Improving the environmental profile of single-use medical devices

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Introduction

Single-use medical devices (SUDs) are an important resource in modern medicine but their disposable nature results in greater resource requirements and generates large quantities of waste. For these reasons, they have been highlighted as environmentally unsound or unsustainable. There are opportunities to improve on this in all stages of the devices life-cycle, however many of these are device specific and much further work is required.

Need

Are SUDs required for all their current applications?

• Innovative treatment pathways, for example less invasive options not requiring SUDs, should be investigated.

•Changes in technology can lead to obsolescence.
•E.g. elimination of saline IV bags used for emergencies and re-infusion due to new design of dialysis machine capable of providing sterile substitution fluid[1].

Design

Environmental impacts should be considered in the design stage and can include:

-Using materials which reduce impacts of device production
- Designing for reuse
- Designing for recyclability

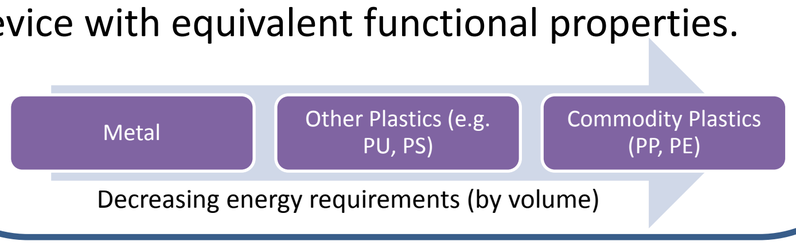
•Changes in design for reduced impacts in one life-cycle stage need to consider potential increased burdens in other stages.

Produce

Using less energy and other resources to produce SUDs is possible by:

•Using less material
e.g. BD claim one of their syringes uses 30% less material[2].

•Using materials requiring less energy to produce a device with equivalent functional properties.

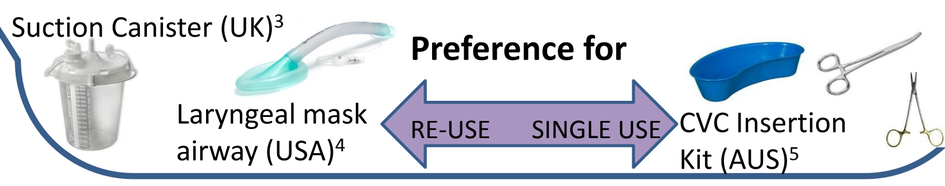


Use and re-use

Re-using SUDs or durable alternatives can reduce the need for SUDs but can require energy intensive cleaning and sterilisation.

This is only safe if adequate cleaning and sterilisation is possible without affecting performance.

Life cycle assessments (LCAs) indicate environmental preference for re-use but not in all circumstances.



Recycle

Open-loop recycling of some SUDs is possible following decontamination
(e.g. Stainless steel instruments)

Closed-loop recycling may not be possible due to strict regulations on materials used for medical devices.

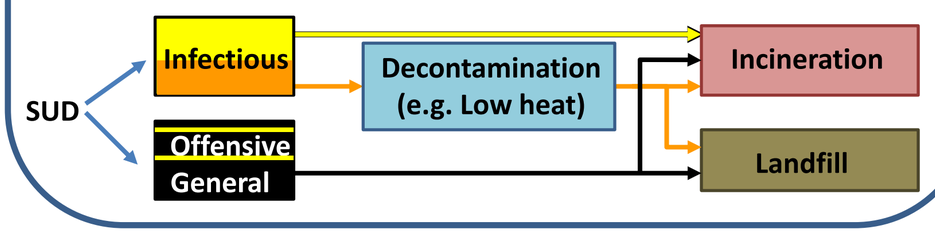
Other SUDs may require changes in design to allow for disassembly of parts made of different materials which need to be homogeneous for recyclability[6].

Dispose

Multiple waste streams with various treatment and disposal options exist for SUD disposal

Where health and safety allow, options with lower environmental impacts should be used.

This is a complex issue and trade-offs exist so the most appropriate option is not always clear.



Conclusions and Recommendations

- Environmental improvements in SUDs are possible but extensive research is required.
- Action in the design stage is vital but device manufacturers may require greater financial incentives to implement this.
- Currently hospitals could focus on recycling metallic instruments and expressing their demand for SUDs with improved environmental profiles to manufacturers.

References

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