CHAPTER 2

Shaping the Next
Critical Care Workforce

Timothy G. Buchman, MD, PhD, MCCM;
Walter A. Boyle III, MD, FCCM; Mary Beth Beyatte, ACNP-BC
Throughout the next 25 years, the demand for critical care will increase. This fact is of special significance, because in developed nations, the post-World War II “baby boomer” generation has entered its seventh decade of life and is facing life-threatening illnesses that will require critical care services.

Among that generation are many critical care physicians and nurses who were drawn to the exciting new discipline of critical care during its rapid 1970-1990 expansion, when interventions such as mechanical ventilation, bedside hemodynamic measurements, and renal replacement therapies became commonplace. However, projections indicate that the ranks of these aging critical care professionals will not be adequately replenished in the ICU. According to studies by both professional organizations and the US government, the gap between needed and available physicians and nurses in the ICU will continue to widen over the next two decades.

In 2000, Angus et al and the Committee on Manpower for Pulmonary and Critical Care Societies reported that more than half of all ICU days and approximately 67% of all inpatient pulmonary days were consumed by patients older than 65 years. Intensivists and pulmonologists worked 61 hours per week over 48 weeks per year to meet the demands. However, most recent data suggests that these demands will not be met going forward, with future predictions in the 2003 US Department of Health & Human Services report of a 22% shortfall of intensivists by 2020 and 35% shortfall by 2030.1

Regulatory changes limiting duty hours have further compounded the challenge. Trainees whose learning derived largely from inpatient service now face progressive duty-hour restrictions and requirements for outpatient experience. These constrain assignments to ICU rotations, critical care clinical experience, and training. These resident duty-hour standards, first mandated by the US Accreditation Council for Graduate Medical Education in 2003 and revised in 2011, were implemented after the Committee on Manpower for Pulmonary and Critical Care Societies’ and US Department of Health & Human Services’ reports were issued. Thus, the projected shortfalls could be even greater than predicted. Similar duty restrictions may well be imposed on other licensed care providers in the near future.

Finally, studies that demonstrated the positive effects of dedicated ICU provider oversight on improved patient outcomes over the last decade have fueled the demand for critical care-qualified providers. In the United States,
this demand is based on patient advocacy through organizations such as the Leapfrog Group.

One approach to addressing the provider shortfall is to change the composition of the multiprofessional critical care team. Another is to reallocate responsibilities among team members. New professional pathways for nurses, such as acute care advanced practice nursing, and critical care training pathways for physician assistants, have created a new category of professional provider to the critical care team. In general, these new providers partner with critical care nurses as front-line caregivers, bringing the competence needed to deliver high quality critical care by extending and leveraging the limited physician intensivist supply. These professional providers further enhance care through attention to standards and adherence to protocols.

This chapter provides an overview of new training pathways and programs that have the potential to fully integrate acute care-trained advanced practice nurses and physician assistants into the critical care team. This chapter further focuses on education strategies that reliably lead to the development of the competencies necessary and appropriate for care providers of critically ill and injured patients.

National Experience

The Critical Care Workforce Partnership, a collaboration of the American College of Chest Physicians, the American Association of Critical-Care Nurses (AACN), the American Thoracic Society, and the Society of Critical Care Medicine, proposed solutions for alleviating current and future critical care provider shortfalls and provided strategies for increasing the number of these providers, increasing the efficiency of the critical care workforce, and addressing demands for critical care services, particularly the demands of the rapidly aging population. One of the proposed recommendations for increasing the critical care workforce is to augment medical and nursing schools’ capacity to educate and prepare critical care providers.

The acute care nurse practitioner (ACNP) is the youngest nurse practitioner (NP) specialty. It evolved in the late 1980s, with the first certification examinations given in 1996. Much like the first NPs in the 1960s, the ACNP specialty emerged in response to a need for cost-efficient, accessible, comprehensive care for patients in need of both short- and long-term acute care. The ACNP role continues to mature as new opportunities for acute care providers emerge.

Research supports the effectiveness and safety-mindedness of ACNPs in the critical care environment. Russell et al found that patients admitted to a neuroscience ICU and to a neurosurgical ward in a university health system who were managed by two ACNPs had shorter overall lengths of stay, shorter mean lengths of stay in the ICU, fewer urinary tract infections, less skin breakdown, and shorter time to mobilization than patients in a comparison group not cared for by ACNPs. In a subacute medical ICU, Hoffman et al found that outcomes did not differ significantly when patients were managed by a team consisting of an ACNP and attending physician compared with a team consisting of a critical care/pulmonary...
fellow and attending physician. Rates of readmission to a high-acuity medical ICU or other ICU within 72 hours of discharge from the subacute medical ICU, rates of mortality and length of stay, and duration of mechanical ventilation were not significantly different. In addition, reintubation rates were lower in the patients managed by the ACNP team.

The Woodruff Health Sciences Center Programs
The Woodruff Health Sciences Center includes Emory University School of Medicine, Nell Hodgson Woodruff School of Nursing, and Emory Healthcare—the largest, most comprehensive health system in Georgia. The Department of Family and Preventive Medicine houses the physician assistant (PA) division, which annually recruits approximately 50 students into a 28-month graduate program that leads to a master’s degree. The school of nursing hosts a 3-semester, 41-credit-hour ACNP training program that prepares nurses to provide advanced practice in acute care settings. After completing the training program, both PAs and ACNPs may then apply for advanced training to become an affiliate provider in critical care. ACNPs typically have 5-10 years of prior experience as critical care nurses. Woodruff Health Sciences Center’s 12-month critical care medicine affiliate provider training program consists of a 7.5-month (ie, 1,250-hour) required practicum that is supplemented with 2 months of lectures, simulations, and national standard courses (eg, Fundamental Critical Care Support), and 2.5 months of electives. During the 1,250-hour practicum, trainees rotate through neuroscience, cardiothoracic, surgical, medical, and emergency critical care units.

The Barnes-Jewish College/ Washington University Program
Another approach to preparing ACNP students for primary provider roles in the care of acute and critically ill and injured patients, specifically those requiring critical care, can be found in the acute care nurse practitioner program at Goldfarb School of Nursing at Barnes-Jewish College, which partners with Washington University School of Medicine’s Department of Anesthesiology. The Goldfarb School of Nursing is located on the campus of Washington University Medical Center in St. Louis. It began in 2009 as a 27-month, 47-credit-hour course of study for registered nurses with Bachelor of Science degrees. Graduates of the program are awarded a Master of Science in Nursing degree and are eligible to take a national ACNP certification examination. A 23-credit-hour, post-master’s certificate program is also available for licensed NPs who wish to become certified in acute care. Admission criteria include 2 years of recent experience in an ICU setting and current Advanced Cardiac Life Support provider status. After an annual application deadline, applicants are interviewed and selected based on admission criteria, prior work experience, recommendations by peers, and personal goals.

Curriculum
The Essentials of Master’s Education in Nursing, produced by AACN;\(^5\) the Nurse Practitioner Core Competencies, produced by the National Organization of Nurse
Practitioner Faculties (NONPF); and the Nurse Practitioner and Clinical Nurse Specialist Competencies for Older Adult Care, by AACN, guide the curricular elements essential to NP education and emphasize quality care outcomes, leadership, collaboration, innovation, and application of evidence-based practice. The Acute Care Nurse Practitioner Competencies, produced by the National Panel and facilitated by NONPF, are built upon and used in conjunction with the NP core competencies. This set of competencies addresses the unique attributes that graduates of ACNP programs must possess to effectively manage acute and critically ill patients and also reflects ACNP scope of practice. The Acute Care Nurse Practitioner Board Certification Test Content Outline, produced by the American Nurses Credentialing Center, also guides curricular content and includes system-specific health problems, psychosocial health issues, and other problems common in acute care. The business aspect of NP practice is also reviewed and discussed. Topics addressed include prescribing principles; reimbursement for NP services, including proper documentation and coding for services provided; credentialing and privileging; certification; and collaboration.

Didactic content in the ACNP specialty courses is delivered by means of traditional classroom presentations given by program faculty and guest speakers from Barnes-Jewish Hospital and Washington University School of Medicine. Included are online modules offered by organizations such as the Society of Critical Care Medicine and AACN; select readings, including pertinent guidelines; and both web-based and in-classroom clinical simulation. Simulation scenarios focus on acute and critical events that occur frequently and those that possess the most serious consequences if not recognized in a timely manner. The scenarios provide additional experiences and opportunities for application of clinical reasoning and incorporation of invasive and noninvasive skills in patient management, which are taught in a parallel course. Students are also encouraged to attend didactic offerings and journal club presentations offered by various nursing and medical departments within Barnes-Jewish Hospital to complement the lecture series, modules, and simulation.

A dedicated course for instruction on the performance of invasive procedures and skills commonly used in acute and critical care settings is included. Procedures such as central and arterial line insertion, endotracheal intubation, bronchoscopy, lumbar puncture, chest tube insertion, and thoracentesis are performed in a clinical simulation laboratory prior to their performance in the clinical setting. Competence is assessed through direct observation by clinical faculty from Barnes-Jewish Hospital, Barnes-Jewish College, and Washington University. After simulation instruction and performance, students gain additional experience with procedure performance throughout mentored clinical rotations, in the operating room by working alongside anesthesiologists, and in the interventional pulmonary department collaborating with more experienced advanced practice nurses.

Noninvasive skills taught in the program include electrocardiogram and radiograph interpretation, as well as management of mechanical ventilation,
pacemakers, and balloon pumps. Students are also provided didactic instruction in radiology that is followed by dedicated experience with physicians in Washington University’s Department of Radiology, where the primary focus is on chest and abdominal radiograph interpretation.

The clinical component of the program includes a total of 740 clinical hours, most of which are prearranged by program faculty. Students rotate through the various critical care areas of Barnes-Jewish Hospital, including the surgical/burn/trauma ICU, neurosurgical ICU, cardiothoracic ICU, and medical ICU, with additional focus on urgent care and diabetes management. Elective hours are built into the rotation schedule and provide students with an opportunity to select the patient care areas or departments of their choice. They work side by side with an experienced group of ACNPs; other advanced practice nurses; and Washington University critical care, emergency medicine, and internal medicine physicians. Regularly scheduled clinical debriefing sessions complement the clinical experiences and provide the students additional opportunities to formally present to faculty and fellow classmates the patients cared for during their clinical rotations. The goals of the sessions are to build students’ confidence, improve their presentation and communication skills, improve their organization of clinical thinking, and synthesize all aspects of acute and critical care into their practice. The sessions stimulate thoughtful dialogue and inquiry and provide additional methods of assessing student competence.

The clinical component also requires that students attend unit-specific, departmental, and hospital-wide meetings and conferences to enhance their clinical experiences and provide additional exposure to evidence-based practice, leadership roles and opportunities, quality improvement, and policy. Examples include grand rounds, morbidity and mortality conferences, multidisciplinary patient care conferences, quality improvement meetings, and advanced practice nursing council meetings.

Competency is assessed with a variety of methods, including direct observation by clinical faculty during clinical simulations and in the clinical areas; patient presentations; clinical notes; case studies; and objective examinations. In the simulation lab, each simulated scenario or procedure includes an accompanying set of objectives and a checklist that contains essential steps that must be performed to successfully complete the scenario. Program and affiliated faculty and fellow students evaluate the students’ performances. Simulation debriefing occurs immediately after each scenario to review the scenario, the performance, and potential areas for improvement and discussion. In the clinical setting, preceptors are required to evaluate each student based on course objectives, discuss evaluations with each student, and submit completed evaluation forms to the program faculty for review.

Students also complete self-evaluations at midterm and near the conclusion of each clinical course. Program faculty then meets with each student to discuss potential concerns, areas for improvement, and a suggested learning plan.
to address deficiencies. Clinical notes, including admission, consult, progress, and those written in the subjective, objective, assessment, and plan format (commonly referred to as “SOAP notes”), are submitted and reviewed by faculty throughout the clinical courses. Patient histories, physical examinations, assessments, and plans are included in each note, as is reimbursement and coding information. Case studies focus on a variety of acute and critical care topics and encourage development of differential diagnoses, lab and radiograph interpretation, and patient management, including health promotion and disease prevention interventions.

Objective examinations, in the form of multiple-choice questions, are administered during the didactic courses and include content on system-specific health problems in acute and critical care. The emphasis of the examinations is on identification and interpretation, patient management principles, and prioritization.

Summary
Preparing advanced practice nurses and physician assistants to function effectively as practitioners in the critical care environment can be challenging for both faculty and students. Both face increased patient care demands, greater patient acuity, and advancements in technology and expectations of evidence-based practice. Key factors in optimizing outcomes for the hiring institutions, the individual NPs and PAs, and ultimately the patients are attention to each student’s previous clinical and work experience and educational preparation, dedicated faculty and clinical preceptors, and rich clinical exposure and opportunities. ACNP or PA educational programs, such as those described in this chapter, build on the education, clinical experiences, and aptitudes of each trainee and work to mold critical care practitioners who provide quality, patient-centered care. This approach to education and training will enable a new breed of ICU practitioners to help fill current and projected critical care provider workforce demands.9-14

REFERENCES


