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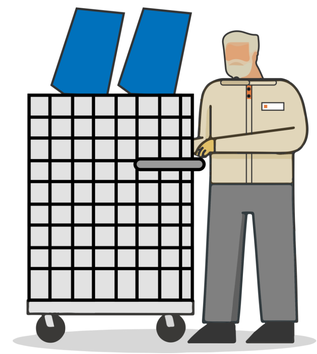

Providing a safe transfer of Vac-Lok cushions with a new transportation trolley implementation

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Introduction

Background

Vac-Lok™ is a type of customized immobilization gadget that is fabricated by vacuuming out the air to create a rigid and secure support for patients during radiotherapy. The vac-loks retain its shape and facilitate daily reproducibility of patients' position throughout the course of treatment (~1.5 months).

Problem

Vac-Loks are transported between SGH Block 2 and NCCS via trolley where staff were observed facing difficulties in maneuvering and transferring of each vac-lok. From previous experience, potential damages to the vac-loks can happen during transfers.

Aims

To address the challenges and risks encountered during transportation of vac-loks for a safe transfer.

Methodology

Three phases Design Thinking (DT) approach (Figure A).

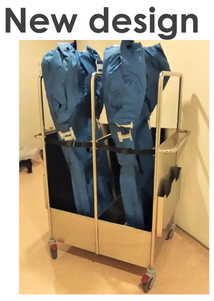
1) Understand phase: Feedback were gathered through interviewing with different stakeholders and observations studies. Potential risks were identified:

- Risk on inventory: Sharp edges on the trolley may puncture the vac-loks during transport as the vac-loks are stacked together without divider, creating risk of frictions between adjacent vac-lok. (Figure B)
- External stakeholders: any damage/mishandling of vac-loks could potentially result in leakage causing interruptions to patients' treatment journey.
- Risk on internal stakeholders: requires ancillary staff to lift the cushion (~5-8kg) 1-metre high during loading/unloading into the old trolley. Staff feedback on manoeuvring difficulties the heavy trolley when fully loaded especially when commuting across the ramp in the tunnel. Additional safety concerns as trolley provides no braking access.(Figure C)

2) Explore phase: The team brainstormed various designs approach from sketching to visual illustrations and 3D CAD. Material, feasibility studies and concept refinements further address the risks and problems identified.

3) Test phase: To validate the idea, the team conducted further testing utilizing software to test on the strengths, durability and dimensions. The trolley was then co-developed with selected vendor with their expertise and suggestions to help guarantee a more extensive solution.

Results

Comparison of the improvements between the 2 trolleys	Old design 	New design 
Smooth corners to prevent puncture/ leakage of cushions risk during transfer	Sharp and protruding edges around the trolley	Achieving zero sharp edges
Compartments divider to **prevent risk of friction** between the vac-loks	No divider	2 dividers provided
Dedicated slots for patient case notes. **Reduce errors of misplacement**	No folder slot	4 folder slots
Better maneuvering with more accessible handlebars for **multi-directional movement** from all sides	Single side handlebar	All corners accessible handlebars
Easier loading of vac-loks (5-8kg each) onto the trolley	Loading in from 100cm height	Loading in from 43.5cm height
Medical wheel casters with brakes for **smooth, quiet and safer transportation**	PVC casters without brakes access	4x PU medical casters with easy brake access

As a result of the new implementation (Figure D), the following risk mitigation measures are in place:

Figure D – Final vaclok Trolley design (Features)

The new trolley has resolved previous concerns and was well-received by ancillary staff. The new design will eventually replace all existing vac-lok transportation trolleys in NCCS.

Conclusion

With the enhanced safety features, user-friendliness alongside easier maneuvering, the new trolley design has addressed previous problems related to vac-lok transfers, thus achieving our aims for the improvement project.

Figure A – Design Thinking Methodology

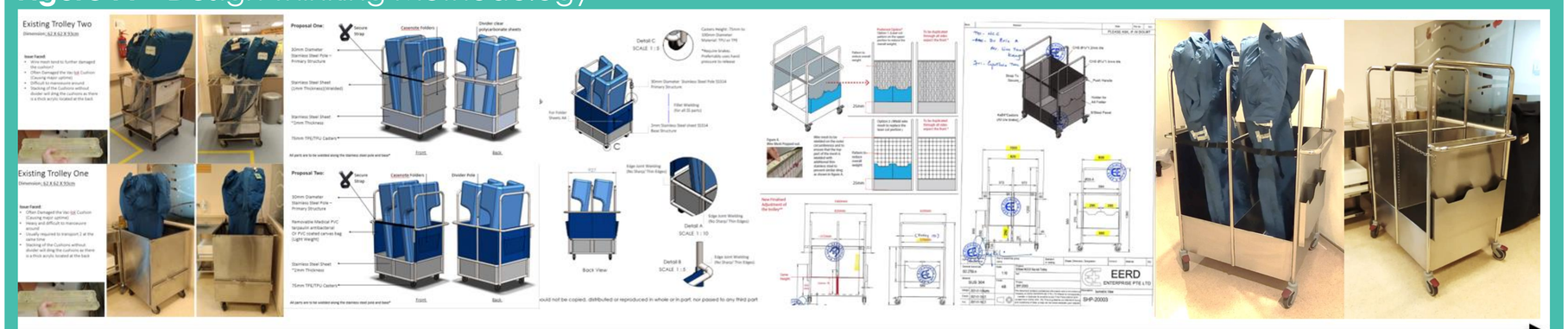


Figure B

Metal wire meshes protruding out of the trolley due to wear and tear.

Figure C

Vac-loks weigh 5-8kg each and staff have to lift it up above 1m during transferring of the vac-loks.