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Is there an ICU doctor in the house?

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In the year 2000, the Committee on Manpower for Pulmonary and Critical Care Services (COMPACCS) developed detailed estimates on the status of the intensivist physician workforce and demand for intensive care services in United States, and additionally modeled future supply and demand for these services. The analysis was based on a variety of contemporaneous data sources from adult noncardiac intensive care units (ICU), and incorporated the effects of the aging of the United States population, age- and disease-specific intensive care use rates, rates of physicians entering the practice of intensive care and physicians leaving the intensive care workforce. The results from the analyses were a concerning projected 22% shortfall of physician intensivist supply by the year 2020, and an even larger gap of 35% by the year 2030 (1).

Since the publication of the COMPACCS forecast, indeed the number of intensive care beds has risen dramatically in the United States, from 88,252 in the year 2000 (2) to 107,409 in 2016 (3), coinciding with growth and aging of the United States population from 281 million to 323 million persons over the same interval (4). And yet, despite considerable interest in intensivist physician staffing and health care outcomes (5–8), there have been fewer investigations into the actual availability of ICU physicians themselves. In 2016, the Health Resources and Services Administration attempted to address this information gap and developed a report that included critical care physician and nurse practitioner workforce projections using AMA Physician Master File codes and a Health Workforce Simulation Model (HWSM, 9). However, the micro-simulation approach made several general assumptions that negatively impacted the accuracy of the projections: (1) supply and demand for services were assumed to be balanced at baseline, (2) the current age and sex distribution of new physician entrants to the workforce was used in future year calculations, and (3) current patterns of retirement and hours worked were used in future year calculations. Consequently, despite an aging United States population and repeated observations of consistent growth in the ICU bed numbers nationally (2, 10, 11), the HWSM report concluded that the ICU physician workforce was not only adequate, but would *exceed* demand by 2025. The conclusion, out of sync with ongoing demographic and infrastructure trends, was wrong.

In this issue of the Journal, Halpern et. al. provide a much needed summary on the state of the ICU physician workforce, using data from the American Hospital Association's Annual

Survey (12). Unlike the HWSM, the Annual Survey is a detailed yearly record of hospital characteristics, and since 2010 includes questions on the provision of care by intensivists. After applying a series of data validation steps and decision rules, the authors reported a total of 28,808 privileged intensivist physicians in the year 2015, representing 19,996 full-time equivalent intensivist physician positions.

The analysis by the authors is important because it provides a practical estimate of the physician ICU workforce in the United States. Unlike the American Medical Association Physician Masterfile or data from the American Board of Medical Specialties, which more narrowly tally physicians using self-designations of practice or critical care board certification – respectively, the American Hospital Association measure of privileged intensivists represents the workforce from the perspective of the hospital. The count of intensivists is therefore the practical physician workforce dedicated to critical care, and is a closer reflection of the patient care within the hospital. From Halpern group we also learn that the types of hospitals that have intensivists are generally larger centers, with more absolute and relative ICU beds, and are located predominantly in metropolitan areas. These resource estimates are essential first steps towards understanding how and where intensive care is being delivered in the United States.

And yet, there are still important gaps in our understanding of how intensive care is provided by physicians in the United States. Although the Annual Survey definition of physician intensivist provided a practical and hospital-based perspective on the number of physicians providing critical care services, we do not have insight into the composition or training of that workforce. For example, it is almost certain that many of the physicians identified as providing intensive care in this analysis were hospitalists. Recent work by the Society of Hospital Medicine indicates that 77% of hospitalists provide critical care services, with 66% serving as the primary ICU service provider (13). Concerningly, however, the same study identified high rates of clinical discomfort among ICU-practicing hospitalists and insufficient support when they were the primary critical care provider – suggesting that an expanded scope of practice may not always experience high quality implementation. Additionally, recent changes that provided a pathway to critical care board certification for emergency medicine physicians are similarly changing the composition of the physician intensive care workforce. Understanding how and where these new providers are integrating into health systems is important for long-term workforce stability. The emergence of dual-trained ED-ICU physicians itself has also had notable spillover effects, motivating some emergency departments to invest in ED-ICU hybrid care areas – where patients receive continued intensive care in the emergency department, rather than being admitted to the ICU. How these patient care areas best fit into the delivery of intensive care has yet to be determined. Finally, as the authors are fully aware (15), intensivist physicians are only one dimension of high-quality multidisciplinary care of the critically ill (15–19). As so, to the question of whether there is an ICU doctor in the house, the answer is more often than not yes – particularly in large urban academic centers. However, to provide high quality care for the critically ill at large, there are many more questions left to ask and answer.

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