

COVID-19

LITERATURE REPOSITORY

How can we ensure PPE supply is sufficient to cover both COVID-19 and the recommencement of paediatric elective surgery in Australia?

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Discussion

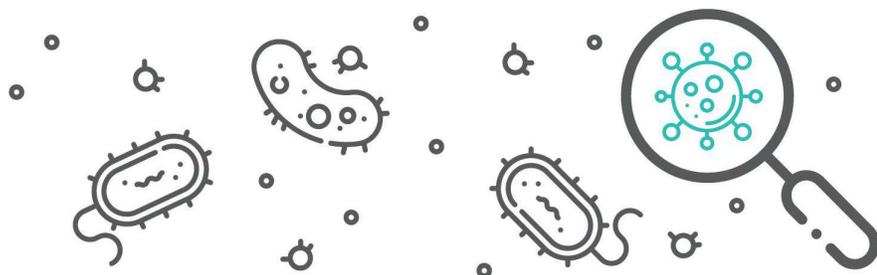
The Australian Prime Minister announced on the 21st of April that elective surgeries would gradually resume within a week, including all procedures for children under 18yrs of age [1], re-igniting questions of resource allocation that led to the suspension of all elective procedures across the country one month earlier [2,3]. Elective surgeries were suspended from the 26th of March reflecting uncertainty of adequate personal protective equipment (PPE) supply in the National Medical Stockpile and stress on global supply chains during a global pandemic [2].

Internationally, paediatric surgical units have responded to exponential rises in COVID-19 cases in their communities by immediately ceasing non-urgent paediatric procedures [4], re-purposing the majority of their operating theatres to makeshift intensive care wards, reallocating staff to other critical wards and ceasing all research and innovation activities. While these measures have been helpful in reducing personnel circulating through the hospitals and allowing reallocation of human and physical resources [5], the costs have not been insignificant. One paediatric surgical unit found a threefold increase in complicated appendicitis [6], possibly reflecting parental reluctance to present to hospital, as well as a culture of fear amongst healthcare workers and their patient population.

Given the flattened curve in Australia, the recommencement of elective surgeries has been announced with a guarantee that surgical masks, gowns and gloves would not come out of the National Stockpile, ventilators would remain sufficient for pandemic preparedness, and the whole decision would be reviewed two weeks later for ongoing viability [1]. Competing demands can be an opportunity to re-assess standard procedures based on an updated evidence base.

Special considerations for COVID-19 and surgical procedures:

SARS-CoV2 has not been documented to accumulate in the blood or CSF, posing no increased risk during neurosurgical procedures while ENT procedures are often aerosol-generating and may need special considerations [7]. In circumstances of high community prevalence, some units are recommending preoperative SARS-CoV2 testing [7] although this is not recommended in the Australian context at this time [3]. Waste management in the healthcare setting and at home should be considered although there is no current evidence of spread through faecal [8], blood or solid waste [9].



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Surgical gowns: To dispose or re-use, that is the question:

Textile materials and elements of PPE, when not used appropriately, have demonstrated cross-contamination in a healthcare setting, such that previous studies of gown use (versus none) showed mixed results [10] as the highest risk of microorganisms transmission occurs during doffing, especially in cases of blood or body fluid adhesion to PPE [11], regardless of type of gown. Studies in the 1990's of fabric characteristics showed that liquid penetration did not necessarily correlate with bacterial transmission [12] however the thickness and repellency of material may contribute [13]. At the time, an observational and qualitative study of surgeons found 80%-99% of surgeons felt comfortable and protected wearing disposable gowns compared to 0-4% who felt safe and comfortable with reusable gowns [14]. By 2001, the role of gowns in reducing patient to patient and healthcare personnel contact with blood-borne and other contact-associated pathogens was well established, although the functional, environmental and economic superiority of either disposable or reusable gowns could not be demonstrated [15]. A systematic review following PRISA guidelines to identify if gown type (disposable vs reusable) affected postoperative wound infections in orthopedic surgeries in 2019 found 17 relevant studies, all moderate or low/conflicting quality of evidence. Overall, there was a lack of consensus. All the non-randomised concluded a significant or slight reduction in deep surgical site infections with disposable gowns [16,17] with a quality of evidence rating from low to very low. Conversely, the review included 3 randomised studies with moderate to low evidence showing comparable surgical site infections between disposable and reusable gowns. All studies had confounding factors preventing high quality evidence [16]. WHO [18], CDC [15] and NICE (UK) guidelines all state no difference in recommendation or infection rates between disposable and reusable surgical gowns while the European guidelines prefer disposable gowns based on low quality evidence of reduced bacterial surgical site infections [16].

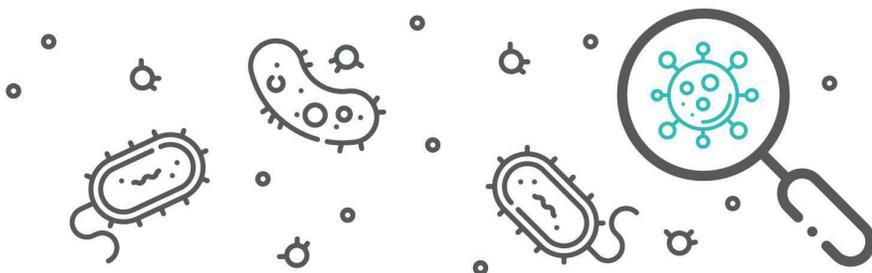
Modern textiles used in the production of reusable gowns are comparable in terms of safety, comfort and cost [19]. A review including only disposable and reusable gowns that would meet current testing standards for medical gowns and drapes (AAMI standards introduced in 2003) asserts that reusable gowns are comparable with disposable products in terms of cost, comfort and safety but have very substantial sustainability benefits in terms of energy consumption, water, carbon footprint, volatile organics, solid waste and instrument recovery when assessed over their lifetime of use [19]. These sustainability benefits have been replicated in multiple studies [20] including a lifetime assessment of disposable versus reusable gowns published last month showing a greater than 64% reduction in all parameters when opting for the reusable gown [21].

Surviving and thriving in a global pandemic

In the context of a global pandemic, surgeon or clinician comfort and confidence must be taken into consideration with regards to PPE and protection of patients from both from iatrogenic infection (e.g. surgical site infections) as well as patient to patient transmission of infection. While there is some evidence that droplets of infectious body fluids (particularly relevant in the time of COVID-19) may roll off fabrics with a water repellent finish more readily [11], preferences amongst healthcare personnel do not reflect available scientific information but align more closely with marketing claims and studies of products that would not meet current standards [19]. Some studies healthcare workers who have developed COVID-19 demonstrate suboptimal PPE use [22], reflecting an ongoing challenge to ensure PPE is rational and its use, application and removal is well understood and practiced by clinicians [23].

Conclusions

As new cases of COVID-19 in Australia continue to fall and thoughts turn to the maintenance and recovery phases of pandemic planning, the balance between pandemic preparedness and provision of routine care must be negotiated. Opportunities to innovate and move towards a more sustainable future have been demonstrated including the consideration of modern reusable surgical gowns to ensure a sustainable, holistic approach to future planning while also providing comfort and confidence to clinicians treating patients with COVID-19.

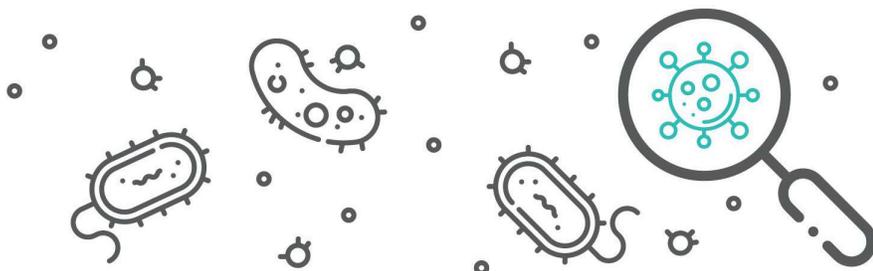


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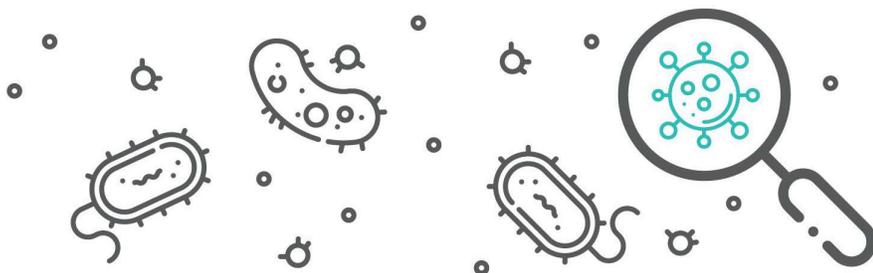
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