



Singapore Healthcare Management 2024



Changi General Hospital
SingHealth



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LAVAGE AND RECHARGE

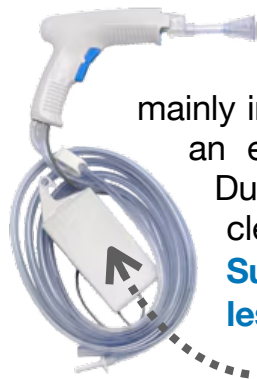
SPARKING SAVINGS AND SUSTAINABILITY

INTRODUCTION

Operating theatres (OTs) produce approximately 50-70% of the total hospital waste, and single-use OT consumables can incur significant costs.

We aim to reduce waste and save costs by repurposing AA batteries from single-use pulsed lavage set (Pulsavac®) sets commonly used in OTs.

BACKGROUND



Pulsed lavage sets (*left*) are commonly used in the OT for wound irrigation and cleaning, mainly in the orthopaedics setting. They are attached to an external battery pack containing AA batteries. During routine use, these battery packs are kept clean (away from the patient and sterile field).

Such sets may be only used for 5 minutes or less. They are then subsequently discarded.

Contains 8 AA batteries!

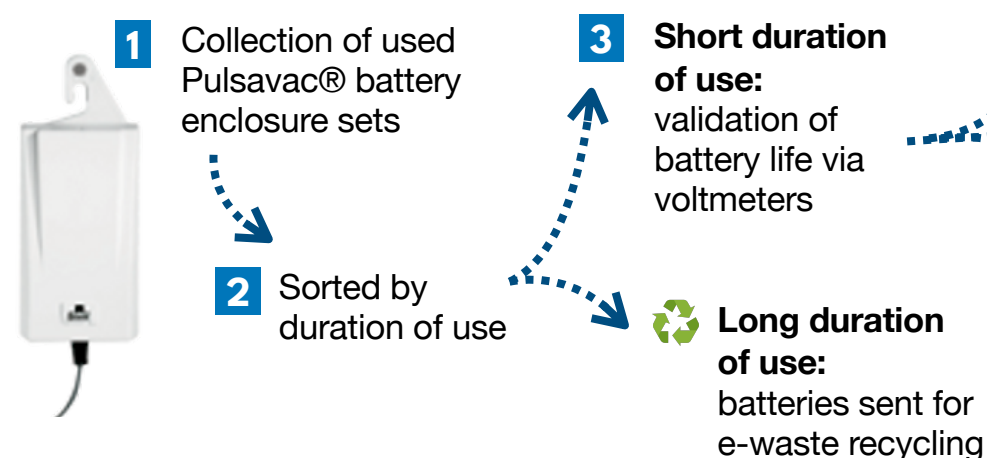
There are many tools and appliances requiring AA batteries in the hospital. Examples include (but are not limited to) automatic hand sanitizer pumps, label printers, and cordless tools. In the Department of Anaesthesia, they are used in patient controlled analgesia (PCA) pumps (*right*).



We set up a workflow to

1. disassemble the pulsed lavage battery enclosures
2. sort batteries by battery life
3. repurpose the AA batteries inside for use in various hospital departments in a variety of implements
4. recycle other enclosure components

METHODOLOGY



IMPACT

During a 6 month period (Sept '23 to Feb '24), we have...



1,600
AA batteries collected and repurposed, resulting in potentially...



2.7 gigajoules
in energy savings



90.6 kg
mass recycled



171.1 kg
CO2 emissions reduction



\$1,360
cost savings

Based on a life cycle analysis of AA batteries, each battery has a carbon footprint of 0.107 kg CO₂ (material, manufacture and transport) and 1.73 MJ in energy costs. Battery costs were \$0.85/ battery. Potential environmental and cost savings were calculated as above.

In addition, 25.1kg of plastic, 6kg of metal and 59.5kg of e-waste were separated from the enclosures for recycling. There was a total 90.6kg of realized waste reduction over 6 months.

CONCLUSION

Repurposing used batteries, reducing new battery usage and salvaging enclosure components for recycling leads to significant cost savings and environmental benefits for the hospital. We aim to refine our current workflow and investigate other uses for these AA batteries where possible.

A Dept of Anaes: PCA pumps
batteries tested and validated for use in PCA pumps for nerve infusions

B Various hospital departments

1. Environmental Services (alcohol handrub pump)
2. Maintenance Department (tools, instruments)
3. Childcare center (toys)



Recycling of plastic, metal, and e-waste