

# SIMULATION-BASED TRAINING WITH EXTRACORPOREAL MEMBRANE OXYGENATOR SIMULATORS – A TRAINING NEEDS ANALYSIS

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## Introduction

For patients with severe cardiac and/or pulmonary failure, extracorporeal membrane oxygenation (ECMO) support is a life-saving treatment. Complications such as mortality, bleeding, and infections are high, and are strongly related to annual ECMO case volume.

Simulating ECMO practice with simulation-based training on simulators (ECMO sims) help to train technical skills as ECMO cannulation, and non-technical skills as complex decision making [1]. ECMO sims with a high level of realism (high-fidelity) are currently lacking [1]. Our EduECMO project strives to develop such a high-fidelity patient-centred educational ECMO simulator, where training needs should be investigated.

The aim of this work is to obtain expert input on ECMO practices and ECMO sim training needs to optimize EduECMO sim design.

## Methods

INACSL Standards of Best Practice for Simulation [2] were used to conduct a training needs assessment. Invitations to participate in an online survey (Google Forms) were sent to ECMO experts by email. Participants signed informed consent. The study was approved by the University of Twente Ethics Committee (UT-NES 230117).

## Results

A total of 41 professionals from 11 countries worldwide responded (Figure 1). Clinical backgrounds were perfusionist (9), intensivist (8), (intensive care) nurse (7), cardiac surgeon (6), anaesthesiologist (5), cardiologist (4), ECMO specialist nurse (1), and physician assistant (1).

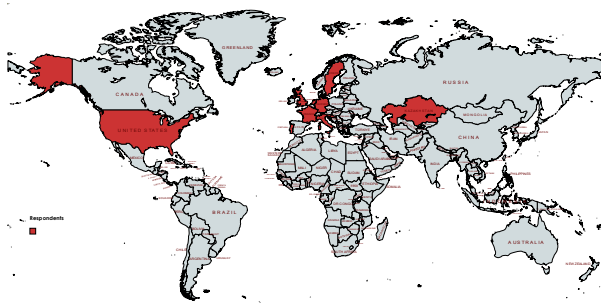


Figure 1: 41 respondents from 11 countries participated in the ECMO training needs survey.

## Basic and complete ECMO simulation training needs

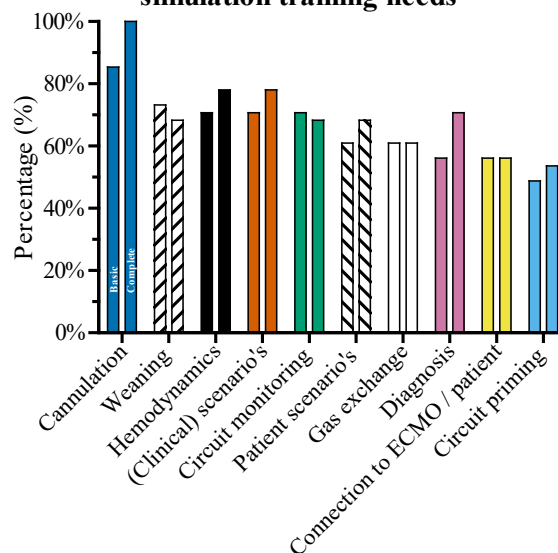


Figure 2: Basic (left columns) and complete (right columns) ECMO simulation training needs as determined by 41 respondents.

18% of respondents are from low-volume centres (< 6 ECMO cases/year), with 42% in mid-volume (6 – 30 ECMO cases/year), and 40% in high-volume centres (> 30 ECMO cases/year).

The majority (83%) had ECMO sim experience, yet only 34% were assessed after training. For both basic and complete ECMO sims, cannulation was deemed most important (85 to 100%), and circuit priming with 49 to 54% the lowest (Figure 2). All respondents (100%) deem at least one patient characteristic as age, sex, skin-tone, or BMI important for basic ECMO sims, with 73% and 20% of respondents requiring mid- to high customization fidelity, respectively.

## Discussion

Our international ECMO simulator training needs assessment showed that a minority of international ECMO experts received ECMO training with subsequent assessment. In line with previous work [1], ECMO sim training needs are not yet fulfilled. Development of a high-fidelity ECMO simulator (e.g. EduECMO) should incorporate these training needs.

## References

1. Duinmeijer et al, J Clin Med, 12:1765, 2023.
2. Sittner et al, Nurs Educ Perspect, 36:294-298, 2012.