Witness Name: Paul Elkington
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UK COVID-19 INQUIRY

WITNESS STATEMENT OF PROFERSSOR PAUL ELKINGTON ON BEHALF OF THE UNIVERSITY OF SOUTHAMPTON

I, Paul Elkington, will say as follows: -

What happened

1. On 16th March 2020, we realised that PPE was going to become a major issue for healthcare workers. Paul Elkington, Professor of Respiratory Medicine, contacted Hywel Morgan, Professor of Bioelectronics, suggesting local production of powered air purifying respirators as an alternative, sustainable strategy. The powered respirator has a battery, a fan and a very high efficiency HEPA filter housed on a belt-mounted unit and blows clean filtered air into a loose-fitting hood with a clear visor. Within a week, locally produced respirators, named PeRSo's, were developed, passed testing with the face fit spray even when directed straight into the HEPA filter air intake, and were piloted on the wards by three respiratory doctors and four nurses the week commencing 23rd March 2020. Feedback was overwhelmingly positive and revealed the degree of demand due to anxiety regarding the provision of type IIR masks on standard wards. We were literally offered cash to provide prototype PeRSos to staff.

2. In collaboration with a local business, INDO lighting, a commercial product was developed, led by Tom Baynham. This involved repurposing a commercially available welder's blower unit with a high efficacy filter. During wave 1, over 1,500 PeRSos were in use on the COVID wards in place of type IIR masks at University Hospital Southampton. During the summer, approvals for use as alternative to FFP3 masks was gained by INDO lighting, from the BSI as the notified body. During wave 2, staff needed to e-mail a request

for issue of a PeRSo allocation to a central hospital distribution point. Over 3,500 PeRSos were in use during the peak in wave 2 at our hospital, all individually requested by staff, on all COVID wards. Once vaccination was widely available, demand and use waned, though some staff still wear their PeRSos in 2024, in particular the porters. The hood needs replacing every 3 months and the filter every 6 months.

3. We made the original design publicly available from the outset (Exhibit PE01 [INQ000574849]). We analysed feedback, cost effectiveness and staff infection rates, and showed that PeRSo use was greatly preferred by staff, cost-saving from approximately 10 weeks, and associated with a reduced staff absence compared with comparator hospitals (Exhibit PE02 [INQ000574850]). The purchase price was £I&S per unit, with replacement hood and filter approximately £I&S each. The respirator could be sterilised by wiping down with a Clinell wipe and re-used for each shift. All staff could wear one (eg with beards) due to the nature of the design, and no fit testing is needed, so staff availability for work on red wards was maximised. For sake of brevity, I have not repeated all the data in our peer-reviewed publications; they are open access and attached (Exhibit PE01 [INQ000574849] and PE02 [INQ000574851]).

4. Therefore, mass implementation of powered respirators in Southampton was an undeniable success, popular with staff, reducing infection, maximising staff availability, saving money and reducing environmental impact.

Issues encountered

5. Whilst the mass use of powered respirators in Southampton was rapidly rolled out and evidently successful in the post-pandemic analysis, our attempts to make this initiative more widely available in the NHS were an equally evident failure. The challenges we faced were:

6. Being unable to identify who was making national PPE decisions to then have a rational conversation about balance of risk. Powered respirators give the highest form of protection and fulfil many of the pre-pandemic HSE guidance regarding respiratory protective equipment (RPE) such as being recommended above tight-fitting face masks if being worn for more than an hour or if two items are needed (such as mask and visor). We knew that Type IIR masks give no protection from airborne infection, and so it was clear that escalating to a far better form of PPE reduced risk to staff. We could have this discussion with our hospital management and infection control teams, who immediately saw the benefit when shown the prototype, but it was impossible to have a similar

conversation on a national scale. All the other benefits, such as better communication, sustainability, staff comfort, increase of effective staff by 10% as those failing fit testing can return to work and sense of safety could not be discussed, and the response was simply "type IIR masks are national guidance".

7. Similarly, gaining regulatory approval, and accessing the correct route, was extremely opaque. We tried as many avenues as we could identify but there seemed to be numerous circular conversations in the early stages of the pandemic which typically ended "we cannot approve until another body has", such as testing the filter efficacy, and then the filter test led to several months delay due to capacity constraints (examples Exhibit PE03 [INQ000574851] and PE04 [INQ000574852]). Whilst we successfully got the product approved by the BSI in time for wave 2 as alternative to FFP3 masks, the same delays and issues will emerge for the next pandemic for any new product unless steps are taken in advance.

8. In terms of getting uptake by other NHS trusts, a central financial issue was that use of disposable PPE was essentially free to them but purchase of powered respirators had to come out of their budget, and so they were highly disincentivised. INDO lighting sold PeRSos to about 20 NHS trusts, but the uptake was much lower than the potential positive impact in terms of better protection and cost savings.

9. As one example, having tried to persuade NHS England that widespread PAPR use should be a central strategy, and had no success, we were suddenly called on about 20th December 2020 asking if we had 100,000 PeRSos available for immediate deployment. Without advance notice, this was clearly impossible.

10. Since the pandemic, we have attempted to advance the case of new regulation regarding powered respirators for NHS and societal use without success.

Lessons for preparedness for the next pandemic

11. It is inevitable that another global pandemic will come, and with advances in molecular biology this may happen relatively soon. I would suggest a major risk is the deliberate release of a man-made airborne virus by a rogue state that has vaccinated chosen groups in its population. Even with investments in UK vaccine infrastructure since the pandemic, it will take at least 6 months from the emergence of a new pathogen, either naturally evolved or genetically modified, and the availability of a new vaccine, and it is likely to be at least 9 – 12 months. Therefore, we need a better strategy for dealing with a new circulating airborne pathogen than just disposable face masks that have a high failure rate

and social distancing. The previous pandemic showed this inevitably leads to lockdowns to break transmission.

12. Although on one hand far-fetched, we have proposed that mass use of powered respirators across society could allow relatively normal functioning until a vaccine is available (Exhibit PE05 [INQ000574853]). These lightweight powered respirators would give much better protection than FFP3 masks, easier communication, have a much lower failure rate in untrained users and be environmentally sustainable. However, the government needs to take the lead on this initiative, making new legislation about the performance features and manufacturing standards, and then incentivise industry to invest in developing such a device by guaranteeing purchase of a minimum number of units. We propose that this is a key component of preparing the country for the next pandemic without an inevitable lock-down, and all the negative impacts.

I do not feel any redactions are necessary.

Statement of Truth

I believe that the facts stated in this witness statement are true. I understand that proceedings may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief of its truth.

Signed: Personal Data

Professor of Respiratory Medicine, University of Southampton; Consultant Respiratory Physician, University Hospitals Southampton; Director, Institute for Medical Innovation. Clinically active on the red COVID wards throughout the pandemic and on the respiratory COVID high dependency unit.

Dated: 18.02.25