

Developing an Extracorporeal Membrane Oxygenation Program



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KEYWORDS

• Patient management • Implementation • Outcomes • Multidisciplinary approach

KEY POINTS

- The Extracorporeal Life Support Organization (ELSO) has developed guidelines that outline the ideal institutional requirements for the development of an extracorporeal membrane oxygenation (ECMO) program.
- The development of an ECMO program requires institutional commitment, advanced technology and equipment, and the multidisciplinary cooperation of trained specialty personnel.
- The ELSO provides an international registry that voluntarily collects centers' individual reported data and offers clinical research support, quality assessment, and regulatory updates related to ECMO therapy.

INTRODUCTION

Extracorporeal membrane oxygenation (ECMO) is a rapidly evolving field that was developed more than 40 years ago for critically ill patients with respiratory failure. Despite other terms used, such as extracorporeal life support (ECLS), ECMO is most often used to refer to all forms of extracorporeal support if gas exchange is involved and is a form of life support for critically ill patients when traditional supportive care is no longer effective. (In this article, which refers directly to source material, the terms

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ECMO and ECLS are used interchangeably.) ECMO has also become a bridge to transplantation and a way to manage acute shock. Over the past 15 years, with the further advancement of ECMO technologies, both the need and demand for ECMO have grown, requiring the development of more ECMO centers.¹ The development of an ECMO program, however, requires institutional commitment, advanced technology and equipment, and the multidisciplinary cooperation of trained specialty personnel.

INSTITUTIONAL COMMITMENT

The Extracorporeal Life Support Organization (ELSO) has developed guidelines that outline the ideal institutional requirements for the development of an ECMO program.² These guidelines suggest an ECMO program is best suited to a tertiary medical center that is centrally/regionally located with a tertiary-level neonatal ICU, pediatric ICU, and/or adult ICU. The institution should also be capable of financially supporting the level of expertise required as well as managing the program's overall cost effectiveness.

Market Analysis

Before planning for the execution and implementation of an ECMO program, an institution must evaluate the regional market. It is crucial to understand the market, regional competitors, and the patient population to predict potential patient volumes and the potential for long-term sustainability.

Needs Assessment

Establishing and maintaining an ECMO program is resource intensive. Prior to initiating a program, a needs assessment is necessary to identify a facility's capability to support a program. Careful consideration must be applied to financial impact, access, and occupancy because the initiation of a program will have an impact on existing critical care services.

Primarily, the center must confirm occupancy of critical care areas allows for the addition of an ECMO program. Total length of stay and ICU length of stay for an ECLS patient are typically much longer than for patients in other specialty areas. Depending on the location of ECLS patient cohort, the addition of ECLS patients could have a negative impact on operating room (OR) throughput and access to ICU beds for non-ECLS referrals.

Self-limiting factors

1. Bed occupancy rate
2. Physician/clinical staff
3. Nursing staff

Knowledge of ECMO as a bridge therapy should be used when designing a program. Although many patients do recover, a small number may require more advanced or durable solutions. The program must be designed with an understanding of the potential for patients to bridge to additional advanced therapies, such as transplantation and ventricular assist devices. ECMO programs without these services should coordinate with centers for the transfer of these patients for consideration of ventricular assist device or transplantation candidacy.

Program Vision

Once the needs assessment and financial modeling are complete, planning for the execution of an ECMO program can begin. Program leadership must be identified.

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