Cleveland Clinic

Simulation and Advanced Skills Center
Simulation Showcase 2024

Standardized Education for Ventilatory Assistance (SEVA) Program

Robert Chatburn, Eduardo Mireles, Sherry Babic, Kimber Catullo, Ryan Cutro,
Alecia Hoffman, Anika Sasidharan Nair

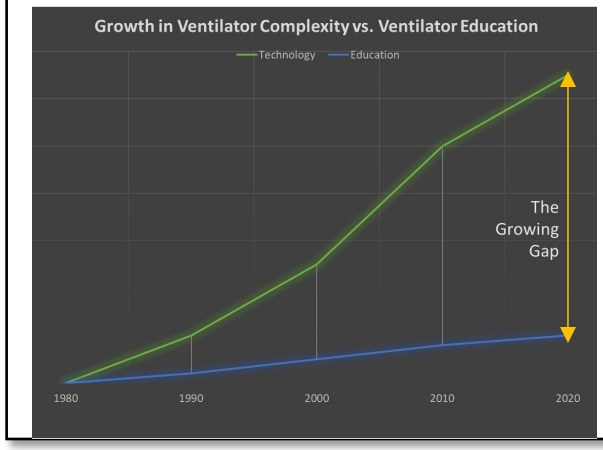
Background

Technology in mechanical ventilation is advancing rapidly and unfortunately, the literature guiding training is not consistent. Mechanical ventilation technology has evolved exponentially over the years, becoming more complex with each generation.

The first generation of mechanical ventilators, before 1980, were mostly noninvasive devices like the iron lung, driven by the Polio pandemic. Currently, the sixth generation offers up to 75 different modes on a single device, featuring advanced control, monitoring, and graphics capabilities, including artificial intelligence.

Currently we have documented 591 different names for modes on 74 different ventilators, and a formal taxonomy identifies 86 unique modes. The technological complexity of ventilators has grown exponentially, but educational resources have not kept pace, leading to a knowledge gap among clinicians. This gap impacts patient safety, healthcare costs, and clinician confidence.

Current gaps in ventilator education and training include that caregivers are trained for the present use of ventilation with no thought for the future technology, there are no credentialing requirements for mechanical ventilation, and the majority of ventilator training is left to the ventilator manufacturing companies that do not guarantee all clinicians are trained and are often only offered during the purchase of new ventilators.



Course Description

SEVA stands for Standardized Education for Ventilatory Assistance. The SEVA mission is to provide a universal and standardized education program in the theory and practice of mechanical ventilation. SEVA uses online and simulation-based instruction that is both self-directed and instructor-led to elevate the competency of healthcare professionals to a mastery level. Clinicians need to understand the technology to apply it to patients effectively and safely. The SEVA program is facilitated by a team of physicians, respiratory therapy educators, research professionals, and simulation specialists. It is intended for experienced caregivers in charge of implementing and managing mechanical ventilation such as critical care physicians (fellowship through staff), respiratory therapists, advanced practice providers, and more.

The SEVA program is based on two decades of work on mechanical ventilation education. Its bases are published in peer-reviewed literature and leading mechanical ventilation textbooks. This included a ventilation taxonomy and an approach of goal-focused care. It is designed to progressively increase the learner's level of knowledge of mechanical ventilation over six courses; three online learning modules and three in-person, day long courses of simulation, group work, and lecture. The program consist of six courses.

1. SEVA-basic: Basic concepts of mechanical ventilation, course topics, and key terminology
2. SEVA-theory: A deep dive into mechanical ventilation, physiology, and taxonomy
3. SEVA-lab: Application of basic concepts on mechanics and waveform analysis
4. SEVA-method: Apply the methods and strategies for implementing Goal-Directed Ventilator Management.
5. SEVA-optivent: Achieve proficiency in ventilator optimization to meet mechanical ventilation goals of patient safety, comfort, and effective release through evidence-based strategies and standardized protocols.
6. SEVA-monitor**:** Develop competence in monitoring and interpreting ventilation data to inform clinical decisions.

KEY FEATURES OF SEVA

- *Standardized Nomenclature*: Consistent terminology for better communication.
- *Technology Understanding:* Deep dive into mechanical ventilator functions and designs.
- *Patient-Ventilator Interaction:* Waveform interpretation for optimizing the interaction for better patient outcomes.
- *Safe Ventilation Practices:* Ensuring safe and effective ventilation strategies.
- *Improved Reporting:* Enhancing communication and reporting through standardized methods.

Outcomes

Pre and post test data was collected each time a learner completed a SEVA-basic, theory or method online learning module. The modules were available on Cleveland Clinic's myLearning platform and was open to all respiratory therapists, critical care APPs, and critical care physicians and it was collected over a one-year period. 47 learners completed SEVA-basic, 20 learners completed SEVA-theory, and 35 learners completed SEVA-method. The results for learner improvement from the pre-test to the post-test was statistically significant with p from the paired t-test at < 0.001 for each module. The results for each module can be seen in the tables below.

SEVA-basic	Pre-test	Post-test
Mean	70	93
Variance	436	34
Observations	47	47
p from paired t-test	<0.001	

SEVA-theory	Pre-test	Post-test
Mean	75	97
Variance	295	33
Observations	20	20
p from paired t-test	<0.001	

SEVA-method	Pre-test	Post-test
Mean	74	92
Variance	164	31
Observations	35	35
p from paired t-test	<0.001	

Confidence Level	Pre-Program	Post-Program
Mean Score	3.97	5.17
p from paired t- test	p < 0.05	

Additionally, a retrospective post-then-pre design to measure participants' self-reported confidence levels before and after the program. This method helps control for response shift bias by asking 150 participants to rate their confidence levels at the end of the course, both as they feel now and as they recall feeling before the course. The confidence levels were measured on a 7-point Likert scale.

The paired t-test showed a significant increase in confidence levels from pre-course to post-course, indicating that the course had a positive impact on participants' confidence.

FUTURE

A post test is being prepared to test the entirety of the SEVA program. Once this test is passed, learners will be considered 'SEVA Masters'. The program is also growing on an international level with several training taking place around the globe. The SEVA team aims to make this the standard education for mechanical ventilation training worldwide.

Contact Information

SEVA@ccf.org
SEVA Program | Cleveland Clinic

American Society of Anesthesiologists® Endorsed Program Simulation Education Network

American College of Surgeons • Division of Education Accredited Education Institutes — Enhancing Patient Safety Through Simulation — Accredited Education Institute

SSH Society for Simulation in Healthcare Accredited Program Assessment, Research and Teaching/Education