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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**

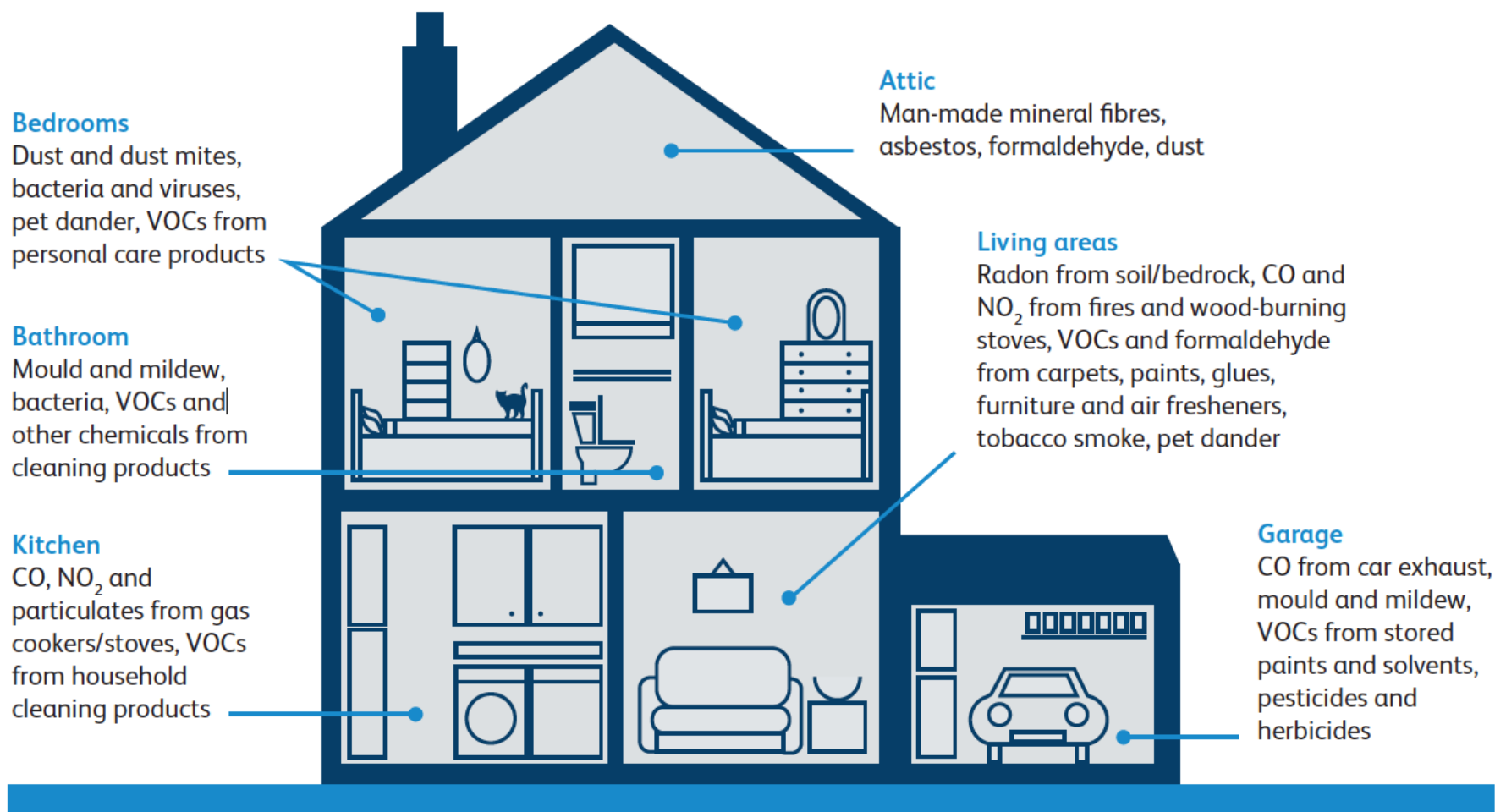
*Ventilation*

**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.



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# PHE IAQ activities

## PHE

- PHE IAQ guidelines for selected VOCs
- Impact of home air purifiers on IAQ and health
- CO<sub>2</sub>: 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



# Improving indoor air quality

## 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 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](http://www.nice.org.uk/guidance/NG149)



# 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.

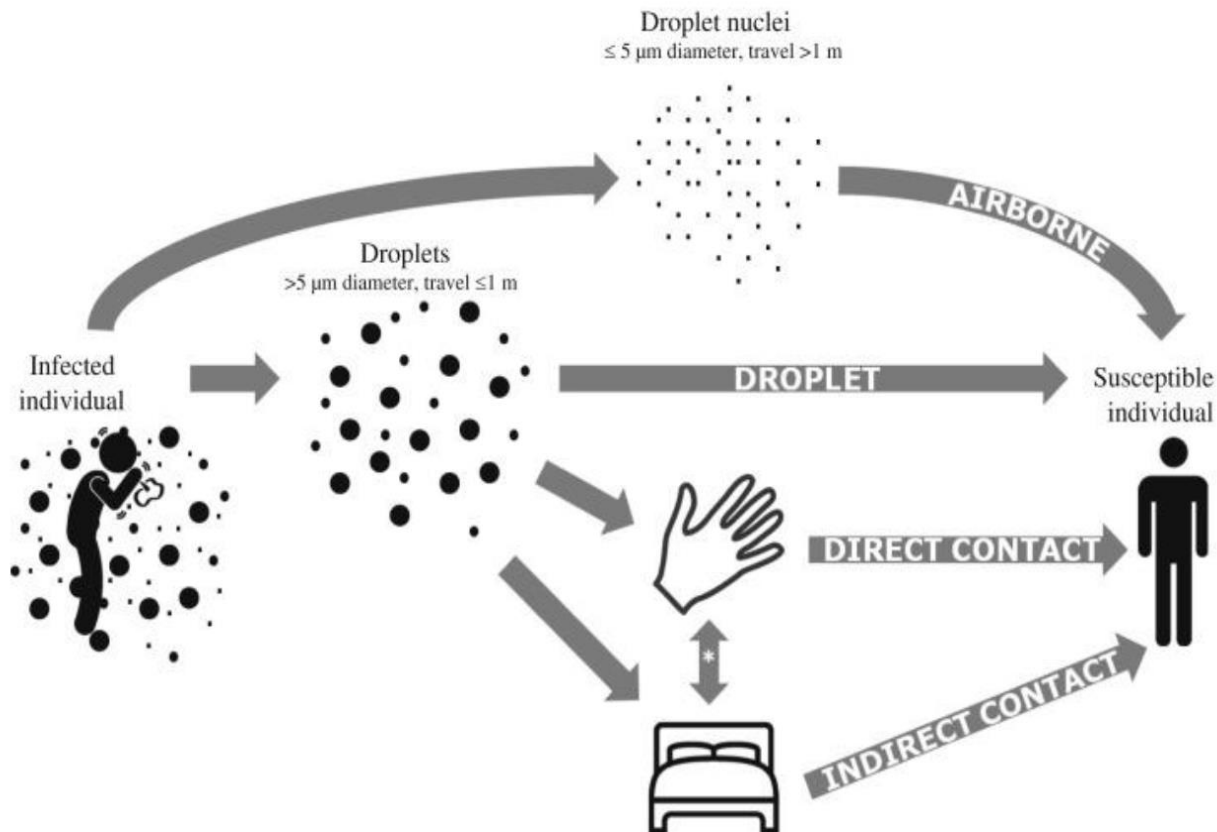
## *Current evidence:*

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 °C and relative humidity of 40-65%, coronaviruses may show stability.



# IAQ and COVID-19



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





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# Guidance on buildings



<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*

CIBSE - Coronavirus COVID-19

cibse.org/coronavirus-covid-19/coronavirus-covid-19-and-hvac-systems

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**Coronavirus (COVID-19) Advice**

- Coronavirus (COVID 19)
- Emerging from lockdown
- Coronavirus COVID-19 and HVAC Systems
- CIBSE Healthcare Group Information note on Coronavirus
- Construction Leaders write to the Prime Minister seeking further support
- COVID-19 Updates from the CIBSE Journal
- Coronavirus Job Retention Scheme CJRS
- CIBSE's Statement on Academic Accreditation and COVID-19 Interruption to Programme Delivery
- Contractual Documents

Home > Coronavirus COVID 19 >

## CORONAVIRUS COVID-19 AND HVAC SYSTEMS

This response outlines the current understanding of the possible routes of transmission of the SARS-CoV2 virus (including airborne transmission) and possible responses that Building Services Engineers can adopt to reduce transmission risks in the built environment.

The current coronavirus (COVID-19) outbreak continues to develop rapidly with relevant advice being updated regularly and an increasing body of research being published.

Government, NHS and Public Health England websites, as well as those of the devolved administrations should be consulted for current policy across the UK.

CIBSE is the UK member of REHVA, the European Federation of Heating and Ventilation Engineers. REHVA has developed a COVID-19 guidance webpage giving information and guidance and has developed

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



British Council for Offices  
Briefing Note  
April 2020

## THOUGHTS ON OFFICE DESIGN AND OPERATION AFTER COVID-19

### Introduction

The COVID-19 pandemic is affecting how we use buildings now and is likely to affect how we design buildings in the future.

To help us prepare for occupier expectations – and perhaps government regulation – this briefing note collects some ideas to consider in the design and delivery of office space. This is not a specific reaction to COVID-19, but a broader view of protection from all sorts of infectious diseases.

The following notes explain a little about how the virus is spread, how this relates to office use, and what we can do to reduce its effects.

A number of the anticipated changes are likely to give rise to legal and commercial considerations for building owners, occupiers, investors and their managing agents.

A realignment of the new responsibilities and interface between managing agents, occupiers and their HR teams is to be expected. Landlords and occupiers may need to take a closer look at existing lease obligations and service charge arrangements in relation to the evolving new working practices and guidelines anticipated.

### Contamination routes

- Contact.** This may occur direct from person to person, or indirectly via person to surface to person.
- Airborne.** Large droplets (>10 µm) are expelled by sneezing and coughing, and in still air typically drop within about 2 m of the infected person. Small droplets (<5 µm) may travel for long distances but have not currently been identified as an infection mechanism for COVID-19. There is evidence from the SARS epidemic that this was a cause of spread, and so it would be wise to take precautions.
- Faecal-oral.** SARS was spread via a defective sanitation system in at least one severe case. Maintaining water in toilet traps and making sure that toilet lids are closed before flushing is important.



### Workplace appeal

As restrictions are lifted and people return to work, some will look forward to the sense of community and social interaction, while others will have adapted to the convenience of working from home. Concerns about infection will remain for all, and offices will have to change to measure users.

Outside the office environment, for many it may be the fear of using packed public transport that affects their motivation to return to the workplace.

### Occupational densities

Office occupation (or at least headline occupancies) has become denser over the last 10 years or so. Desks have become smaller and more densely packed, so workers sit closer together, which is in conflict with expert advice for social distancing. Headline occupancy density – typically 8 m<sup>2</sup> per person – may decrease, and the trend to share desks may be reversed, with more desks being individually allocated to particular users.

Desk sharing results in many different workers using the same facilities – desks, seats, monitors, etc. More frequent and intense cleaning routines may be used to sanitise workstations before a new user takes over. This will require more frequent and intense workplace management. It is likely that desk-sharing ratios will be reviewed.

<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](http://www.gov.uk/phe)**

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