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Choosing Between Single-Use and Reusable Bedside Devices

ECRI's recent report on bedside devices, supplies and catheters examines the complex decisions hospitals must make when selecting between single-use disposable and reusable or reprocessed equipment. These choices are shaped by three often competing priorities: infection prevention, financial efficiency and environmental sustainability. Although single-use products are frequently promoted as a safer option for reducing hospital-acquired infections, the available evidence is limited or inconclusive for most bedside devices. Cost implications vary depending on device type, reprocessing method and local conditions, while environmental impacts differ according to production, sterilisation and waste management practices. The report shows that a balanced approach requires careful consideration of the interplay between these factors.

Clinical Outcomes and Infection Prevention

Evidence on clinical performance was uneven across the eight device categories reviewed. For sharps containers, one study linked single-use models to lower rates of Clostridioides difficile infection compared with reusable containers. Reusable electrocardiographic lead wires showed comparable or slightly lower infection rates than single-use equivalents, though the difference was not statistically significant. Endotracheal suctioning catheters produced mixed results: in some settings, reuse was associated with increased risk of ventilator-associated pneumonia, particularly where resources limited effective sterilisation; other studies found no significant differences in contamination.

For several other devices – including blood pressure cuffs, electrophysiological catheters, intermittent pneumatic compression sleeves and pulse oximetry sensors – no direct clinical outcome data were identified. This lack of strong evidence is partly due to the rarity of device-related infections and the need for large study populations to detect meaningful differences. The report also notes that many studies rely on non-randomised designs, which increases uncertainty and the potential for confounding factors to influence results.

Economic Considerations in Device Selection

Cost findings often favoured reuse, though the degree of benefit varied. Electrophysiological catheters, intermittent pneumatic compression sleeves, endotracheal suctioning catheters and pulse oximetry sensors were all reported to be less expensive over time when reused. Reprocessed central venous catheter insertion kits were also cheaper than fully disposable kits, despite higher initial purchase prices for reprocessable instruments. In the case of pulse oximetry, reusable clips could deliver hundreds of millions of dollars in savings annually at a national scale compared with disposable stickers.

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Blood pressure cuff costs depended on cleaning frequency and whether cuffs were dedicated to individual patients. Disposable cuffs used for the length of a patient's stay could be less costly than reusable models cleaned after each use, while reusable cuffs dedicated to one patient had the lowest daily cost. Economic outcomes were influenced by procurement contracts, procedure volumes, labour costs and waste disposal fees, making results highly specific to local conditions.

Environmental Impact and Sustainability Goals

Environmental assessments frequently showed benefits for reuse. Reprocessed intermittent pneumatic compression sleeves, pulse oximeters, sharps containers and many catheter types generated less waste and had lower greenhouse gas emissions compared with disposable counterparts. For example, switching to reusable sharps containers reduced plastic waste by hundreds of tonnes annually and cut greenhouse gas emissions by more than 80% in one large hospital.

However, these benefits were not universal. Electrophysiological catheters sterilised with ethylene oxide had a higher environmental impact than single-use equivalents due to the resource intensity of the detoxification process. For central venous catheter insertion kits, the environmental advantage of reprocessing depended heavily on the source of energy used for sterilisation; coal-based electricity could offset the climate benefits, while renewable sources delivered substantial reductions in greenhouse gas emissions. These variations highlight the need to consider local infrastructure and supply chain realities when evaluating sustainability claims.

Life cycle assessments also showed that some reusable devices achieved environmental gains after only a small number of uses. For pulse oximeters, the environmental impact of reusable sensors became lower than disposables after just over two uses, even when accounting for the cleaning process. Such findings suggest that targeted changes in device choice and reprocessing strategy could yield meaningful sustainability improvements without compromising functionality.

There is no single solution when choosing between single-use and reusable or reprocessed bedside devices. Infection prevention outcomes vary by device type and remain uncertain for many products. Economic benefits from reuse can be substantial but depend on local cost structures, procurement strategies and operational practices. Environmental impacts also vary, with significant potential gains in many cases but occasional disadvantages linked to specific sterilisation methods or energy sources.

Hospitals seeking to optimise device choice must weigh these factors in combination rather than isolation. A structured evaluation process, informed by local data on infection risks, total lifecycle costs and environmental effects, can help ensure that procurement and use decisions align with patient safety goals, financial responsibility and sustainability commitments.

Source: ECRI

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