

COVID SAFE SCHOOLS

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COVID-19 is airborne, so it's preventable.

Ensuring the supply of clean air will reduce the transmission of COVID-19, and other airborne diseases, such as chickenpox, influenza, measles, whooping cough and RSV.

What we know about airborne transmission:

- COVID-19 is almost always transmitted by breathing infected air [vii]
- Good **ventilation** (fresh air) reduces risk of infection by 50% or more [vii], [viii]
- Wearing N95 or P2 **masks** reduces risk of infection by 50% or more [ix]
- Suitable air **purifiers** (also called HEPA filters), reduce risk 50% or more [x]
- Combining safety measures multiplies the protection dramatically. [xi]

*COVID-19 is airborne,
so it's preventable.*

The Latest Science on Omicron & Children

- For children, two doses of a COVID-19 vaccine is about 12% effective in preventing Omicron infection and 48% effective in preventing hospitalisation or death. [i]
- RATs fail to detect Omicron up to 40% of the time. [ii]
- PCR testing fails to detect Omicron approximately 12% of the time. [iii]
- About 50% of children with Omicron have no symptoms. [iv]

Air is everywhere...

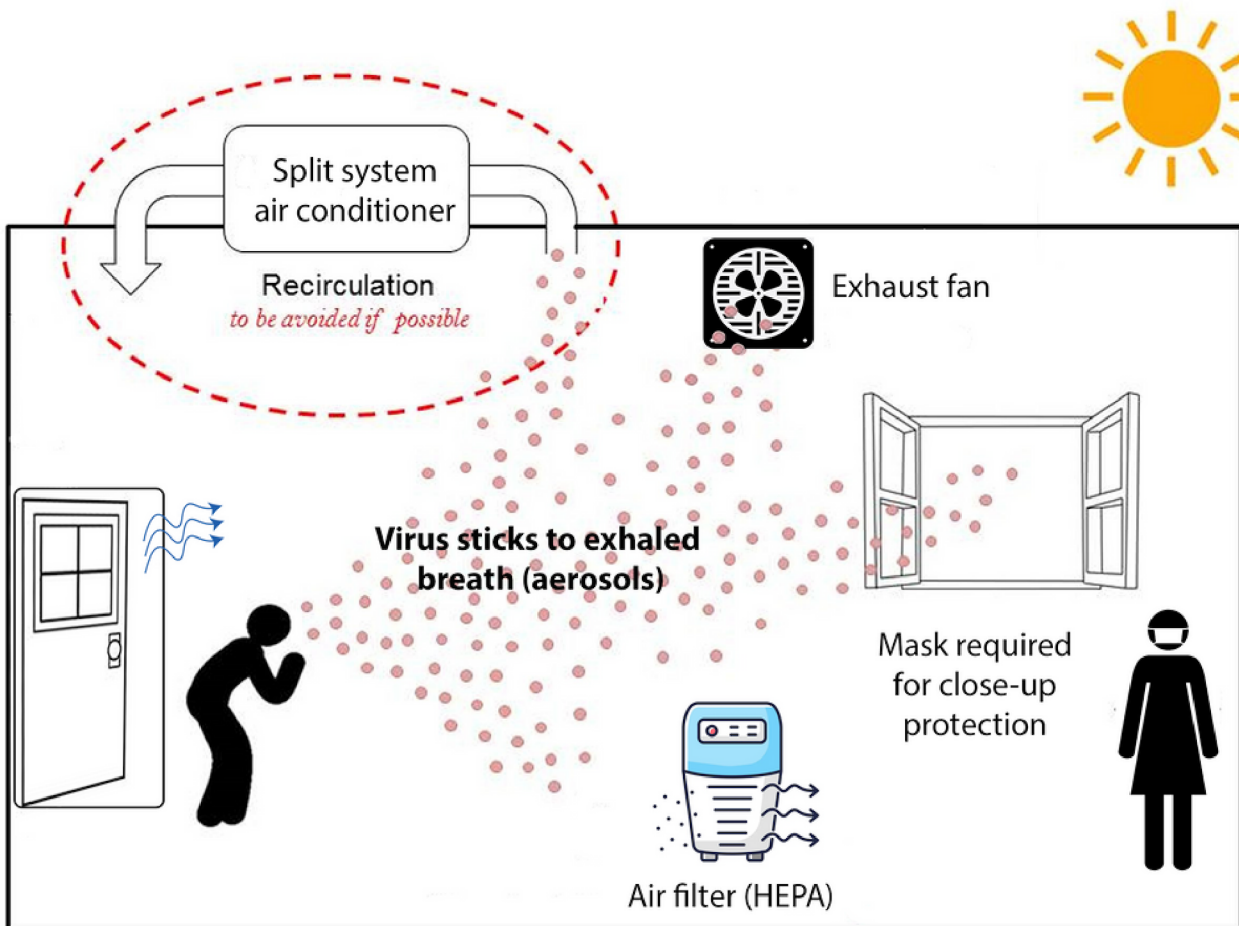
Maximising airflow and maintaining air quality indoors plays a critical role in protecting health, well-being and containing airborne transmission.

- More ventilation = Less spread of airborne disease
- Dilute contaminated indoor air by introducing clean air from outside
- Replacing the air in the room 6 times an hour is recommended [xii] (6 ACH or Air Changes per Hour)
- Filter contaminated air to remove exhaled disease-carrying vapour (aerosols)
- Wear well-fitting masks for extra protection, especially when an infected person is very close. Cloth masks are not very effective, blue "surgical" masks are a bit better. Ideally use P2, N95 or equivalent respirators [xiii]
- Regularly monitor indoor CO2 levels to warn of dangerously poor air quality

The Latest Science on Omicron & Children (cont)

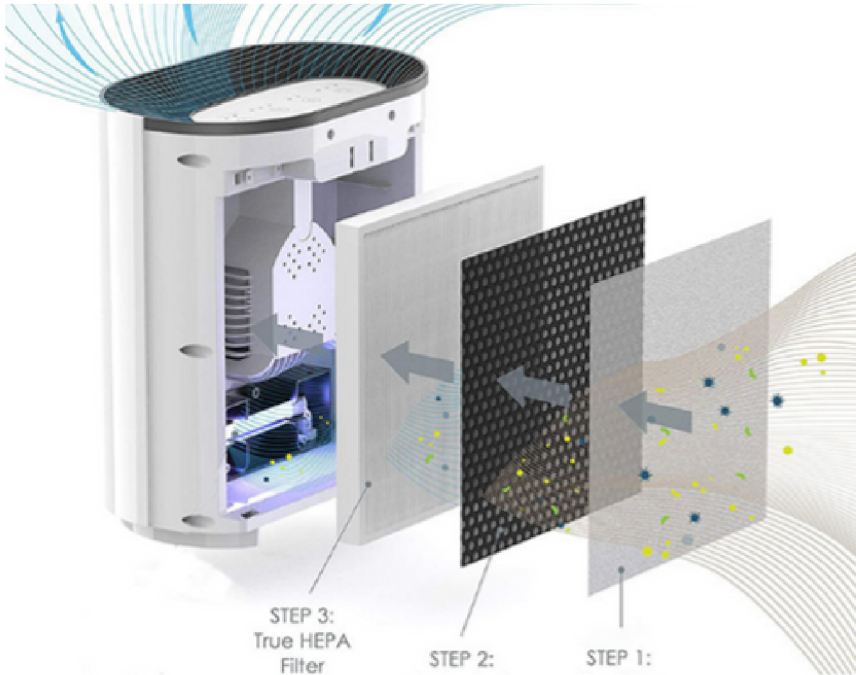
- Infection does not provide lasting immunity- reinfection within weeks is becoming common. [v]
- Most children appear to recover quickly from COVID-19 but some will become ill enough to require hospital treatment.
- COVID-19 can affect a child's heart, lungs, kidneys, brain, skin, eyes, or gastrointestinal organs, even if the child had mild symptoms.[vi]

Below: An overview of methods of air management and control



Portable Air Purifiers

High quality air purifiers use HEPA (High Efficiency Particulate Air) filters to trap the aerosol that carries the virus through the air. They often include a carbon filter to absorb certain gases and odours.

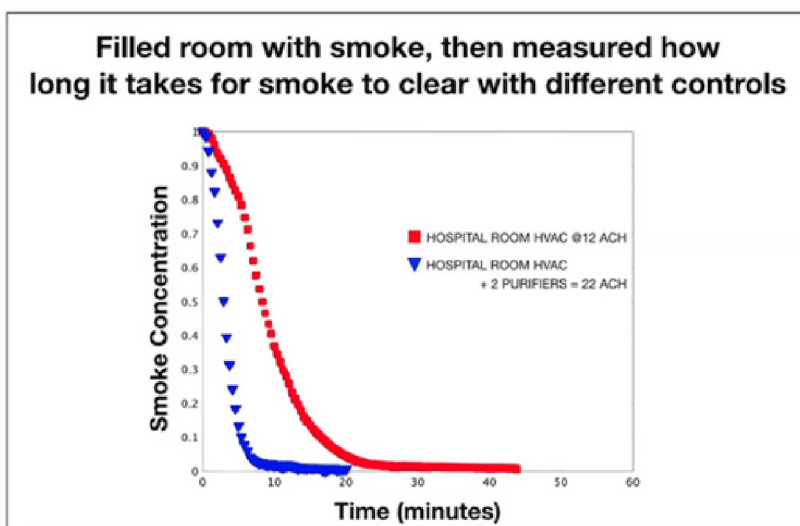


For optimal results:

- Purifiers should operate continuously, on the highest speed that is not too noisy. See "Other Considerations" to the right.
- Do not use 'automatic' settings that turn down the speed when the air is 'clean'.
- Purifiers should be used in addition to good ventilation, not as a substitute.

This diagram below shows how the air is cleared 4 times faster when 2 purifiers are put in a well-ventilated room.

<https://health.westlab.com/webinar/winter-is-coming-webinar/replay>



With air purifiers (blue), smoke gone in minutes

Advantages of HEPA filtration

- Low cost to run. Unlike air conditioners or heaters, their energy consumption is quite low.
- Multiple units also helps prevent 'dead spots' of stagnant air in the room.
- Correct choice and use of air purifiers can significantly reduce risk of COVID-19 transmission. [xii]

Other Considerations

- Purifiers can be noisy at full speed, however, using multiple units running at around half speed is much quieter, as well as more effective if placed correctly.
- Air quality indicators on purifiers do not tell us anything about levels of airborne COVID-19 present.
- Make sure the air purifier has sufficient Clean Air Delivery Rate (CADR) to filter all the air in the room 6 times per hour.
- Example: Room is 10 x 7 m 2.4 m ceiling = 168 m³. Need CADR 1,008 m³ per hour. Chosen purifier has Clean Air Delivery Rate 545m³ /hr so you need at least 2 running full speed. Use 3 or 4 not running at maximum to reduce noise.



CO₂ Monitoring

High levels of CO₂ are a sign of poor ventilation, which means high risk of virus transmission[xlii] as well as poor concentration, headaches, drowsiness.



CO₂ monitoring tips

- Most CO₂ monitors can be set to beep if the level gets too high. Warns you of danger, like a smoke alarm warns of fire.
- Beware of cheap (less than \$100) monitors. Look for ones that use NDIR sensors as other types are unreliable.
- Monitoring in real-time lets you know when you need to do more to improve airflow
- CO₂ monitors do not tell us the actual levels of airborne COVID-19 present but by proxy indicate COVID-19 concentration levels may be unsafe.

What we know about CO₂ monitoring:

- CO₂ monitors are small devices which display the CO₂ concentration in ppm (parts per million).
- Fresh air reads about 400 ppm. Keeping CO₂ below 800 ppm is considered best practice.
- If the CO₂ gets above 800 ppm, it's time to increase ventilation. At 2,800 ppm, the risk of transmission of COVID-19 triples.[xv]
- Reducing CO₂ levels can also improve concentration and cognitive abilities and provides a better learning environment for students. [xiv]
- A pocket-sized CO₂ monitor with Bluetooth capabilities such as the Aranet 4 (shown above) can operate on one battery for up to 4 years.

Improving CO₂ levels provides a better learning environment for students

Air Conditioners & Fans

HVAC (Heating, Ventilation & Air Conditioning) systems bring in fresh air and remove stale air. These ducted systems are more complex and expensive but provide reliable ventilation when designed and operated properly.



What we know about mechanical ventilation:

- Ceiling or wall fans within a room have an unpredictable effect on aerosol transmission and may not always be the best option for improving airflow.



- 'Split system' air conditioners recirculate air in the room and do not bring in fresh air to dilute virus-laden aerosols.
- The suitable ACH rate (Air Changes per Hour) will vary depending upon the density of occupation and the physical demands of the activity undertaken by the occupants. 4 to 6 ACH is recommended. [xii]

Increasing fresh airflow helps to disperse infectious aerosols

Advantages of portable fans



- Fans placed at external doors or windows which blow air into or out of a room increase ventilation and disperse infectious aerosols.



Case Study

How Brisbane Independent School prevented outbreaks of COVID-19, despite Omicron wave

By Janelle Miles and Ciara Jones 1st April 2022

<https://www.abc.net.au/news/2022-04-01/brisbane-school-no-covid-omicron-outbreaks-term-1/100956850>



George Roff was part of a dads' working group at the school who used science and engineering knowledge to prevent the spread of COVID-19.

A small primary school in Brisbane's west has done what many others have been unable to achieve during COVID-19's Omicron wave in Queensland: remain outbreak-free.

And it's all a result of a group of dads at the Brisbane Independent School in Pullenvale getting together with the principal and using science and engineering knowledge to prevent SARS-CoV-2 — the virus that causes COVID-19 — spreading through classrooms.

George Roff, a Brisbane scientist who specialises in marine ecology, said the working group — including an engineer and a medical specialist — started discussing ways of stemming the spread of COVID-19 through the 71-student school in December, after Queensland's interstate borders reopened.

Using a smoke machine, they studied airflow patterns in the school's five classrooms and administration areas. Carbon dioxide meters were also used to identify low-ventilation areas or "dead spots".

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ABC NEWS

Key Story Points:

- Using a smoke machine, a group of dads studied airflow patterns in the school's five classrooms and administration areas
- Their goal was creating clean-air classrooms at the school to minimise the risk of COVID-19 transmission
- An air quality expert says she is impressed by the working group's innovation and methodology



Case Study (continued)

NEWS

They then purchased air purifiers — known as high-efficiency particulate absorbing (HEPA) filters — to mitigate the risk from SARS-CoV-2 particles that might be circulating in classrooms and other indoor areas of the school.

Although one teacher and up to two students in most, but not all classes, have had COVID-19 during Queensland's rampant Omicron wave, no in-school transmission has been identified.

"Our goal in creating clean-air classrooms at the school was to minimise this risk of transmission within the community," Dr Roff said.



The school in the western suburbs of Brisbane managed to avoid any COVID-19 outbreaks in early 2022.

Lack of guidance on preventing COVID-19 spread a concern for parents

Medical specialist Jay Mueller, who was part of the working group, said he was concerned about the lack of guidance about how to make schools safe from COVID-19 transmission.

"The narrative that's been proposed is, 'You don't need to worry about kids because it's benign in kids', which I don't think is totally true," Dr Mueller said. "COVID is not as bad in kids as it is in adults, but that doesn't mean it's still good. It has worse outcomes than plenty of other diseases for which we are very, very careful.

"Kids may not get sick and end up in hospital as often but they have to live with the long-term effects of COVID.

"The body of evidence that continues to accrue is that they're going to be less healthy as a result of having had COVID than they would be had they not.

"To me, the idea of having kids have multiple COVID infections was not acceptable."

Dr Mueller is a member of OzSage, an independent scientific advisory panel that came together during the pandemic to provide expertise on ways to reduce virus transmission.

"The big crisis of COVID will be borne in terms of long-term health outcomes and system strain for healthcare," he said.

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Case Study (continued)

NEWS

"If you get COVID, your risk in the 18 months following that COVID infection of having a vascular event — like a stroke or a heart attack — is several times higher than it was before.

"There is no scenario in which it becomes less transmissible.

"The only scenario is that we provide environments where the virus can't transmit and that's using basic principles of public health and physics to make that not possible.

"If you do that, then you can relieve the anxiety and constant worry people have about acquiring the virus and transmitting it to vulnerable loved ones."

Brisbane Independent School principal Lachlyn Bowie said she was grateful for the expertise of the working group in approaching the issue of COVID-19 mitigation scientifically.

"At the end of the day, this is about health and safety," Mrs Bowie said. "We're trying to protect our students and staff.

"Considering the number of cases that are happening in other schools, where there's a lot of cases in every single classroom, that's certainly not our experience."

Expert impressed by group's innovation

QUT air-quality expert Lidia Morawska said she was impressed by the working group's innovation and methodology.

"It's prevented their children from being infected and demonstrated to the whole of Queensland, and beyond, how important it is," Professor Morawska said.

"Air quality, and what's in the air, is important not only because of infection transmission but because we need clean air in classrooms so our kids' breathe clean air."

Queensland Health data shows that, in the seven days from March 23 to 29, as many as 19,615 school-aged children tested positive for COVID-19.

Independent Education Union Queensland and Northern Territory branch secretary Terry Burke said schools had been under significant pressure this term due to COVID-related staff shortages and student absences.

"There are some schools where a third of the staff have had to be away, as have been a third of students," Mr Burke said.

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Case Study (continued)

NEWS

"Unsurprisingly, a number of schools have brought back masks as a requirement to try to contain the outbreaks."

Mr Burke said a relief teacher shortage had made it difficult to fill gaps in the school workforce.

"We've certainly noticed a lot of relief teachers [who] have decided they no longer wish to do relief teaching and have basically made themselves unavailable — that's made it harder for schools," he said.

"It's perhaps a longer-term issue — that many staff are now questioning whether this is the career for them."

"If it's this tough, they're not too sure that they want to persist with it." Mr Burke said COVID-19 vaccination rates in school-aged children needed to improve ahead of term two.

Federal Health Department data shows Queensland continues to lag behind other states and territories in relation to COVID-19 vaccination in children.

Just 22.3 per cent of Queensland's five to 11-year-olds have received two doses of a COVID-19 vaccine and 71.64 per cent of 12 to 15-year-olds.

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- [ii] <https://www.smh.com.au/national/experts-urge-caution-on-rat-accuracy-as-watchdog-probes-test-kit-complaints-20220203-p59tgj.html>
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- [iv] <https://www.cdc.gov/mmwr/volumes/71/wr/mm7111e1.htm>
- [v] <https://www.smh.com.au/national/nsw/only-had-it-seven-weeks-ago-more-people-report-covid-19-reinfection-20220328-p5a8j5.html>
- [vi] <https://www.dicardiology.com/videos/video-overview-multisystem-inflammatory-syndrome-children-mis-c-covid-19-exposed-children>, <https://www.niaid.nih.gov/diseases-conditions/long-covid-multisystem-inflammatory-syndrome-children-misc>
- [vii] <https://theconversation.com/heres-where-and-how-you-are-most-likely-to-catch-covid-new-study-174473>
- [viii] <https://www.reuters.com/world/europe/italian-study-shows-ventilation-can-cut-school-covid-cases-by-82-2022-03-22/>
- [ix] https://www.cdc.gov/mmwr/volumes/71/wr/mm7106e1.htm?s_cid=mm7106e1_w
- [x] <https://doi.org/10.1101/2020.10.02.20205633>
- [xi] For example, combining ventilation and filtration reduces risk 25 fold.
- [xii] <https://cleanairstars.com/hepafilters/> or <https://sgeas.unimelb.edu.au/engage/guide-to-air-cleaner-purchasing>
- [xiii] <https://www.theguardian.com/australia-news/2022/jan/11/respirators-or-cloth-an-australian-guide-to-face-masks-in-the-age-of-omicron>

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