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Practice Points

Laundering single-use gowns in the event of critical shortage: experience of a UK acute trust

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The coronavirus disease 2019 (COVID-19) pandemic resulted in unprecedented global use of personal protective equipment (PPE) to protect healthcare workers (HCWs). In the UK, gowns were recommended for all patient care until the infection was downgraded from a high-consequence infectious disease by Public Health England (PHE) on 19th March 2020 [1]; subsequently, gowns were advised as ‘airborne PPE’ for aerosol-generating procedures, and in high-risk areas such as critical care [2]. Although elective surgery diminished, reduction in gown use from theatres was outstripped by surge elsewhere; over 126,000 patients were admitted across the UK by 9th July 2020 [3], with approximately 17% needing admission to critical care settings [4].

The global demand for PPE exceeded the timely production of gowns which met the required standards. By mid-April 2020,

widespread media reports described PPE shortages in the UK, including single-use surgical gowns, leading some organizations to search for alternative strategies to ensure ongoing protection of staff [5].

At Sheffield Teaching Hospitals (STH), gown stock was maintained throughout the pandemic, but alternative options were explored to ensure that STH had means of protecting staff if the event of absolute shortage ever occurred. One of these was whether the on-site hospital laundry facility could be used to wash and decontaminate single-use surgical gowns for re-use as part of COVID PPE. This article describes some of the considerations, processes and challenges encountered in setting up and delivering such a system.

The main priority was to ensure that staff were provided with a safe and best-available option at all times. To do this, a risk-assessed hierarchy of options was produced, working alongside the Occupational Safety Management Team. The aim was to provide a gown alternative for use only in the exceptional event of a critical shortage of single-use gowns, with their use kept under constant review, particularly the availability of higher-ranking options.

It was proposed that if the gowns were treated as fabric items, and they physically withstood the process, use of the hospital laundry system, which is well established in decontaminating healthcare linen, could be investigated. The hospital laundry has the advantage of allowing high throughput, with less ‘hands-on’ staff time compared with other disinfection methods such as ultraviolet radiation or hydrogen peroxide vaporization, as well as requiring less space.

There were two immediate concerns. The first concern was the effect that any disinfection method would have on the

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properties of gowns, particularly fluid resistance. It was planned that washed gowns should not be considered to be water resistant unless this was confirmed by testing. The second concern was the safety and intended use, if washed gowns were not fluid resistant. Fabric ‘washable’ gowns are included in the World Health Organization’s PPE guidance [6], and have since been recommended by PHE as an option in acute shortage settings [7]. It was therefore considered that washed gowns should be used in accordance with PHE guidance, with a plastic apron worn underneath and forearms washed after use [7]. It was stipulated that this was only for COVID PPE where lower bodily fluid exposure was expected, and was not applicable for potential high fluid exposures, including operating theatres.

Next, the practicalities and steps required to implement a system were explored. Standard STH laundry processes conforming to HTM-01-04 [8] were followed, utilizing a washer extractor rather than a continuous tunnel washer to reduce the risk of entanglement and damage. STH linen then routinely undergoes tumble drying; a reduced heat tumble cycle was needed for the delicate gown fabric. Gowns were processed separately from other hospital linen to avoid confusion.

After each wash/dry cycle, gowns were examined by laundry staff to check the integrity of the fabric, absence of tears, and that the hems and cuffs remained intact. During trial runs, it was noted that gowns required the Velcro to be fastened pre-washing to prevent catching on gown fabric during the laundry cycle. Fabric integrity was also affected by marker pen, and residual glue from stickers or tape; subsequent end-user instructions specified avoiding these.

As mechanical degradation of the gowns was observed with four or more laundry cycles, it was decided that they should be washed a maximum of three times. In order to ‘count’ the number of cycles, laundry staff would make a small hole in the posterior bottom edge of the gown.

A collection system from clinical areas was considered. Gowns that were heavily contaminated were to be discarded as normal, as it was appreciated that staff might feel uncomfortable with re-use of these, irrespective of whether or not they could be safely decontaminated. Gowns with defects were also to be discarded. Suitable gowns would be placed in a labelled bin, separate from the rest of the PPE. A HCW, in PPE, would prepare the gowns by inspecting and discarding any with defects or with three holes in the hem, removing any tape, applying the Velcro tab, and finally placing the gown in an alginate bag to be sent to laundry. An instruction poster was designed for staff outlining which gowns were suitable, the laundry process, and how to prepare the gown for laundry.

During trials of this process, staff concern about what this meant for PPE supplies and fear of using less-protective options became apparent. It was recognized that although a fabric gown was within guidance, this would be perceived by many as downgrading of PPE. It was anticipated that significant support would be needed from the communications and management

teams in the event of ever needing to use the washed gowns in clinical care.

Using this system, nearly 2000 gowns were washed successfully. These were stored and never used for clinical care. Whilst this provides reassurance that this emergency system could be used successfully, exploration of fluid-resistant options continued, and gown procurement (which remained the priority throughout) was maintained successfully.

Conflict of interest statement

None declared.

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