

A History of Ethics and Law in the Intensive Care Unit

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- Withholding and withdrawing life-sustaining therapy
- Cardiopulmonary resuscitation • Do-not-resuscitate orders
- Critical care medicine

Intensive care units (ICUs) have existed in the United States and other developed countries for approximately 50 years. During that time, many patients have benefited from mechanical ventilation and other medical interventions available in the units. However, these treatments have not been in the past and are not today uniformly effective. According to Angus and colleagues,¹ one-fifth of all Americans now die after using intensive care some time during a terminal hospital admission. Whether they live or die, many ICU patients experience prolonged pain and suffering. At the same time, their care comes at a high price: Multz and colleagues² have estimated that in 1998, ICU expenditures in the United States amounted to 34% of hospital budgets, \$62 billion in health care costs, and more than 1% of the gross domestic product.

Because they provide potential benefit at great personal and public cost, the ICU and the interventions rendered therein have become symbols of both the promise and the limitations of medical technology. At the same time, the ICU has served as an arena in which many of the ethical and legal dilemmas created by that technology have been defined and debated. This article outlines major events in the history of

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ethics and law in the ICU, covering the following 10 areas: (1) the evolution of ICUs, (2) ethical principles, (3) informed consent and the law, (4) medical decision-making, (5) cardiopulmonary resuscitation, (6) withholding and withdrawing life-sustaining therapy, (7) legal cases involving life support, (8) advance directives, (9) prognostication, and (10) futility and the allocation of medical resources.

Although other countries have contributed to the history covered in this article, the authors highlight the United States because they are most familiar with how ethical principles are applied in the United States and with its laws. In addition, although nurses and other clinicians are invaluable members of the ICU team, the article focuses primarily on the role of physicians in causing and confronting ethical and legal issues. Finally, although some men and women who have addressed these issues and contributed to the authors' knowledge of them are mentioned, many others have not been mentioned because of space limitations.

THE EVOLUTION OF ICUs

The ICU, now commonplace in hospitals in the United States and other developed countries, evolved from three main sources, according to Hilberman.³ First was the postoperative recovery unit, the first of which was established for neurosurgical patients at the Johns Hopkins Hospital in Baltimore in 1923. The demand for recovery units increased during World War II, with the development of field hospitals and new surgical techniques that kept patients alive but required prolonged recovery. The Ochsner Clinic in New Orleans opened a recovery unit in 1947 so that patients undergoing complicated procedures, such as pneumonectomy and esophagogastrectomy, could be maintained after surgery. This and other recovery units were the forerunners of today's surgical ICUs (SICUs).

The first medical ICUs (MICUs) were created primarily to care for patients with respiratory failure caused by poliomyelitis and other neuromuscular diseases. Negative-pressure ventilation was used for such patients until Ibsen⁴ demonstrated the superiority and wider applicability of positive-pressure ventilation during the polio epidemic in Copenhagen, Denmark in 1952. Respiratory care units were opened in Toronto, Canada, Uppsala, Sweden, and at the Baltimore City Hospital in 1958. The Baltimore unit, which was developed by Safar,⁵ is regarded by Ayres and Combs⁶ as America's first stand-alone ICU.

The first coronary care units (CCUs) were established in 1962 at Toronto General Hospital, Bethany Hospital in Kansas City, and Presbyterian Hospital in Philadelphia.³ These and the other units that followed were based in large part on advances in electrocardiographic monitoring, which revealed that potentially treatable arrhythmias often caused death in patients with myocardial infarctions, and on resuscitative techniques that could best be used in such patients if they were closely monitored. These advances included AC defibrillation, which was shown to reverse ventricular fibrillation by Zoll and colleagues⁷ in 1956; closed-chest cardiac massage, reported by Kouwenhoven and colleagues⁸ in 1960, to support patients who arrested while receiving anesthesia; and DC defibrillation, which was demonstrated to be superior to AC defibrillation by Lown and colleagues⁹ in 1962.

Specialized units for neonatal and pediatric patients, patients with burns and neurosurgical problems, and patients recovering from heart surgery were developed after SICUs, MICUs, and CCUs were established. Like the earlier units, these new units were justified primarily by studies demonstrating the physiologic effects of mechanical ventilation¹⁰ and other therapies. Few outcome studies were actually available in the 1950s, 60s, and 70s, other than those showing improved survival because of the

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