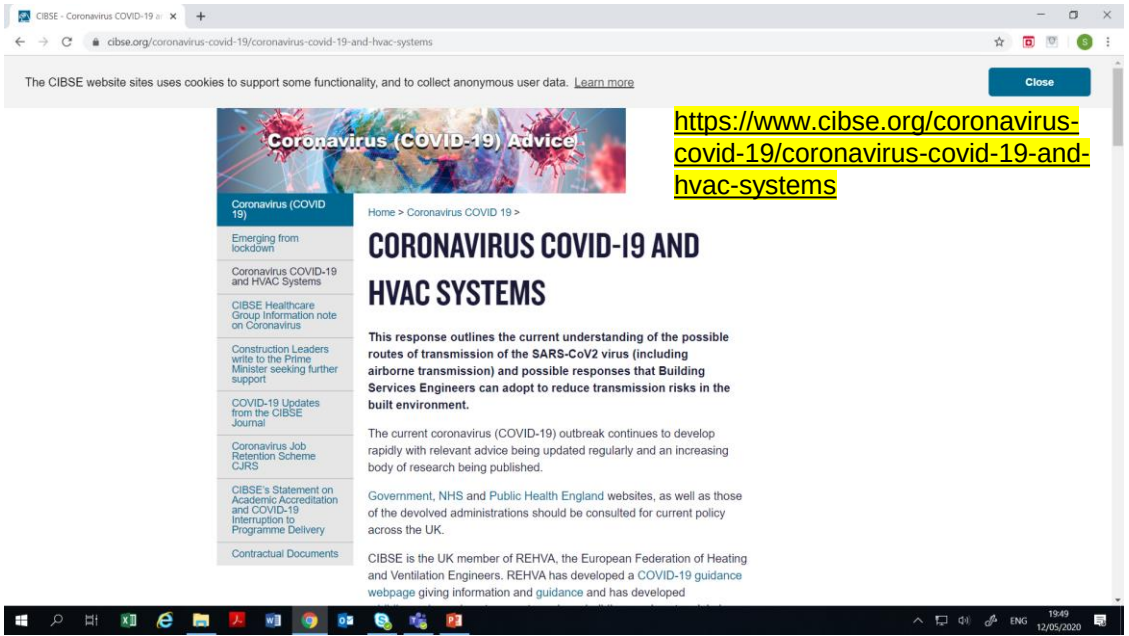
REHVA
Federation of European Heating, Ventilation and Air Conditioning Associations

https://www.rehva.eu/activities/covid-19-guidance

REHVA COVID-19 guidance document, March 17, 2020
(updates will follow as necessary)

How to operate and use building services in order to prevent the spread of the coronavirus disease (COVID-19) virus (SARS-CoV-2) in workplaces



https://www.cibse.org/coronavirus-covid-19/coronavirus-covid-19-and-hvac-systems

http://www.bco.org.uk/Research/Publications/Thoughts_on_Office_Design_and_Operation_After_Covid-19.aspx

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Let's work together

to reduce our exposure to indoor air pollution

Thank you!

www.gov.uk/phe

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