

INCLUSIVE ENVIRONMENTS
Stories of Inclusion
Access for All Children

THE ACCESS ASSOCIATION
Spring 2025 Seminar

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Clinically Vulnerable Families

Introduction



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Clinically Vulnerable Families

More than 1 in 10 children has an underlying condition which makes them Clinically Vulnerable

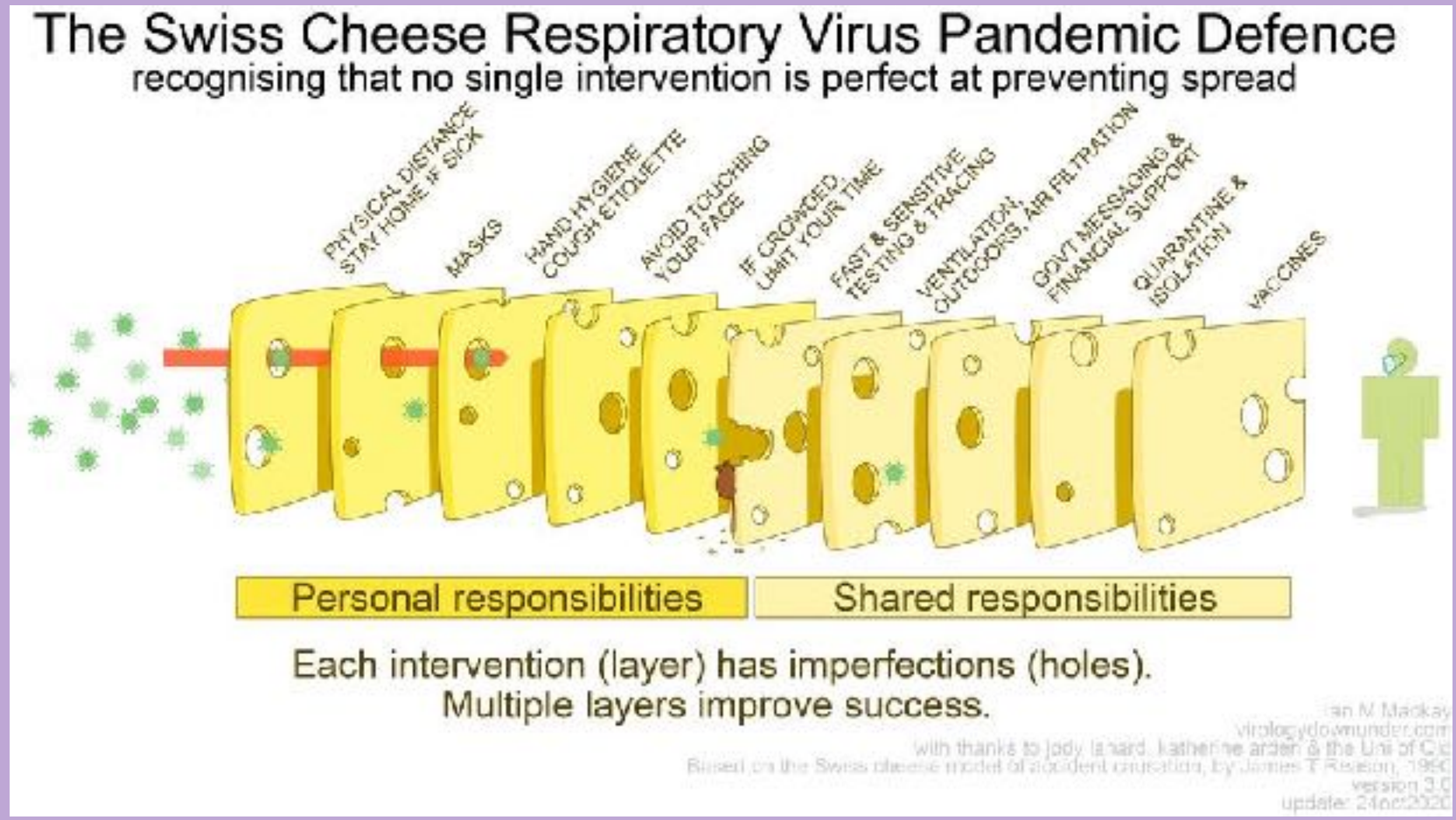
https://pmc.ncbi.nlm.nih.gov/articles/PMC9271837/



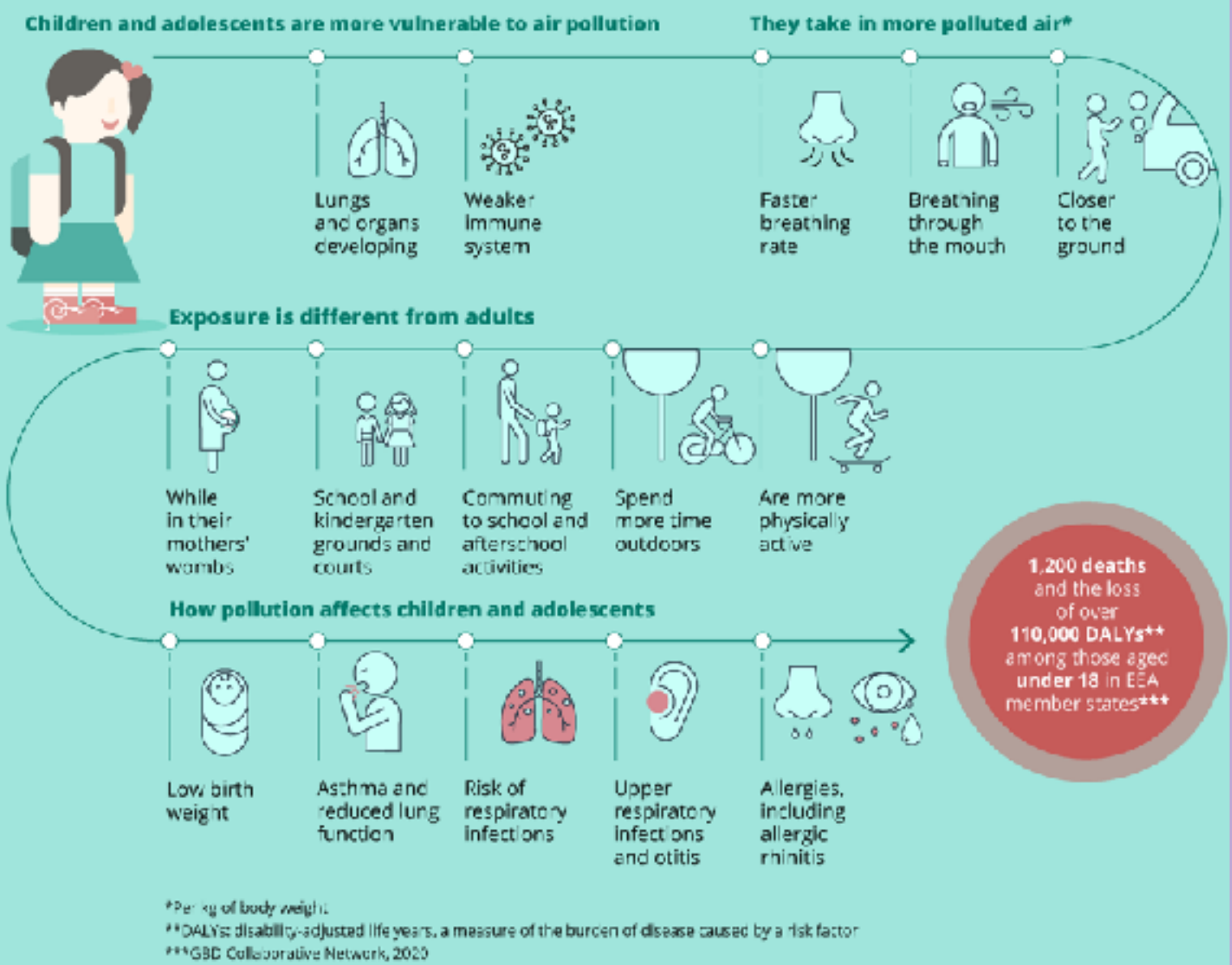
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Clinically Vulnerable Families

Layers of protection



The Link Between Air Quality and Health

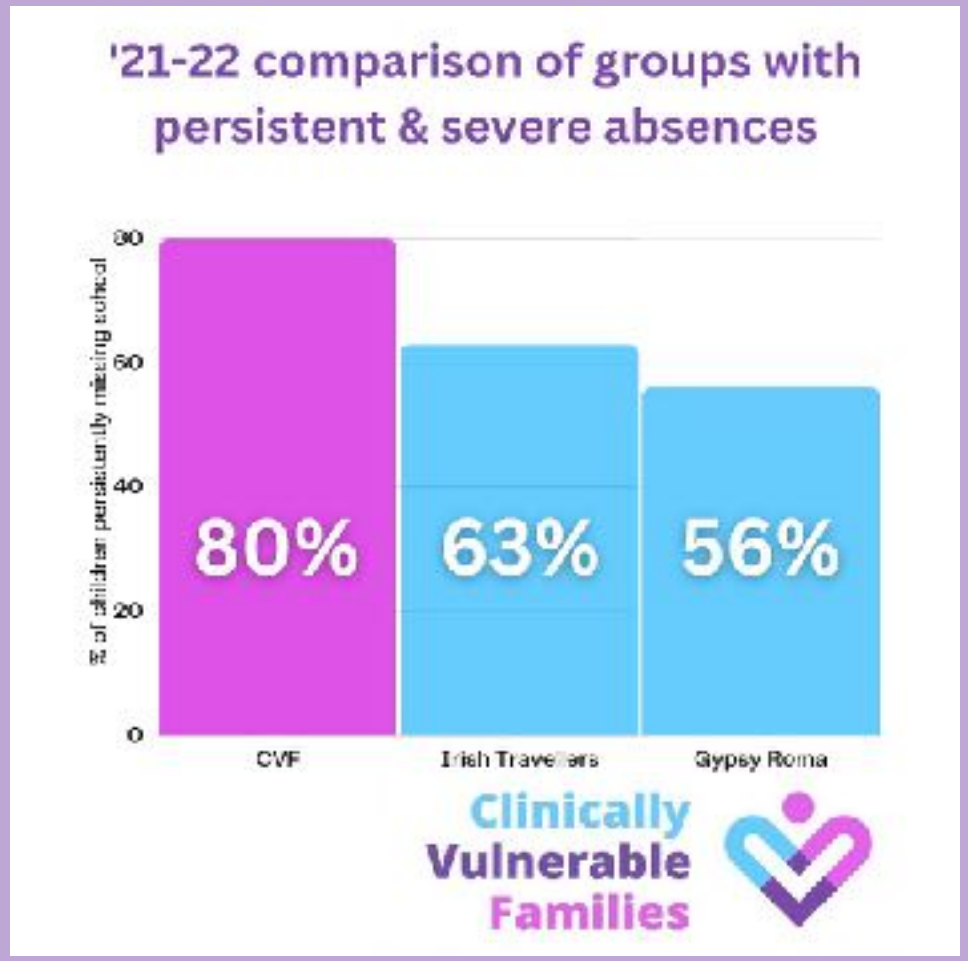


European Environment Agency

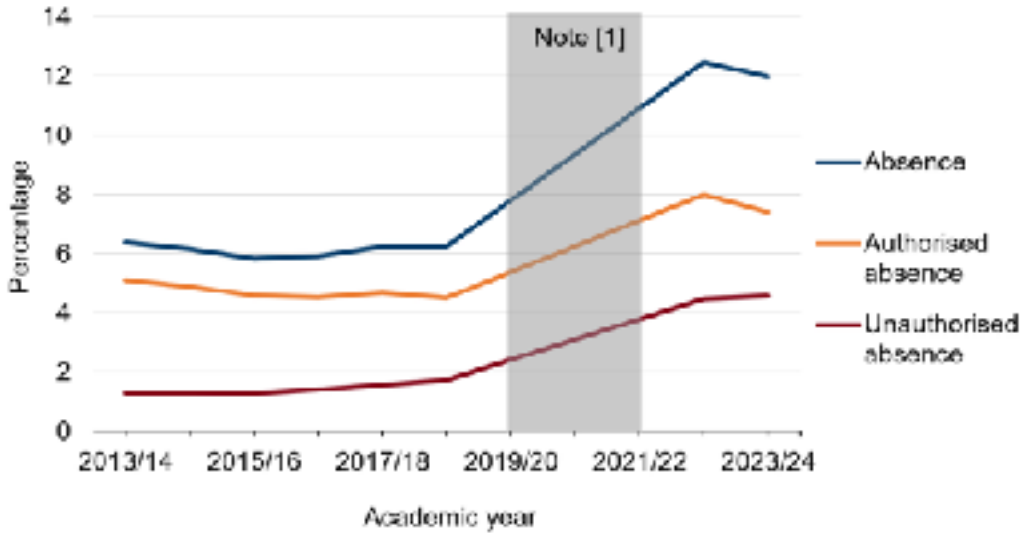
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Impact of infections on CV Children and School Attendance



Percentage of half-day sessions absent from school of secondary school-age pupils, 2013/14 to 2023/24



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Climate Change, Pollution, and Children's Health

Childhood Asthma Crisis: The UK has one of the highest rates of childhood asthma prevalence, emergency admissions, and deaths in Europe.

Health Inequality: Outcomes are significantly worse for children in the most deprived areas.

Schools and Air Pollution: 99% of UK schools are in areas with unsafe air pollution levels (PM2.5) according to WHO standards.

Long-Term Impact: Exposure to polluted air during childhood increases the risk of lifelong health conditions.

Sources: State of Child Health Report 2020 (RCPCH) Asthma & Lung UK

BB101 is Outdated

Mechanical ventilation

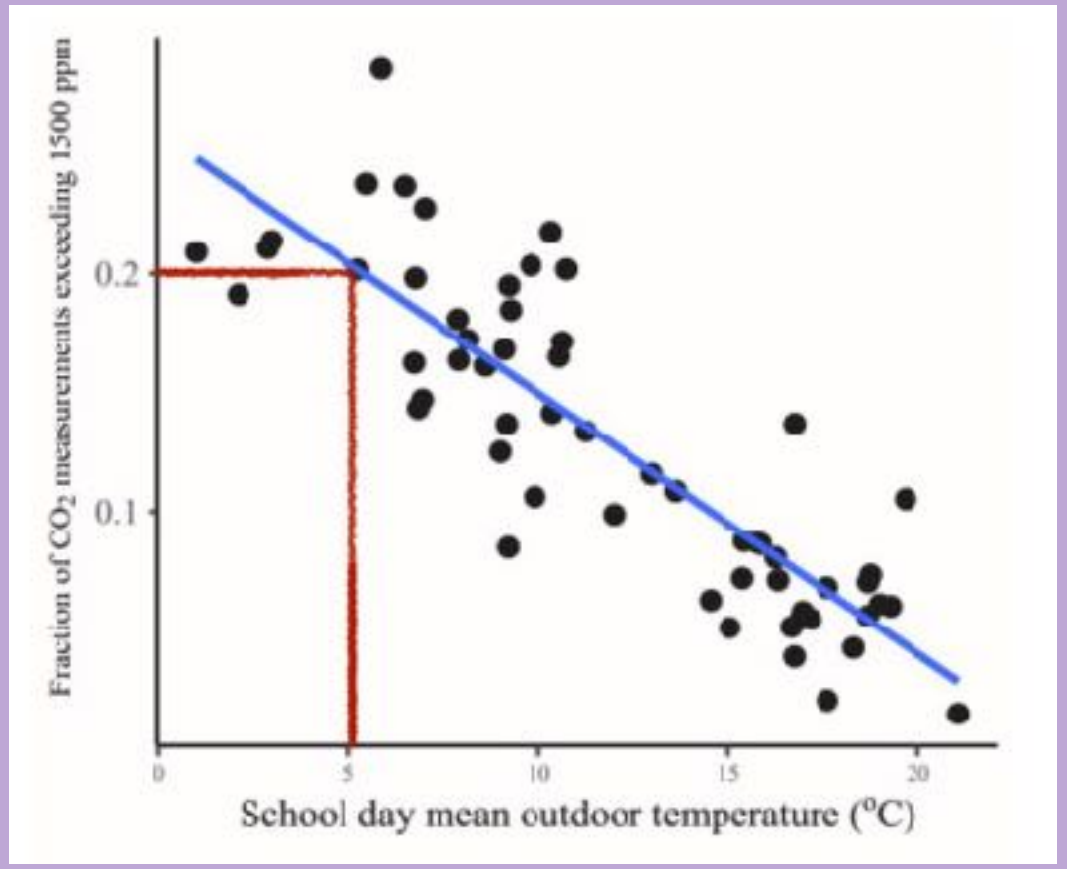
Mechanical ventilation is where the driving force for the supply of fresh air and/or extract of stale air is provided by a fan. In general teaching and learning spaces where mechanical ventilation is used or when hybrid systems are operating in mechanical mode, sufficient outdoor air should be provided to achieve a daily average concentration of carbon dioxide during the occupied period of less than 1000ppm, when the number of room occupants is equal to, or less than the design occupancy. In addition, the maximum concentration should not exceed 1500ppm for more than 20 consecutive minutes each day, when the number of room occupants is equal to, or less than the design occupancy.

Natural ventilation

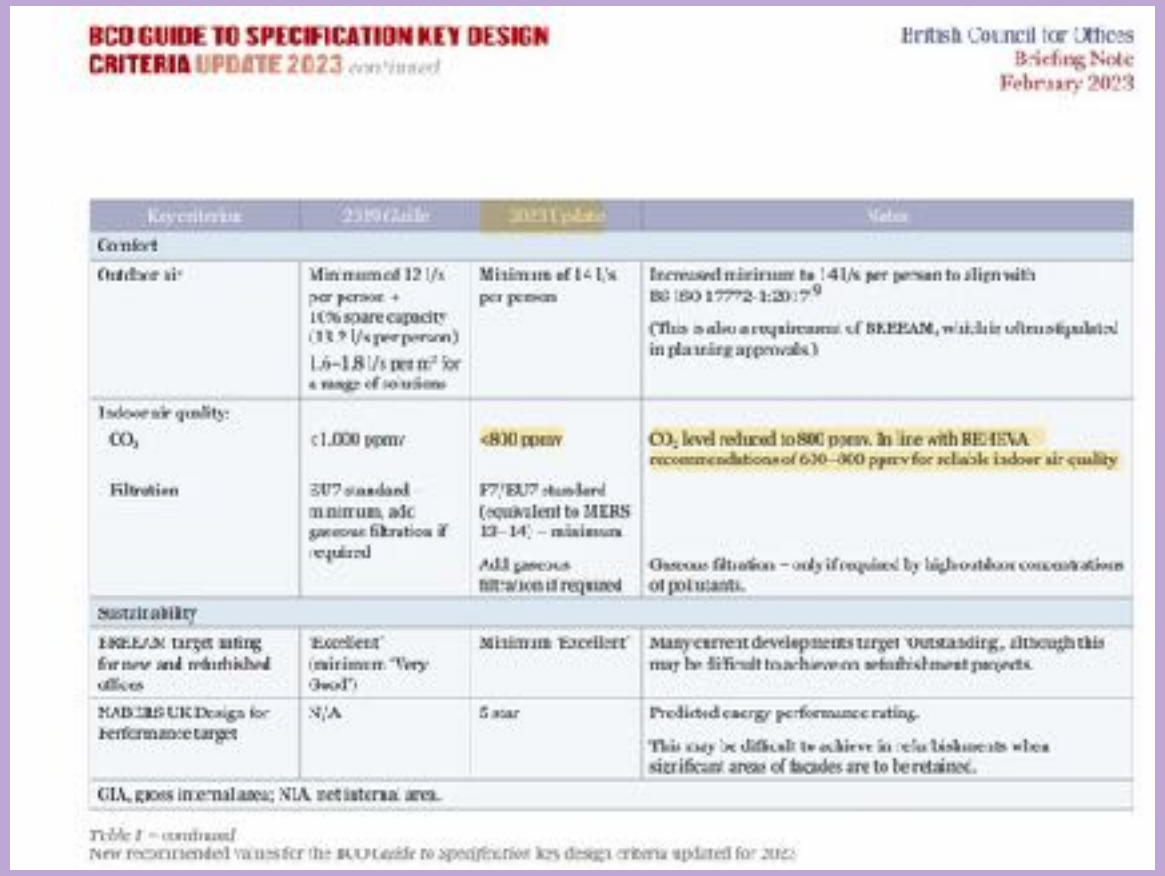
Natural ventilation is where the driving force for the supply of fresh air and extract of stale air is buoyancy and/or wind. In general teaching and learning spaces where natural ventilation is used or when hybrid systems are operating in natural mode:

a. Sufficient outdoor air should be provided to achieve a daily average concentration of carbon dioxide during the occupied period of less than 1500ppm, when the number of room occupants is equal to, or less than the design occupancy. In addition, the maximum concentration should not exceed 2000ppm for more than 20 consecutive minutes each day, when the number of room occupants is equal to, or less than the design occupancy; and

b. The system should be designed to achieve a carbon dioxide level of less than 1200ppm (800ppm above the outside carbon dioxide level, taken as 400ppm) for the majority of the occupied time during the year. This is the criterion for a Category II building in the case of a new building; or 1750ppm (1350ppm above the outside carbon dioxide level) for a category II building, in the case of refurbishment or remodelling (see next page for definitions of Category types).



BS 8300 Overlooks Ventilation – A Critical Gap in Inclusive Design



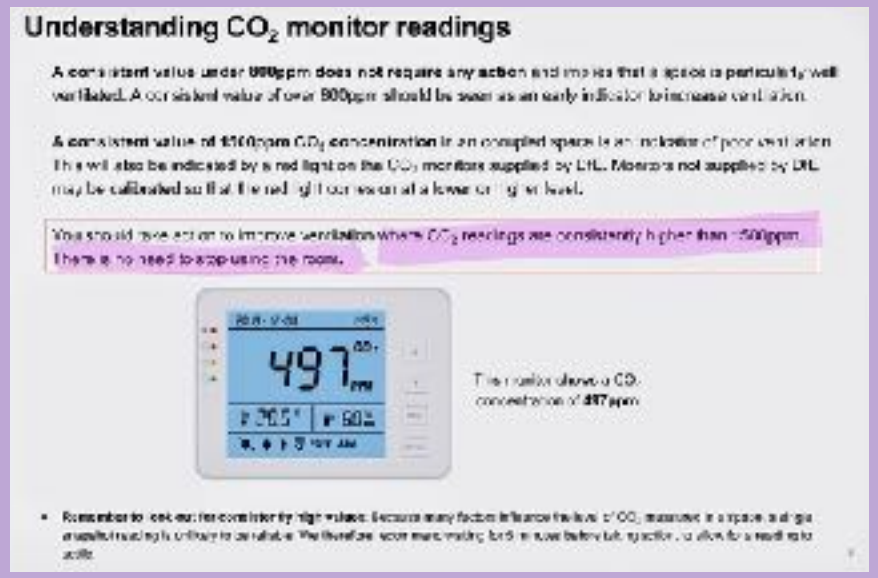
BCO GUIDE TO SPECIFICATION KEY DESIGN CRITERIA UPDATE 2023 *continued*

British Council for Offices
Briefing Note
February 2023

Key criterion	2019 Guide	2023 Update	Value
Comfort			
Outdoor air	Minimum of 12 l/s per person + 10% spare capacity (13.2 l/s per person) 1.6–1.8 l/s per m² for a range of scenarios	Minimum of 14 l/s per person	Increased minimum to 14 l/s per person to align with BS ISO 17772-1:2017[9] (This is also a requirement of BREEAM, which is often applied in planning approvals.)
Indoor air quality: CO_2	c1,000 ppm	<800 ppm	CO_2 level reduced to 800 ppm, in line with REHVA recommendations of 600–800 ppm for reliable indoor air quality
Filtration	ISO7 standard minimum, add gaseous filtration if required	F7/ISO7 standard (equivalent to MERS 13–14) – minimum Add gaseous filtration if required	Gaseous filtration – only if required by high outdoor concentration of pollutants.
Sustainability			
BREEAM target rating for new and refurbished offices	'Excellent' (minimum 'Very Good')	Minimum 'Excellent'	Many current developments target 'Outstanding', although this may be difficult to achieve on refurbishment projects.
NABERS UK Design for performance target	N/A	5 star	Predicted energy performance rating. This may be difficult to achieve in refurbishments when significant areas of facades are to be retained.

GIA, gross internal area; NIA, net internal area.

Table 1 – continued
New recommended values for the BCO Guide to specification key design criteria updated for 2023



Understanding CO_2 monitor readings

A consistent value under 800ppm does not require any action and implies that a space is particularly well ventilated. A consistent value of over 800ppm should be seen as an early indicator to increase ventilation.

A consistent value of 1500ppm CO_2 concentration in an occupied space is an indicator of poor ventilation. This will also be indicated by a red light on the CO_2 monitor supplied by DRL. Monitors not supplied by DRL may be calibrated so that the red light comes on at a lower or higher level.

You should take action to improve ventilation where CO_2 readings are consistently higher than 1500ppm. There is no need to stop using the room.

The reading shows a CO_2 concentration of 497ppm

- Remember to ignore inconsistently high values. Because many factors influence the level of CO_2 measured in a space, a single unqualified reading is unlikely to be reliable. We therefore recommend waiting for 5 minutes before taking action, to allow for a result to settle.

School Maintenance



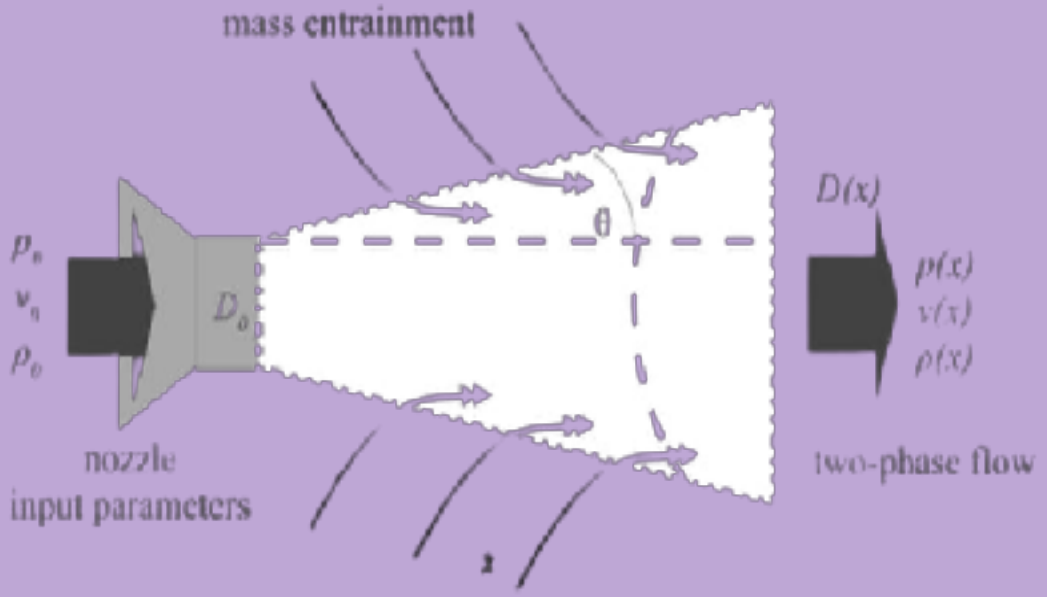


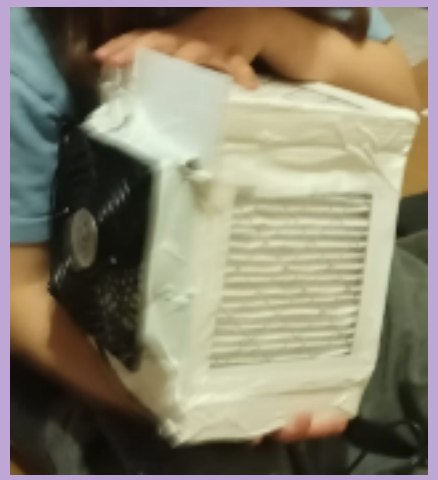
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Case Studies







Introduction

Strategies for Implementing Inclusive Design

•Practical approaches to incorporating inclusive design principles that ensure clean air and accessibility for all children.

- Examples include upgrading ventilation systems, using air purifiers, and selecting building materials that do not emit harmful pollutants.

Source: The Lancet COVID-19 Commission Task Force on Safe Work, Safe School, and Safe Travel

Benefits of Improved Air Quality

Test Scores & Health Outcomes	Ventilation Renovations & Measurements	Findings
↑ Test scores	Ventilation renovations were completed to improve IAQ in all school buildings within a single Texas school district.	Maths and reading test scores significantly improved, with an increased probability of passing by 2% and 3%, respectively.
↑ Cognitive function	CO_2 concentrations were measured as a proxy for ventilation rates in classrooms.	Cognitive testing of students shows a 5% decrease in "power of attention" in poorly ventilated classrooms, equated to the effect of skipping breakfast.
↑ Maths, reading, and science scores	Classroom ventilation rates were measured in 140 fifth-grade US classrooms.	Mean mathematics scores increased by up to 0.5% per each liter per second per person increase in ventilation rate, with similar effects on reading and science scores.
↓ Asthma symptoms	Exposure factors were measured in 100 primary and secondary school classrooms with and without new ventilation systems.	Pupils who attended schools with new ventilation systems reported fewer asthmatic symptoms.
↓ Respiratory symptoms	Over 4,000 sixth graders from 297 schools participated in a survey of indoor environmental quality in schools.	Lower ventilation rates, moisture, and dampness were all independently associated with a higher incidence of respiratory symptoms. Inadequate ventilation was also associated with more missed school days.
↓ Missed school days (child absenteeism)	Increased ventilation rates and child sick days were studied for 635 children attending 20 daycare centers in Denmark.	A 12% decrease in sick days was found per hour increase in air exchange rates.
↓ Missed school days	CO_2 as a proxy for ventilation was studied in 60 naturally ventilated primary school classrooms in Scotland.	For each 100 ppm increase in time-average CO_2 concentration, student attendance decreased by about 0.4 days per year.
↓ Sickness absence	CO_2 concentration was measured continuously over two years in 162 US primary school classrooms with a mixture of mechanical and natural ventilation.	For each 1 L/s (2.2 cfm) per occupant increase in ventilation rate, illness absence decreased by 1.6%.

Recommendations and Advocacy