

# Preparedness and Education in Airway Management



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## KEYWORDS

- Airway management • Education • Simulation
- Competency-based medical education • Simulation-based medical education
- Deliberate practice • Simulation-based mastery learning

## KEY POINTS

- Inadequate education and training are major factors contributing to patient morbidity and mortality in airway management.
- Preemptive thinking and planning are essential components of safe airway management.
- Simulation-based medical education (SBME) has efficacy similar to that of traditional medical education.
- Deliberate practice is a more effective indicator of expertise than experience or academic achievement.

## PREPAREDNESS AND EDUCATION

*The purpose of medical education at all levels is to prepare physicians with knowledge, skills, and features of professionalism needed to deliver quality patient care.<sup>1</sup>*

### ***Traditional Medical Education***

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Most anesthesiologists have honed their skills in the operating room during many hours of clinical practice; this is the traditional method of medical education that

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Disclosure: Dr P. Baker has received airway management equipment for teaching and research purposes from a number of companies including Olympus, Karl Storz, Covidien, LMA, Ambu, Parker, Welch Allyn, Cook, King Systems, Verathon, and Truphatek. He also owns Airway Simulation Limited, which manufactures the ORSIM bronchoscopy simulator.

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was formalized into an apprenticeship model by William Halsted more than 100 years ago. Learning depends on exposure to clinical cases of varying difficulty and can be improved by supervision and teaching. This method of experiential learning has advantages of managing real anatomy, physiology, and pathology in a stream of variety and complexity. Experience is conveniently gained during working hours without absence from operating sessions to attend lectures or workshops. The apprenticeship model remains the most common form of medical education and has supporters who argue that competency-based medical education (CBME) is too prescriptive, thereby missing the broader qualities of being a physician.<sup>2</sup> It is also claimed that CBME tends to dwell on mere competence and therefore sets a low standard for readiness to practice and tends to be top-down, applying primarily to trainees.<sup>3</sup>

Despite this support, the traditional medical education model has the following flaws<sup>4</sup>:

1. Clinical exposure to complex patients is serendipitous, and therefore the development of airway experience is proportional to working hours. The type of case mix, increasing use of alternative airway devices such as supraglottic airways (SGAs), regional anesthesia, and clinical placement can all adversely affect airway skill development. Some technical skills develop slowly because of the low incidence of difficult airways (Table 1). One study concluded that up to 200 endotracheal intubations, under supervision, may be required before trainee anesthesiology residents achieve a 95% success rate in the operating room.<sup>5</sup> A similar study examined the learning curve for the laryngeal mask airway in first year anesthesiology residents and found that supervision was deemed necessary for the first 40 insertions.<sup>6</sup>
2. With traditional medical education, patients are inevitably exposed to novices; this has direct implications on patient safety, particularly with high-risk procedures required for airway management. Novice bronchoscopists have an increased complication rate during the first trimester of their bronchoscopy training, which can influence the success rate of positive biopsy results.<sup>11,12</sup> Direct laryngoscopy and tracheal intubation have a success rate of only 50% in novices, with a heightened risk of esophageal intubation during this time.<sup>13</sup>
3. Teaching airway management in the operating room is not ideal, because it can increase the workload of the instructing anesthesiologist and cause distraction from patient care.<sup>14</sup> Ethical issues arise if patients are used for training purposes when the airway procedures are either unnecessary or unsafe.<sup>15–18</sup>
4. Airway equipment is often introduced into departments with little training or reference to instructions.<sup>19</sup> Practitioners are often self-taught or are taught by

**Table 1**

**Gaining experience at managing complex airway problems inevitably takes time because of the low incidence of difficult airways**

Difficult intubation	6.2% <sup>7</sup>
Difficult bag mask ventilation	1.4% <sup>8</sup>
Difficult bag mask ventilation, difficult laryngoscopy	0.4% <sup>7</sup>
Impossible bag mask ventilation	0.15% <sup>9</sup>
Impossible laryngeal mask	1.1% <sup>10</sup>
Impossible intubation, difficult bag mask ventilation	0.3% <sup>7</sup>
Impossible intubation, impossible ventilation	0.0019% <sup>9</sup>

Data from Refs.<sup>7–10</sup>

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