FEATURE

Are UK doctors getting sufficient protective equipment against covid-19?

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The BMA has warned that doctors are at risk of serious illness or even death because of a lack of proper personal protective equipment (PPE). To determine the vulnerability of healthcare workers on the front line, we look at what the latest guidelines recommend and the evidence behind the use of different grades of equipment, from surgical face masks to full PPE. Are doctors and other healthcare workers being equipped with the protection the evidence indicates they need?

What are UK guidelines on PPE, and how do they differ from the World Health Organization guidelines?

Revised guidelines from Public Health England recommend that healthcare workers caring for patients with suspected or confirmed covid-19 should “have access to the PPE that protects them for the appropriate setting and context” and that “risk is not uniform and so elements of the updated guideline are intended for interpretation and application dependent on local assessment of risk.”¹

Evidence indicates that aerosol transmission (where the virus is suspended in air) is not driving the pandemic, although certain procedures, such as intubation, risk creating aerosols. Instead, the virus is most commonly transmitted in droplet form, when someone sneezes and coughs, possibly infecting someone nearby, or when droplets fall on hard surfaces and can survive for hours. Public Health England recommends different protection for different risk levels when healthcare workers treat patients with confirmed or suspected covid-19:

- When carrying out aerosol generating procedures (AGPs): FFP3 respirator, long sleeved disposable gown, gloves, full face shield or visor
- In high risk units where AGPs are being carried out: FFP3 respirator, long sleeved disposable, gloves, disposable eye protection
- When giving direct care: fluid resistant surgical mask, apron, eye protection, gloves.

The guidance allows for local or individual risk assessment when the patient’s risk of having covid-19 is not known. Where clinicians are providing face-to-face assessment or direct care

where the risk cannot be established, the guidance recommends a fluid resistant mask, apron, eye protection, and disposable gloves.

It says that when a patient’s covid-19 status is unknown and the virus is circulating at high levels, clinicians may use PPE for all patients, in line with the type of care being given and associated risk of infection.

The updated guidance is in line with that of the World Health Organization (WHO).²

Public Health England has produced a list of medical procedures, including intubation and extubation, bronchoscopy, and tracheotomy, which are “considered to be potentially infectious” AGPs.¹ The list is:

- Intubation, extubation, and related procedures, such as manual ventilation and open suctioning of the respiratory tract (including the upper respiratory tract)
- Tracheotomy/tracheostomy procedures (insertion, open suctioning, removal)
- Bronchoscopy and upper ear, nose, and throat airway procedures that involve suctioning
- Upper gastrointestinal endoscopy where there is open suctioning of the upper respiratory tract
- Surgery and postmortem procedures involving high speed devices
- Some dental procedures (such as high speed drilling)
- Non-invasive ventilation, such as bi-level positive airway pressure ventilation and continuous positive airway pressure ventilation
- High frequency oscillatory ventilation
- Induction of sputum
- High flow nasal oxygen

What is the guidance from specialist groups?

On Friday 27 March the Faculty of Intensive Care Medicine, Intensive Care Society, Association of Anaesthetists, and Royal

College of Anaesthetists in the UK issued joint guidance. The organisations said that this represented “our interpretation of Public Health England’s current guidance,” given that guidance “has been interpreted in very different ways, some of which can lead to the unnecessary use of PPE and consequent shortages.”³

The joint guidance, which is expected to be updated in response to Public Health England’s new guidance, recommended wearing some form of protection while treating all patients (within 2 m), even those in whom covid-19 is not suspected or confirmed. The joint guidance says that clinicians should wear gloves and consider wearing a surgical mask, eye protection, and waterproof apron.

In addition, where covid-19 is known or suspected, the joint guidance says:

- People working in clinical areas more than 2 m from the patient should consider gloves, waterproof apron, and surgical mask
- People in close contact with patients (for procedures including nerve blocks, local anaesthesia, ward rounds, and outpatient appointments) should wear gloves, waterproof apron, surgical mask, and consider eye protection
- People working in intensive care units and operating theatres, when carrying out AGPs and for 20 minutes afterwards, should wear gloves, long sleeved, fluid resistant gown, fit tested FFP3 mask, eye protection, and consider a second pair of gloves.

The joint guidance divides into “droplet protection” for close patient contact and “airborne protection” for clinicians who are exposed to AGPs. For protection against droplet infection, they recommend gloves, waterproof apron, fluid resistant surgical mask, and to consider eye protection. For airborne protection, they recommend gloves, fluid resistant, long sleeved gown, fit tested and checked FFP3 mask, eye protection, and to consider a second pair of gloves.

The Royal College of Surgeons of Edinburgh, Royal College of Surgeons of England, Royal College of Physicians and Surgeons of Glasgow, and Royal College of Surgeons in Ireland have said in a statement: “When covid-19 status is positive or uncertain, international experience recommends full personal protective equipment (PPE) be used for laparotomy, but shortages prevent this in most areas, and stratification is necessitated with lesser measures for low risk cases. Full PPE is advised for positive or suspected patients and includes double layers of disposable gloves and gown, eye protection, and FFP3 mask.”⁴

In response to Public Health England’s updated guidance, the Royal College of Surgeons of England said in a statement, “We continue to urge our members to wear the highest appropriate grade of facial protection, especially where procedures generate spray or ‘aerosol.’”⁵

In the US, the American Society of Anesthesiologists, Anaesthesia Patient Safety Foundation, American Academy of Anesthesiologist Assistants, and American Association of Nurse Anesthetists issued a joint statement stating, “We recommend as optimal practice that all anesthesia professionals should utilize PPE appropriate for aerosol generating procedures for all patients [whether suspected or confirmed covid-19 or not] when working near the airway.”⁶

They say this is because “identification of who is covid positive or negative with certainty is not possible in the setting of clinical care.” They say that people carrying out AGPs should wear “eye protection (goggles or a disposable face shield that covers the

front and sides of the face), a gown, and gloves, in addition to airway protection with N95 masks [equivalent to FFP3] or PAPRs [powered air purifying respirators].”

The United States is also experiencing shortages of equipment, and the Centers for Disease Control and Prevention has a list of suggestions for extended use or reuse of N95 respirators.⁷

Is there enough PPE available across the NHS?

Widespread reports say that the right PPE is not available in sufficient quantities to all the healthcare sectors that require it. The BMA warned on 25 March that there was “growing evidence that thousands of GPs and hospital staff are still not being provided with the kit they need to properly protect themselves and their patients.”

On 2 April Chaand Nagpaul, the BMA’s chair of council, added, “It is four days since the minister Robert Jenrick gave the assurance that no frontline staff should be working without the right protective equipment. Yet this week the BMA has received concerns from doctors in over 30 hospital trusts about inadequate PPE supplies and GPs across England who are yet to receive eye protection.”

The chair of the Royal College of General Practitioners wrote to England’s health secretary, Matt Hancock, last week seeking “urgent clarification” on PPE and guidance on its use, especially aprons and eye protection, given that many patients with covid-19 might be asymptomatic.⁸ “It is therefore vital that urgent clarity is provided as to whether GPs should begin wearing PPE for all face-to-face patient consultations,” he wrote. On 2 April he responded to the updated guidance by saying, “We understand that initial stocks of PPE have been getting to GP practices. We now need to ensure that this supply is sustained throughout the pandemic, that practices start receiving new equipment recommended in the guidance such as eye protection soon, and that effective mechanisms are in place for practices to request emergency supplies, should they need them.”

Eye protection seems to be a particular problem. The Health Care Supplies Association took to Twitter to appeal for help from DIY stores. It said late on Saturday 21 March, “If any DIY stores want to help at this time, then donating supplies of visors and glasses will greatly help NHS staff. We have trusts who for various reasons are running short.”⁹ Meanwhile the Royal Mint is to manufacture up to 4000 plastic visors a day to protect NHS staff.

On Monday 30 March the social care minister Helen Whately told BBC Radio 4’s *Today* programme that 117 million pieces of equipment had been delivered to hospitals, primary care, hospices, and care homes over the previous two weeks. But hospitals and GP surgeries continued to report shortages.

Some hospitals made direct appeals to their communities. University Hospitals Warwickshire and Coventry reportedly put out an urgent request on a local business social media website on Saturday 28 March asking for businesses that might be able to supply polycarbonate face shields and plastic goggles, for use by nurses treating patients with covid-19.

A group of NHS doctors went further, setting up a crowdfunding account to raise money to buy PPE to be donated to NHS trusts. Mona Barzin, Salaj Masand, Ravi Visagan, and Nav Kumar said in their appeal, “Unfortunately, current hospital supplies are not sufficient, and while we are reassured the government is doing everything it can, healthcare workers on the frontline are risking themselves daily without adequate protection to care for sick patients. Healthcare workers on the frontline without

PPE is the equivalent of going to war without armour and protection.” By the evening of Thursday 2 April the appeal had raised £1 351 115.

What's the evidence on the effectiveness of PPE in different settings?

An updated Cochrane review, posted on MedRxiv and under review at *The BMJ* this week, finds little good evidence of the effectiveness of face masks in reducing the spread of respiratory viruses, but it recommends that healthcare workers still wear surgical masks in clinical settings. It found no evidence of any difference between surgical masks and N95 respirators.¹⁰ The University of Oxford's Centre for Evidence-Based Medicine is producing a series of rapid evidence reviews looking at this. Its first review considered the effectiveness of different types of masks.¹¹

The review found that “Most real world research comparing standard face masks with respiratory masks has been in the context of influenza or other relatively benign respiratory conditions.” There are no published trials comparing standard face masks with respirator masks in covid-19. There is also little research in community or primary care settings.

It said that evidence from a recent (2020) meta-analysis of the effectiveness of N95 respirators versus surgical masks against influenza included six randomised controlled trials and 9171 participants. It found no differences in efficacy in preventing flu, flu-like illness, or respiratory infection. Respirators “appeared to protect against bacterial colonisation,” however.

Based on this finding, the review concludes that the trials reviewed “provide cautious support for the use of standard surgical masks in non-AGPs, though the empirical studies underpinning this conclusion were not in a covid-19 population, and only one was in a community setting.” They plan to publish more evidence on other types of PPE within days, including a review of what should be considered AGPs and which PPE is recommended for primary care.¹²

People perceive that the UK is providing less rigorous guidance on PPE than China. Is this true?

Chinese physicians have made available a handbook of covid-19 prevention and treatment,¹³ based on their experience. They identify three levels of protection. All staff at healthcare facilities, they say, must wear surgical masks as standard.

- Level 1 (pre-examination triage waiting rooms, general outpatient department): disposable surgical cap, disposable surgical mask, work uniform, disposable latex gloves

- Level 2 (fever outpatient department, isolation ward area, imaging examination of suspected or confirmed patients, cleaning of surgical instruments used with suspected or confirmed patients): as above, with N95 (FFP3 equivalent) mask, goggles, disposable medical protective uniform
- Level 3 (when performing AGPs on suspected or confirmed patients or other procedures where patients may spray or splash respiratory secretions or bodily fluids, including surgery and autopsy): as above, with possible addition of full face respiratory protective devices or powered air purifying respirator.

It is difficult to know whether these precautions were adhered to in China. In the early stages of the pandemic, at least, Chinese doctors might not have had access to such equipment.

Competing interests: I have read and understood BMJ policy on competing interest and have the following interests to declare: none.

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