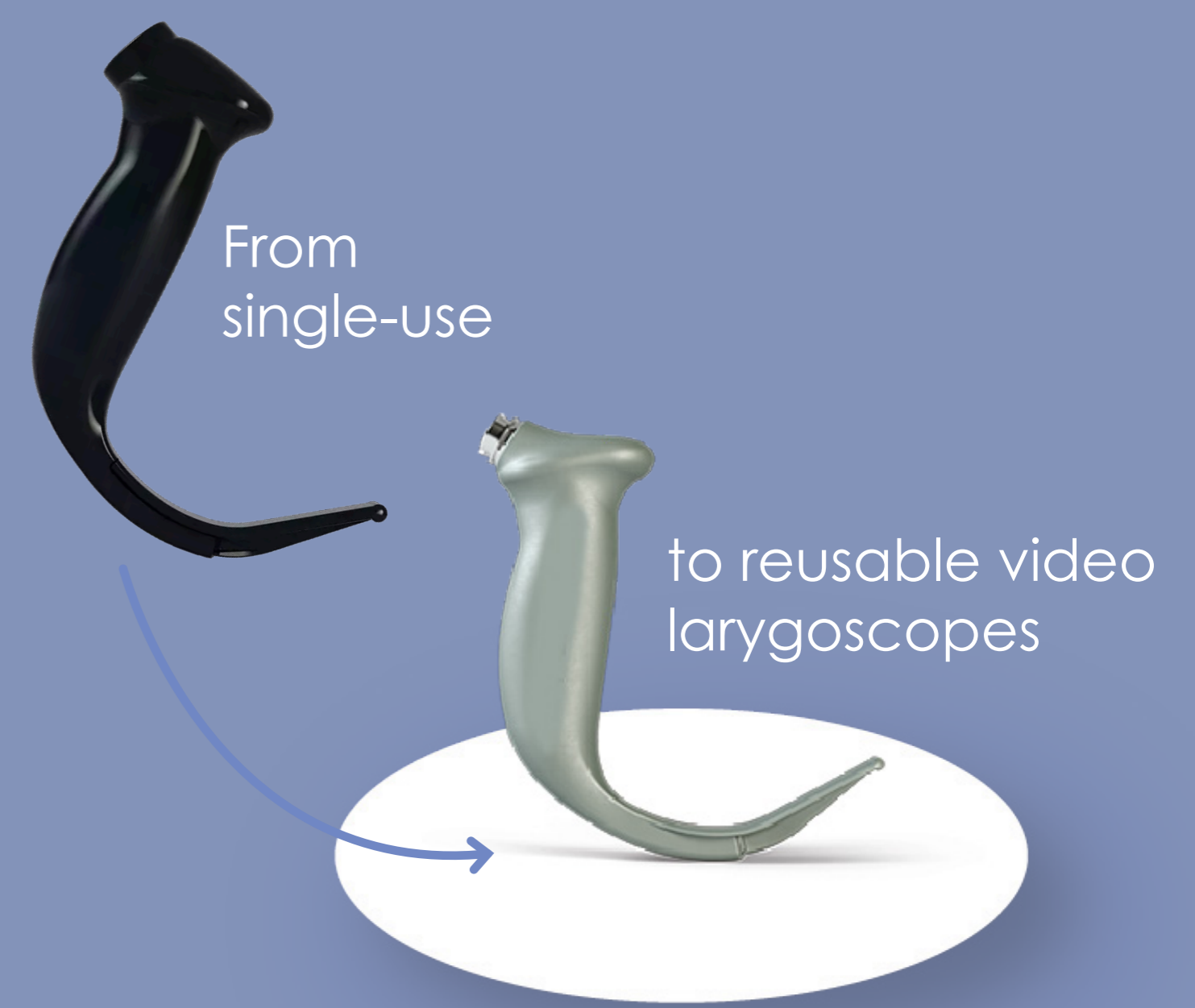


Towards a Circular ICU

How to implement reusable video laryngoscopes at the Intensive Care



Unsustainable healthcare

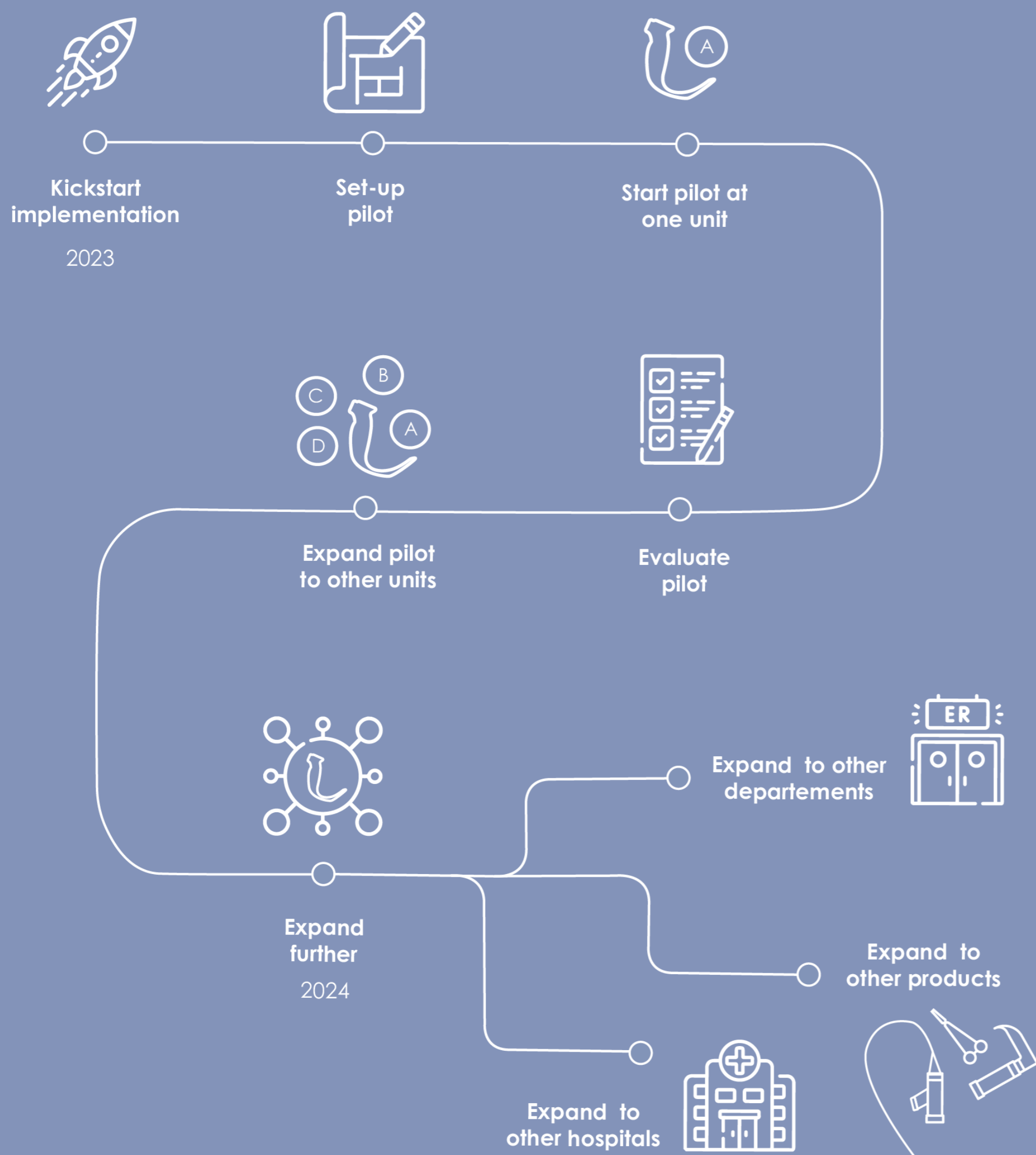
The healthcare sector uses a lot of on single use medical products, causing large amounts of CO2 emissions and excessive amounts of waste. This project contributes to a circular Intensive Care Unit (ICU) by investigating the barriers and possible solutions for a transition from single use video laryngoscopes (VL) to (partly) reusable ones, in order to develop guidelines and best practice for the transition of other single use medical products to reusables.

To produce single-use products, raw materials are extracted, products are manufactured, used, and disposed of after using the product just one time. This is known as the linear economy or the 'take-make-waste' system, having a devastating effect on the environment. However, reusing medical products comes with organisational challenges. Concerns with patient safety, liability, the costs, and complexity of developing and maintaining in-house reprocessing infrastructure and logistics have left hospitals with a complex organisational challenge.

These organisational challenges are investigated with the use of a case product: the video laryngoscope. Through stakeholder interviews and observations barriers to the implementation of reusable video laryngoscopes were identified and evaluated. It was determined that the fully reusable video laryngoscope was the best option since it fits best with the vision of a fully circular ICU in 2030.

Evaluating reusable alternatives

	Single-use VL	Semi-reusable VL	Completely reusable VL
Patient safety	Safe for patients (responsibility with manufacturer)	Safe for patients (responsibility with manufacturer)	Safe for patients (responsibility with hospital)
Workload	No added workload	Extra workload nurses of 30 seconds	Extra workload nurses of 1 min + added workload for logistics and CSD employees
CSD and logistics	No added CSD and logistics	No added CSD and logistics	Added CSD and logistics, but no need to invest in new reprocessing equipment
Costs	66,600 euros/ year	58,680 euros/ year	Initial investment of 208,000 euros + yearly costs of 12,600 for logistics and CSD
Sustainability	Not sustainable - base level	Approx. 66% less CO2 emissions compared to single-use VL	Approx. 6 times less CO2 emissions compared to single-use VL + toxicity of glutaraldehyde



Implementing the fully reusable video laryngoscope

For the implementation of the reusable VL it is essential to spark the actual implementation of the reusable VL and communicate with and facilitate stakeholders. The implementation processes need to be kickstarted through the set-up of a tender, followed by a pilot, pilot evaluation and expansion of the pilot in order to ensure proper implementation. After implementing the VL three other medical devices were identified to follow in the footsteps of the reusable VL: Laryngoscope blades, bronchoscopes, and scissors. Laryngoscope blades and bronchoscopes can be collected in the same place since the use-case of them is very similar to the VL. Scissors will require further research but follow a similar journey to and from

This project brings value to the ICU of the Erasmus MC through identifying that the Erasmus MC has the resources and capabilities to implement the reusable VL's, as well as presenting recommendations for the implementation process.

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