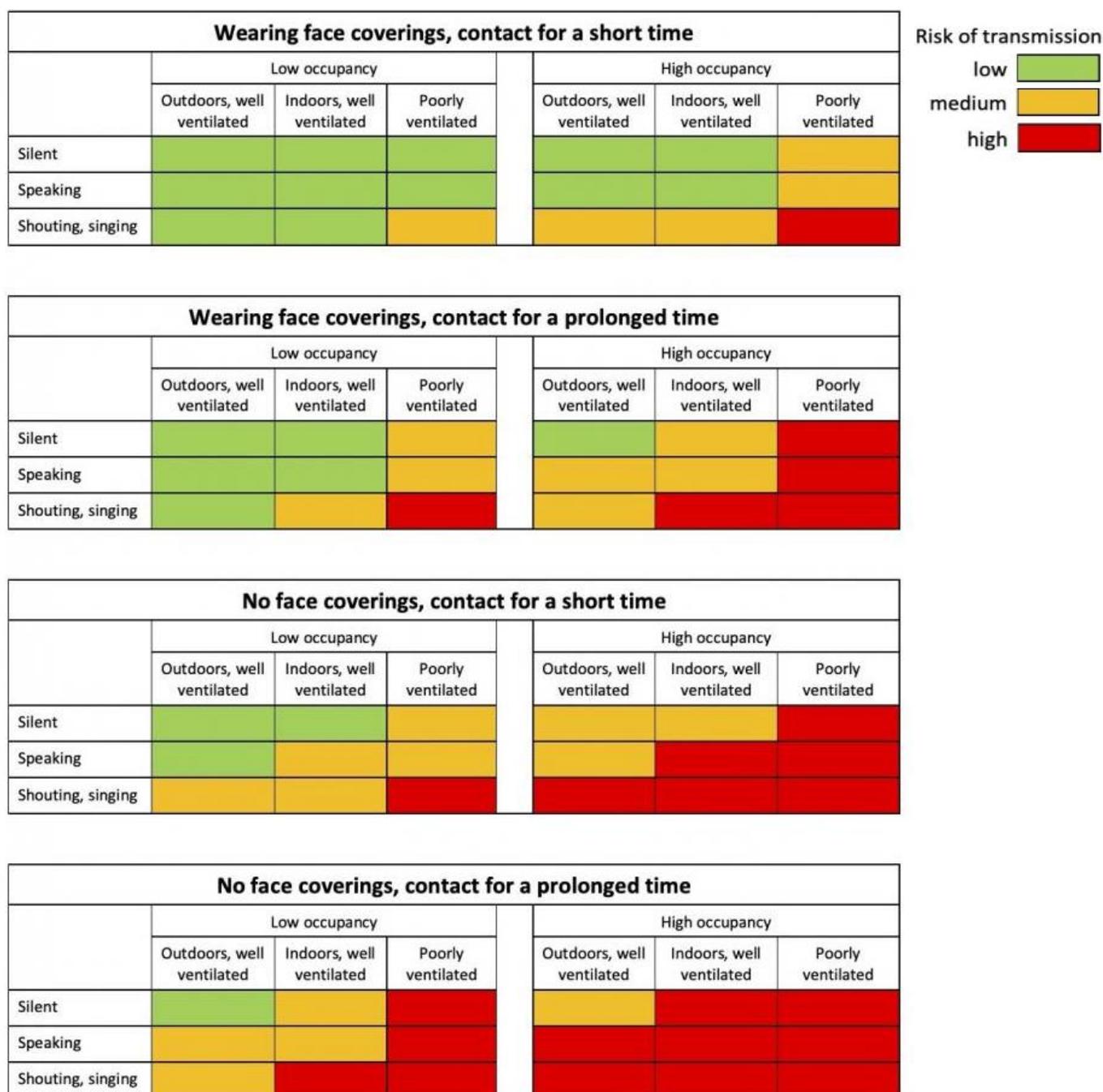


## The Independent SAGE Practical Guide to Creating Safer Air to Reduce COVID-19 Transmission

We can adapt our behaviours and environments to protect ourselves and others using the tools we have learned work to reduce COVID-19 transmission. As mandatory restrictions lift, these adaptations are increasingly important for protecting the most vulnerable in society, particularly as COVID-19 transmission remains high in schools and millions return to indoor workplaces.

We know that COVID-19 [travels through the air, spreading and collecting, especially indoors, similar to cigarette smoke](#). This means that talking, singing or simply breathing can transmit COVID -19 to other people in the same space. Figure 1 shows how [different environments and personal protective measures affect this build up and risk of transmission](#), with busy, poorly ventilated environments among those with the highest risk. This model has recently been [supported by published quantitative analysis](#).

Figure 1 – Risk of SARS-CoV-2 transmission in different settings: considering only asymptomatic individuals



When Covid transmission is high in your community, it makes sense to avoid “red” situations as much as possible. While many people might have little control over their work or commuting environments, we can nonetheless reduce our risk. [A combination of approaches is recommended to keep in the green or amber risk zones](#), meaning we should continue to do the following as far as we can while infections are high:

- Meet outdoors or indoors only where there is good ventilation and/or air purification.
- Mix with fewer people while indoors
- Reduce the time spent indoors when with other people
- Wear high-quality, well-fitting (FFP2) masks when inside
- Avoid shouting, singing or heavy exercise indoors with other people

The practical guide at the end of this document provides one page of summary advice on measures you can take to protect yourself and others.

## Summary

There are many ways we can adapt our behaviours and environments to reduce transmission of coronavirus and limit its spread. While many environments might be out of our control, we nonetheless can reduce our risk and risk to others. [The more steps we take, the greater protection to ourselves and others](#).

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## Thank you to contributing academics Prof Trish Greenhalgh and Dr Adam Squires

With thanks to Professor Trish Greenhalgh (University of Oxford) and Dr Adam Squires (University of Bath) who joined [Independent SAGE’s Friday Briefing on 4 February 22](#) to discuss their work and advice on clean air, and to Oliver Day (University College London) who produced the first draft document on the basis of that discussion. Icons on the Practical Guide are from [The Noun Project](#).

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## Supplementary Resources

Other useful checklists, assessments and guides include:

- [UK Health & Safety Executive classroom workplace assessment](#)
- [Irish Health & Safety Authority checklist](#)
- [Scores on the Doors](#) Information, Communication & Certification programme – in pilot.

## Examples of products (masks, CO<sub>2</sub> monitors, HEPA filters)\*

Masks (FFP2/3 or N95) are available [online and at many high street stores for £1-£2 per mask](#).

- [FFP 3](#)

Government-approved / purchased CO<sub>2</sub> monitors:

- SA1300P ([product information](#) and [video guide](#))
- DT 326 ([product information](#) and [video guide](#))
- GS241T ([product information](#) and [video guide](#))
- DT-182D ([product information](#) and [video guide](#))

Example HEPA filter models:

- Totalclean AP25 - [£100](#)
- LEVOIT LV-H133 - [£200](#)
- Dyson Pure Cool Me - [£300](#)
- Dyson Purifier Hot+Cool™ Formaldehyde - [£600](#)
- Camfil City M Air Purifier - [£1,700](#)

\* NB: these are example products, rather than recommendations

## 1. Wear a mask



A well-fitted, high filtration (FFP2 Europe or N95 in USA) can stop -95% of coronavirus particles entering your body and the surrounding environment. They are more effective than other types of mask and can be reused for several weeks. Wearing a mask also demonstrates that you care about others when in large indoor settings, especially settings with poor ventilation.

## 2. Ventilate the air



One of the best ways to reduce transmission is by investing in cleaner air indoors. **Clean air ventilation** dilutes air indoors with fresh air from outdoors. This reduces build-up of exhaled air (and so COVID-19), therefore reducing transmission. Most UK schools, for example, are already opening windows/internal doors periodically throughout the day and many also have mechanical ventilation in place. Any ventilation measures should be coupled with CO<sub>2</sub> monitors to assess for build up of stale air. The Department for Education has recently purchased 300,000 CO<sub>2</sub> monitors for schools. At -£120 each, these may be suitable for some private citizens wishing to monitor CO<sub>2</sub> levels at home or in other spaces. The amount of ventilation through windows varies a lot depending on the weather, increasing when it's cold or windy outside, so monitors help check you're getting enough fresh air while keeping the room comfortable. Where monitors consistently show CO<sub>2</sub> at red/dangerously high levels, indicating stale air accumulation, further protective measures should be implemented to prevent COVID-19 transmission.

## 3. Filter the air



Where ventilation cannot achieve fresh enough air, you can try HEPA ("High Efficiency Particle Air") filter units that remove the respiratory aerosol particles (which can contain COVID-19) from the air. Each HEPA unit blows out a certain amount of clean, filtered air (known as the "Clean Air Delivery Rate", CADR). Adding more units provides more clean air, just like opening more windows. This [online calculator](#) will tell you how much clean air in total you will need (based on recommendations from [Unison and HSE](#)), if you know either the size of the room, or the number of people you expect it to hold. The [online calculator](#) will also suggest sets of commercial HEPA units from different companies that can deliver the required amount of clean air. Using more than the suggested HEPA filters will further lower covid risk. If you can't meet the recommended HEPA filtration, any filtration is still better than none, but then consider further mitigations such as distancing.

## 4. Physically distance



Keep physical or 'social' distancing as well as ventilation / HEPA indoors, especially if unmasked. This distance avoids breathing directly into the other person's face, where room ventilation and filtration are less effective.

## 5. Test regularly, get vaccinated, and get boosted

