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Mechanical Ventilation Survivorship: A Tale of Two Countries

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Nearly 1 million Americans undergo mechanical ventilation annually, of whom up to one-third die during their hospitalizations (1). Historically, the success of mechanical ventilation has been

measured by patient survival. However, in more recent years, as advances in therapeutics and technologies have led to improvements in mortality associated with critical illness, attention has shifted to survivorship outcomes. The many morbidities associated with surviving mechanical ventilation (2, 3) lead to substantial healthcare use after episodes of acute care, such as use of nonacute inpatient care and subsequent rehospitalization (4, 5). Measures of resource use—length of inpatient stay, discharge disposition, and hospital readmission, for example—are not only important to hospitals and policymakers; they are also endorsed by patients and their families as important patient-centered outcomes (6).

Patterns of care for mechanical ventilation survivors across different countries are not well described. It is known that patients admitted to ICUs, as are most mechanically ventilated patients, remain in acute care hospitals for shorter durations in the United States than in other countries (7). However, whether this difference translates

into actual differences in healthcare use and overall outcomes is unknown. In this issue of *AnnalsATS*, Wunsch and colleagues (pp. 463–470) report the results of a retrospective observational study of postacute care and outcomes in two contemporary cohorts: mechanical ventilation survivors admitted to hospitals from 2010 through 2012 in New York State and in Ontario (8). They found that although initial hospital length of stay was similar in the two populations overall, length of stay was consistently shorter in New York than in Ontario among patient subgroups of comparable acuity. Furthermore, more patients in New York were discharged to nonhome destinations and had higher 30-day hospital readmission rates. Subgroup analyses demonstrated particularly strong associations with 30-day hospital readmissions in New York among patients with new tracheostomies, patients who required hemodialysis during hospitalization, and patients discharged to nonhome destinations. Interestingly, they also found that hospital-free days out to 2 months after the initial hospitalization (i.e., days alive and not admitted to an acute

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care hospital during that period) did not differ between New York and Ontario, even in most subgroup analyses. As the authors note, this finding suggests the possibility of an “equilibrium” in post-acute care resource use between New York and Ontario, despite apparent differences in initial acute care.

This study represents one of the first epidemiological descriptions of discharge practices and hospital readmission rates among survivors of mechanical ventilation in different healthcare delivery systems. Other strengths of the study are that it includes large samples from both countries, complete data for available variables, and sophisticated and thoughtful methodology within the constraints of the data.

Given that healthcare spending in the United States is dramatically higher than in other high-income countries (9), it is tempting to draw international comparisons in an effort to measure national performance, enhance accountability, and promote reform. However, we must proceed with caution. Papanicolas and colleagues made three key recommendations in their proposed framework for comparing international healthcare delivery systems: 1) define the boundaries of the healthcare delivery systems, 2) manage data limitations, and 3) account for inherent national values present in each system (10). In this study, the boundaries of the healthcare delivery systems accessible in the datasets include only acute care hospitals. The existence and organization of other types of healthcare facilities, such as skilled nursing facilities and hospice, differ between the United

States and Canada (11, 12). These differences are particularly relevant to this patient population because nearly two-thirds of mechanically ventilated patients are discharged to nonhome destinations in the United States (13). The availability of nonacute care facilities are dramatically less in Canada than in the United States, and, as the authors acknowledge, the inability to capture these facilities in this study limit the conclusions that one can draw from its findings.

Second, this study used administrative claims data that are common between the healthcare delivery systems. Unfortunately, these data do not permit detailed accounting for differences in the patient populations, which may be substantial. For example, the severity of illness of patients at the time of admission to the ICU may differ across the different health systems (7, 14), but administrative data does not include physiological variables that reflect those differences and allow for risk adjustment. In addition, the clinical condition at the time of discharge may be similarly different, given the high prevalence of patients in Canada remaining in the hospital after resolution of acute illness while they await admission to acute care facilities with limited capacity (11). In addition, the authors point out that similar data is not necessarily collected uniformly—in this case, the administrative coding for mechanical ventilation, the key to identifying the study population in the first place. Furthermore, different countries may also define particular conditions differently. Therefore, the data limitations may result in two cohorts that are potentially quite different from each other,

without a means to adequately adjust for those differences.

Finally, healthcare delivery systems are designed and optimized to reflect priorities of each particular country. As has been demonstrated previously and reflected in this paper, U.S. health care favors shorter index hospitalizations and, in turn, tolerates higher hospital readmission rates than are seen in other countries. However, it is unclear if this makes U.S. performance better or worse than that of other countries (15). In addition, access to healthcare resources is highly variable in the privatized healthcare system of United States, whereas Canadian citizens have more homogeneous access under a universal healthcare model, again leading to potential unmeasured differences in the patient population that result from differences in when and how patients present for medical care (10).

In summary, this study is a provocative initial description of post-acute care resource use and outcomes among survivors of mechanical ventilation across two different countries. It reinforces previous empirical evidence that management of critical illness in the United States involves less use of acute care resources than in other countries, as well as that this may come with a tradeoff of increased use after the first episode of acute care. In the end, it generates more questions and hypotheses regarding how the United States and Canada may and may not differ in care delivery, and it sets the stage for many interesting studies in the future. ■

Author disclosures are available with the text of this article at www.atsjournals.org.

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