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a life cycle assessment (LCA)

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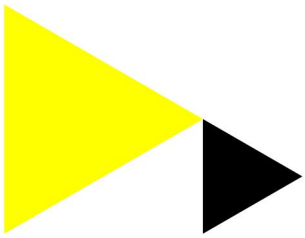

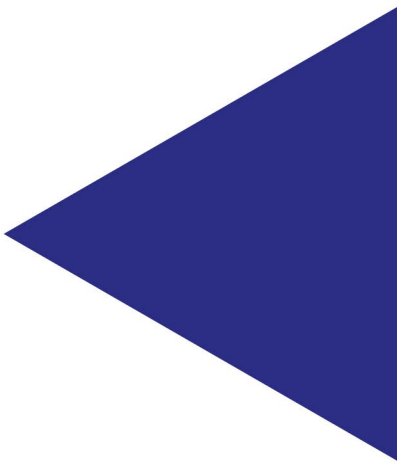

SUSTAINABLE ICU CARE

CLOSED SYSTEM INDICATED WHEN SUCTIONING IS REQUIRED > 6 TIMES PER 72H PER PATIENT

OPEN OR CLOSED SUCTIONING IN INVASIVELY VENTILATED PATIENTS FOR SUSTAINABILITY OF ICU CARE? – a life cycle assessment (LCA)

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INTRODUCTION

Care for critically ill patients comes with the use of disposables and generates a large amount of waste [1]. For example, invasively ventilated ICU-patients receive various airway care interventions to clear secretions in the upper and/or lower airways [2,3]. Endotracheal suctioning is most commonly used, up to 8-17 times per day [4,5].
Endotracheal suctioning can be performed in two ways:

1. closed suctioning (designed for multiple uses within 1-3 days)
2. open suctioning (a single-use catheter)

Analysis on environmental impact of both systems could guide healthcare workers in environmentally friendly and sustainable choices.

OBJECTIVES

Determine environmental impact of open and closed suctioning systems.
Hypothesis:
a closed system is more environmentally sustainable than an open system.

METHODS

Life cycle assessment (LCA) analysis

Materials

1. closed suction system 'TrachSeal', $13,.73 each (Intersurgical, Wokingham, United Kingdom) that needs to be replaced after 72 hours
2. open suction system from Bicakcilar, $0.27 each (Bicakcilar Medical Devices, Istanbul, Turkey)

Life cycle assessment

- calculation of environmental impact of the products over the entire life cycle: from raw material extraction to disposal [6]
- analyses of impact on 18 environmental categories e.g. global warming, toxicity and aggregated categories e.g. damage on human health expressed in disability-adjusted life years (DALYs)

RESULTS

The environmental impact of the closed suction system was significantly higher compared to the open suction system (Fig. 1). However, since one closed suctioning system can be used for several days, the use of 6 or more open systems within 72 hours in one patient has more impact.

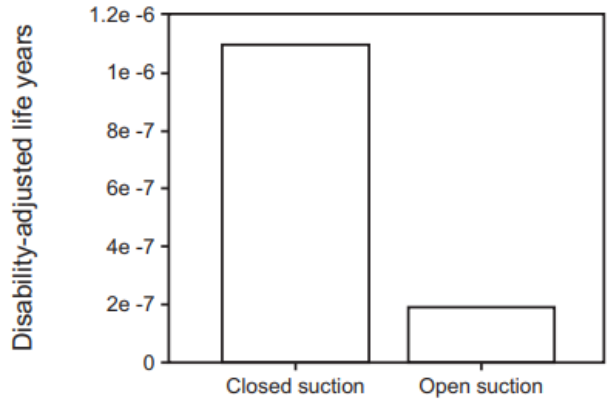

Fig. 1. Environmental impact of two suction systems. Y-axis: damage on human health expressed in DALYs: summarized overall environmental impact of impact factors (e.g., global warming, toxicity)

CONCLUSION

When open suctioning is performed more than 6 times within 72 hours in one patient, the use of a closed suctioning catheter is more sustainable.

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