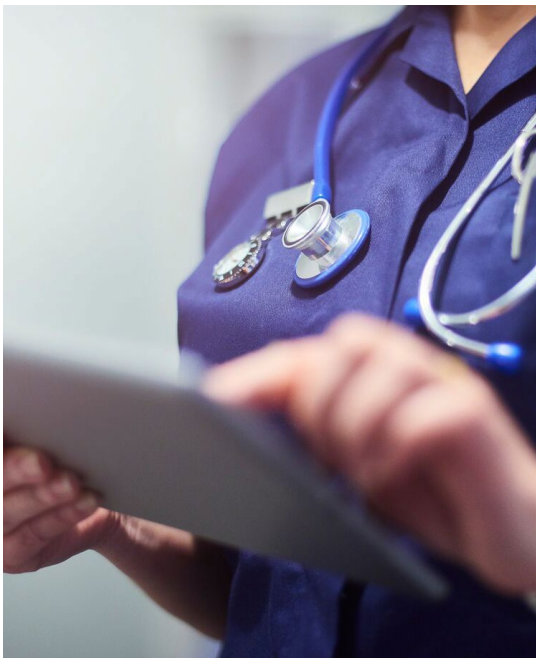
Sustainable Healthcare Toolkit

Reducing waste associated with unnecessary personal protective equipment (PPE)



Purpose

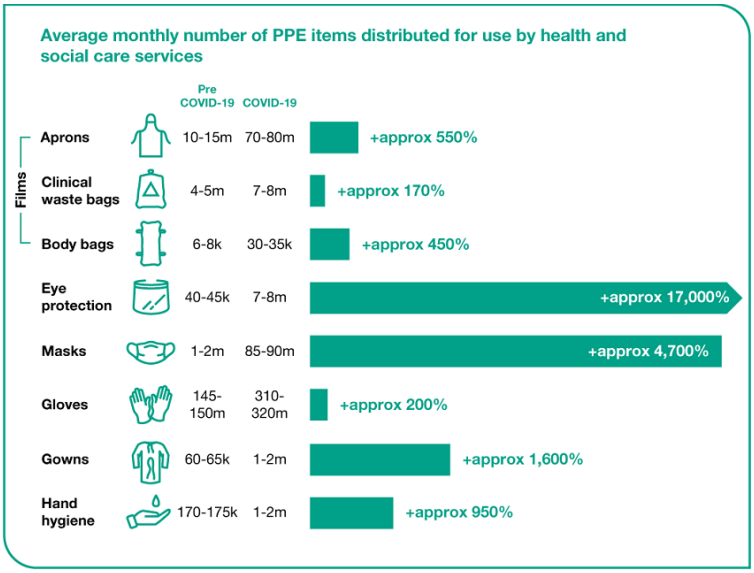
Personal Protective Equipment (PPE) such as face masks, gloves, gowns and aprons play a pivotal role in preventing the spread of infectious diseases for both healthcare workers and patients. However, this comes at a significant cost to the environment.[i]

The purpose of this toolkit is to provide practical guidance for those colleagues who are seeking to reduce the environmental impact of care through appropriate PPE use in the clinical setting without compromising safety or quality of care. The predominant focus of this toolkit is gloves, but many of the principles discussed can also be applied to face masks, plastic gowns and other PPE products.

Background

As one of the mainstays of infection prevention and control (IPC), PPE can be found in all healthcare settings [ii]. Having been brought into sharp focus during the COVID-19 pandemic, the global demand for PPE has remained high.[iii] Even before the WHO highlighted PPE figures on usage and waste during the COVID pandemic[iv] [v], the issue of PPE waste was a concern. For example, the box below shows the amount of PPE items consumed in the UK.[vi]

Overcoming the environmental impact of PPE requires the global medical, research, manufacturing and regulatory communities to collaboratively take up the challenge. Emerging innovative approaches to design, materials engineering, decontamination and waste disposal are showing progress in reducing the environmental impacts of PPE. There is also a significant near-term opportunity to reduce the amount of PPE used unnecessarily by healthcare professionals.



The availability of PPE in clinical areas – coupled with the prominence of IPC measures during the COVID-19 pandemic – is a likely contributing factor to PPE being used by healthcare professionals for activities where it offers no discernible IPC benefit.[vii] Well-meaning attempts by healthcare professionals to reduce the spread of infection through the use of PPE may in fact be doing the opposite as illustrated by the case study on the following page from Great Ormond Street Hospital (GOSH) in the UK.

There will always be a need for PPE in healthcare settings but taking steps now to ensure that the right products are used at the right time will go a long away to reducing their environmental burden.

Improving understanding regarding appropriate PPE use

In many countries, local guidance on IPC refers to the appropriate use of PPE.[viii] [ii] [ix] The National Infection Prevention and Control Manual (NIPCM) for the UK explicitly recommends against overuse or inappropriate use of PPE and has issued clear, evidence-based guidance around standard and transmission-based IPC precautions, summarised below.

SICPs	Gloves	Apron	Gown (ambulance staff use coveralls)	Fluid resistant surgical mask (FRSM)	Eye/face protection
No anticipated exposure to blood or body fluid, mucous membranes, or non-intact skin.	✗	✗	✗	✗	✗
Exposure to blood or body fluid, mucous membranes, or non-intact skin is anticipated but **NO risk of splashing or spraying.**	✓	✓	✗	✗	✗
Exposure to blood or body fluid, mucous membranes, or non-intact skin is anticipated **AND risk of spraying or splashing**.	✓	✓	✗ Unless in place of an apron if extensive spraying or splashing is anticipated.	✓	✓

TBPs	Gloves	Apron	Gown	Fluid resistant surgical mask (FRSM)	Respiratory Protective Equipment (RPE)	Eye/face protection
Contact precautions	✗ Unless exposure to blood or body fluid, mucous membranes, or non-intact skin is anticipated or footnote 1 applies[1]	✓	✗ Unless in place of an apron if extensive spraying or splashing is anticipated	✗ Unless risk of splashing or spraying of blood or body fluids is anticipated or footnote 2 applies[2]	✗	✗ Unless risk of splashing or spraying of blood or body fluids is anticipated
Droplet precautions	✓	✓	✗ Unless in place of an apron if extensive spraying or splashing is anticipated	✓	✗	✓
Airborne precautions	✓	✗	✓	✗	✓	✓

There is also consistent and clear guidance across IPC guidelines regarding;

- PPE not being a substitute for hand hygiene
- Double gloving being avoided in routine clinical care
- Avoiding PPE use for administrative tasks such as documentation, telephone use etc.

Patient communication and perceptions must always be considered when decisions are made about use of PPE to ensure that trust is maintained regarding clinical safety and hygiene standards. In Australia, the Infection Control Expert Group (ICEG) has developed resources and issued guidance for health and residential care settings[x] which reinforce the need for healthcare professionals to communicate with patients that in some circumstances PPE may not be necessary.

Whilst some of these points may seem obvious, training on appropriate use of PPE is not always delivered in a consistent manner and clinician preference is therefore likely to predominate.

Case Study – Great Ormond Street Hospital, UK

There is a body of evidence demonstrating that the overuse of non-sterile gloves is associated with poor hand hygiene, the cross-contamination and transmission of healthcare associated infections, as well as contact dermatitis[1]. To combat this, in 2018, Great Ormond Street Hospital launched an initiative aimed to improve hand hygiene practice and the appropriate use of gloves[1]. This initiative was based on staff training and an awareness campaign, and resulted in:

- a reduction in the number of referrals to occupational health for contact dermatitis
- a saving of 21 tonnes of plastic with glove use reduced by 33%
- commercial saving of £90,000
- no adverse effects on rates of infection

Putting PPE theory into practice

<table>
<tr><th>Step</th><th>Action</th><th>Description</th></tr>
<tr><td>1</td><td>Engage Clinical Governance / Leadership</td><td>It is important to identify those healthcare leaders who are accountable for the safe and effective delivery of care, particularly in relation to infection control and reporting.

Changes to training or clinical practice regarding PPE use will require clinical governance and leadership support and endorsement, therefore early engagement and making a compelling ‘case for change’ will be critical success factors.</td></tr>
<tr><td>2</td><td>Collect baseline data around PPE in line with Market Unit</td><td>It is important to gain access to data at an early stage in order to understand how the impacts of any changes around PPE will be measured. As a minimum, the baseline data points in the table adjacent should be collected from the previous year;

There may be additional data points that you may wish to measure, and therefore it is important to understand the granularity / level of detail available for given data sets prior to commencing any initiative.

<table><tr><th>Data Point</th><th>Description</th></tr><tr><td>PPE volumes / expenditure</td><td>This should be split by PPE type and is likely to be available from procurement teams</td></tr><tr><td>Infection control rates</td><td>This should be split by infection and transmission type where possible</td></tr><tr><td>Contact dermatitis rates</td><td>Where available from staff surveys +/- occupational health in line with local privacy guidance</td></tr><tr><td>Clinical activity / case-mix etc</td><td>This will ensure that any changes in PPE volumes are reflective of activity and case-mix</td></tr></table></td></tr>
<tr><td>3</td><td>Plan and develop staff awareness campaign / training programme</td><td>Consider what the most effective approach to staff engagement will be. This could, for example, be a specific training programme deployed to clinical staff, or a comms/awareness raising campaign. An example from the UK Royal College of Nursing (RCN) and a factsheet from Australia are available online. Any awareness campaign or training must align with standard IPC training and consider the perspective of the patient by ensuring that;
- staff are able to answer questions from patients about why they are not wearing PPE for certain activities
- communication that is visible to patients includes the rationale for appropriate PPE use.</td></tr>
<tr><td>4</td><td>Measure impact</td><td>The data points and methodology from step 2 should be used to monitor and report progress against the baseline.</td></tr>
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Additional opportunities for consideration

Reducing unnecessary use of PPE is important but even when PPE cannot be avoided, there may be ways to reduce its impact on the environment.

Opportunity	Description
Review existing PPE supplier carbon footprint	There is a large market for PPE and consideration could be given to procuring PPE from suppliers with the lowest carbon products. This could be as a result of manufacturing process, transportation distance or type etc.
Explore new innovative products	The FDA in the USA has recently approved; (i) a new, biodegradable, single-use nitrile glove that has been shown to break down by 80% in the first year, with full decomposition estimated to occur after 1 to 5 years in active landfill. (ii) a plant-based surgical mask, that generates 55% less carbon emissions than standard synthetic masks and is industrially compostable.
Sustainable disposal	Consideration could be given to other ways to dispose of gloves within healthcare settings instead of incineration via clinical waste or landfill. For example in Australia, one organisation is using disposable PPE in concrete manufacturing.

Further reading and information

1. The **Royal College of Nursing** in the UK has extensive, user-friendly resources about PPE including details of their gloves off campaign and glove awareness week.

2. **Health Care Without Harm** has useful guidance on PPE and the administration of immunisations.

3. **The Centre for Sustainable Healthcare** has a range of networks, one detailing an effective Quality Improvement initiative on PPE management which you can read about on their website

References

[i] Can medical care exist without plastic? | National Geographic
[ii] Infection prevention and control in healthcare settings - sixth update 9 February 2021 (europa.eu)
[iii] COVID-19 and PPE Waste: A catalyst for sustainable healthcare? — Centre for Sustainable Health Systems
[iv] Environmentally Sustainable Management of Used Personal Protective Equipment | Environmental Science & Technology (acs.org)
[v] Tonnes of COVID-19 health care waste expose urgent need to improve waste management systems (who.int)
[vi] Personal protective equipment (PPE) strategy: stabilise and build resilience - GOV.UK (www.gov.uk)
[vii] How to reduce glove use | RCN Magazines | Royal College of Nursing
[viii] NHS England » National infection prevention and control manual (NIPCM) for England
[ix] Australian Guidelines for the Prevention and Control of Infection in Healthcare (2019) | NHMRC
[x] Guidance on the use of personal protective equipment (PPE) for health care workers in the context of COVID-19 | Australian Government Department of Health and Aged Care