

Personal Respirator Southampton (PeRSo): Improved PPE for COVID19

The problem: Standard PPE is uncomfortable, hard to communicate in, wasteful and FFP3 supply is limited

The solution: A reusable respirator with better protection, comfort, communication and reduced cost

The proposal: That personal respirators are centrally funded and distributed as part of NHS PPE provision

BBC news summary: <https://www.youtube.com/watch?v=QqJPAh0Ax3A&feature=youtu.be>

Background:

- Respiratory protection is critical to preventing transmission of coronavirus
- Standard face masks allow 40% inhaled air to bypass the filter, while FFP3 masks are claustrophobic to wear, have an 18% failure rate and lead to skin problems. Neither protect the eyes
- Use of disposable face masks is unsustainable, with 129 billion being used globally each month
- New mutants spread more effectively, probably through aerosol, and may evade vaccines

The innovation:

- We developed a respirator that has multiple benefits over current PPE
- It has a clear visor and hood, and delivers clean filtered air from a battery powered pack mounted on a belt for 12 hours between charges
- Protection (99.95% particles filtered) is much greater than standard PPE
- The respirator is reusable, merely needing recharging between shifts
- The PeRSo has passed BSI and HSE regulations with CE marking
- Widespread deployment at a large NHS hospital has been highly successful



Validation and feedback:

- Significant benefits vs standard PPE include greater comfort (p 0.011), better patient response (p 0.044), wearer feels safer (p < 0.0001), better overall (p 0.006).
- Communication is much easier as the entire face is visible
- The mass production version has passed all testing and final sign-off is imminent, with capacity to manufacture 50,000 per week



Benefits of solution:

- Protection from coronavirus infection is much better than disposable masks
- The 5% staff who fail fit testing can return to work fully
- Respirator use becomes cost saving from 2 months vs FFP3 masks at £3 each
- Existing NHS masks can be stockpiled or used by patients and visitors
- The environmental impact of disposable mask use is greatly reduced

Conclusion

Widespread use of powered respirators gives greater staff protection, improves the patient experience, saves money, increases NHS productivity and reduces the environmental impact compared to standard PPE.

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Regulatory body guidance that respirators provide the best protection:

<https://www.hse.gov.uk/pubns/priced/hsg53.pdf> (points 65 and 69)

<https://www.cdc.gov/niosh/nppt/topics/respirators/factsheets/respsars.html>

(search PAPR)

Project background: <https://www.southampton.ac.uk/perso>

Commercial supplier: <https://www.baynhams.com/covid-19>

