

## Face coverings for self-protection

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**COVID-19 Actuaries Response Group – Learn. Share. Educate. Influence.**

### Summary

When the wearing of face coverings in shops became mandatory in UK on 24 July 2020, there was no specific requirement other than coverage of mouth and nose. The purpose was to protect others. No minimum quality was stipulated; improvised face coverings were acceptable. Moreover, general use of the highest quality medical PPE masks was discouraged, as this would have reduced their availability for frontline healthcare workers.

One year on, supply is no longer a practical issue, but cost is a factor. Following easing of restrictions on 19 July 2021, there is more individual choice over face masks. This choice is not simply binary: to wear a face mask or not in a particular setting. The quality of face mask might be upgraded according to a personal wish for gaining self-protection. As general usage of face coverings declines, there may be an increased demand for FFP3 masks which offer a degree of self-protection in specific high-risk settings.

The legal requirement to wear a face covering in English shops, public transport and other enclosed public spaces ended on 19 July 2021. After then, the Prime Minister has said it becomes a matter of personal responsibility. The Health Secretary, Sajid Javid, has qualified that, unless exempt, it is expected and recommended that people wear face coverings in crowded indoor settings like public transport.

During the first wave of the pandemic, wearing face coverings was not mandatory. The argument against their use was that homemade masks would be many times less effective than medical masks at preventing the wearer from transmitting the virus – and of little use in protecting the wearer themselves. There was also a practical concern that a sense of false confidence given by using a mask might lead to greater individual risk-taking. Additionally, the public were discouraged from procuring surgical or respirator masks on the grounds that healthcare professionals were finding PPE hard to source and such action might deprive healthcare workers of essential protection, and drive up NHS procurement costs.

With the gradual reopening of public areas following the first pandemic wave, the wearing of face coverings in shops and supermarkets became mandatory on 24 July 2020. The previous month, they had become mandatory on public transport and in NHS settings. This decision was taken so as to give people more confidence to shop safely, and enhance protections for shop workers. This had not happened earlier because of the ambivalent NERVTAG report of 13 April 2020<sup>1</sup>: *“Evidence from observational studies tend to support a protective effect of wearing face masks in the community, but results are heterogeneous and subject to major biases and residual confounding.”*

Given the ambivalent scientific evidence, there was no specific minimum standard of face covering, which would have been hard to justify scientifically, and equally hard to enforce given the extra cost burden on poorer communities. Face coverings may be improvised from old clothing for next to nothing. Basic manufactured 3-ply disposable face masks may be bought cheaply for a few pence each.

However, for those wishing to protect better their families, colleagues and friends, there are higher grade options.

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<sup>1</sup> NERVTAG(2020) *Face mask use in the community*, 13 April 2020



Type IIR face masks EN14683 are medical face masks with a bacterial filtration efficiency (BFE) of 98%. These can be purchased in bulk for about 30p each (five times more than basic masks). The IIR face masks are made up of a 4-ply construction including a splash resistant layer to protect against blood and other bodily fluids. Type IIR face masks are tested in the direction of exhalation (inside to outside) and take into account the efficiency of bacterial filtration. *They are for use in protecting others from the wearer transmitting infection.* A higher grade of face mask is needed for self-protection.

FFP2 and FFP3 Filtering Face Piece Masks are European classes of respirators, tested on the direction of inspiration (outside to inside) and take into account leakage to the face and filtration efficiency.

FFP2 face masks are the equivalent of N95 face masks, which meet the guidelines from WHO for protection against Covid-19. FFP2 masks have a minimum of 94% filtration percentage and a maximum of 8% leakage to the inside. These masks are not shaped to an individual face but are simply held in place by the elastic earloop and have a typical lifespan of 3 to 8 hours depending on environmental factors. French and German health officials have advised people to wear surgical masks rather than cloth face coverings, while in Bavaria and Austria, it has been compulsory since late January 2021 to wear a medical grade FFP2 mask on public transport and in shops<sup>1</sup>.



FFP3 face masks are the most effective at filtration, with a minimum filtration of 99% and a maximum leakage of 2% to the inside. These masks are better shaped to an individual face for a more snug fit and typically have a valve to help breathe as the filtration material is much thicker. The valve also reduces the build-up of moisture, lengthening the lifespan of the mask. As a measure of their general practical reliability, FFP3 masks are typically used for handling asbestos.

FFP2, FFP3, N95 and other respirator masks are effective at protecting the wearer from viral transmission.

Frontline workers in healthcare settings must have self-protection against infection from COVID-19, because of their unavoidable exposure to those who are unmasked for medical reasons. But there are other settings, where a person may be exposed for prolonged periods to those unmasked, and would benefit from mask self-protection.

<sup>1</sup> Geddes L. (2021) What's the most effective mask for preventing COVID-19 transmission, GAVI, 27 January 2021

Consider, for example, a commuter on a crowded London tube train, who is in close proximity to five neighbour passengers for at least fifteen minutes. Taking the COVID-19 prevalence in London to be at the early July 2021 level of around 1:250, there is 2% chance that the commuter would be exposed to infection, if no neighbour was wearing a face covering. In practice, the risk may be higher as different passengers enter and exit the space or if changing tubes is required.

A survey has indicated that as many as 27% of tube passengers have admitted to not wearing a mask during the pandemic<sup>1</sup>. This common disregard of transport regulation reflects the comparatively low tube usage over the past year, and avoidance of crowding has usually been possible. However, as tube usage returns closer to pre-pandemic levels, crowding will occur, and may be unavoidable during the morning rush hour, even if return journeys home may be staggered.

Assuming compliance with the face covering recommendation drops to 50%, or perhaps below, after 19 July 2021, our example above gives at least a 1% chance that a rush hour commuter on a busy tube route would be exposed to infection. There is still considerable uncertainty in the COVID-19 dose-response curve, but assume conservatively that the commuter receives a sufficient dose on exposure to become infected. Is it worth buying a FFP3 mask for an essential journey, such as attending a crucial morning business meeting? The cost of a single use FFP3 mask is about £3, which is ten times more than a IIR face mask.

To avoid a small chance of COVID-19 infection, this would be manifestly cost-effective for an organisation requiring attendance of key people, and significantly cheaper than paying the £15 daily London congestion charge, or using Uber. It would make sense for companies to bulk buy FFP3 masks, and supply them to those staff members who might need to journey to work during the morning rush hour, and who might be particularly vulnerable to COVID-19.

In the future, as COVID-19 gradually fades from daily public consciousness, people may become much less inclined to wear face coverings merely to protect others. However, those who perceive themselves to be vulnerable may be self-motivated to wear high quality face masks to protect themselves in special circumstances of high exposure in crowded places.

In mid-February 2020, when there were only a few COVID-19 cases in UK and USA, I took a BA flight from London to San Francisco. For the entire eleven-hour flight, I sat next to someone wearing an FFP3 mask, with a bottle of hand sanitiser in his briefcase. He was the only person on the plane who wore any kind of face covering. Examples of selective risk-averse self-protection like this may be the way of the future.

*21 July 2021*

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<sup>1</sup> [www.nationwidevehiclecontracts.co.uk](http://www.nationwidevehiclecontracts.co.uk)