Constantinos Regas1, Paul Elkington1,2

1 University Hospital Southampton NHS Foundation Trust

2 Faculty of Medicine, University of Southampton

Constantinos Regas ORCID: 0000-0001-8666-6476

Paul Elkington ORCID: 0000-0003-0390-0613

Rapid Response:

Re: Respiratory protective equipment in the NHS: time to fund a cheap PAPR system

Dear Editor

In response to an opinion piece on respiratory protection by Peters et al [1], English writes that it is time to fund powered air purifying respirator (PAPR) systems for healthcare staff [2]. We completely agree.

At the start of the Covid-19 pandemic, our team of clinicians and engineers developed the Personal Respirator Southampton (PeRSo). This initially had a hood fully covering the head and shoulders. A design iteration exposed the ears to reduce noise and to allow use of a stethoscope. We conducted our own flow, filtration, air-tightness, CO2 concentration and microbiological testing [3]. PeRSo is cost-effective, and a UKCA/CE-marked version was subsequently manufactured by a commercial partner. We made the design available open-source and derivatives have been produced in resource-poor countries such as Colombia and South Africa [4].

By the second Covid-19 wave (November 2020), we had issued over 3,600 PeRSo systems to staff at University Hospital Southampton, all requested by the user. The systems are still in use, requiring a hood replacement approximately every 2 months and a filter change every 6 months. We prospectively compared PeRSo satisfaction with standard PPE (FFP3 or FFP2 fluid-repellent surgical mask) [5]. We found greatly improved user comfort and patient satisfaction with PeRSo, significantly lower sickness absence rates against comparator hospitals, and deployment was cost saving from approximately 3 months. In addition, staff who did not have a well-fitting FFP3 mask during fit testing, or who experienced severe skin reactions, could be issued with a PeRSo, allowing them to work safely in high risk areas.

Our biggest hurdle was understanding and meeting the evolving technical standards and procurement requirements set by a multitude of agencies: the NHS, Health and Safety Executive and the Office for Product Safety and Standards. Like so many other issues affecting the NHS, not least the digital and sustainability agendas, a clear set of standards is needed, underpinned by appropriate risk-benefit analyses. Product developers need regulatory certainty so that they can deploy compliant products as quickly as possible, for the benefit of patients and staff.

*Competing interests: The authors were members of the PeRSo development team. They have no financial interest in PeRSo.*

References

1. Peters C, Lawton T, Butler M, Waters H, Hughes E. Why is respiratory protective equipment still an issue in the NHS? BMJ. 2022 Apr 27;o1082 doi: https://doi.org/10.1136/bmj.o1082

2. English PM. Respiratory protective equipment in the NHS: time to fund a cheap PAPR system. BMJ. 2022 Jun 8;o1404 doi: https://doi.org/10.1136/bmj.o1404

3. Elkington PT, Dickinson AS, Mavrogordato MN, Spencer DC, Gillams RJ, De Grazia A, et al. A Personal Respirator to Improve Protection for Healthcare Workers Treating COVID-19 (PeRSo). Front Med Technol. 2021 Jun 10;3:664259 doi: https://doi.org/10.3389/fmedt.2021.664259

4. PeRSo-DW, University of Southampton. https://www.southampton.ac.uk/publicpolicy/support-for-policymakers/poli...

5. Munro A, Prieto J, Mentzakis E, Dibas M, Mahobia N, Baker P, et al. Powered Respirators Are Effective, Sustainable, and Cost-Effective Personal Protective Equipment for SARS-CoV-2. Front Med Technol. 2021 Oct 14;3:729658 doi: https://doi.org/10.3389/fmedt.2021.729658