



The Blessing and the Curse of the Administrative Database

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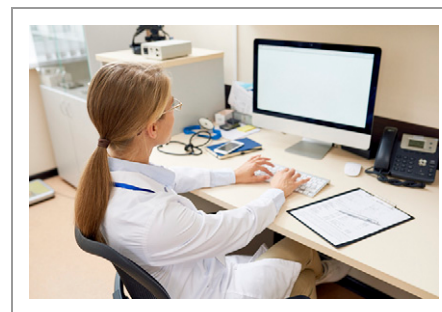
Hospital administrative databases are largely derived from discharge abstracts of patient records by trained chart abstraction personnel and are intended primarily for billing and demographic use. Unlike clinical data derived from dedicated research databases, which are often limited in scope, hospital administrative data are generally captured for all patients, often at a large number of hospitals, making these data an appealing source for observational research (1). What many researchers and consumers of the literature often fail to appreciate, however, is that this is a secondary use of these data, and they may lose sight of the inherent limitations of these otherwise-rich data sources. In this issue of *AnnalsATS*, Garland and colleagues (pp. 229–235) sought to better understand the accuracy of an administrative hospital database in Manitoba, Canada. In doing so, the authors provide an illustrative example of the perils inherent to research based solely on administrative datasets, which lack the granularity of alternative data sources, such as the electronic health record (EHR) (2). We contend that these findings are likely generalizable elsewhere and provide an important cautionary tale.

In their study, the authors assessed the quality of administrative data in the Canadian Discharge Abstract Database, a database mandated by the Canadian Institute for Health Information. It uses *International Classification of Diseases, Tenth Revision*, Canadian coding standards (ICD-10-CA) diagnoses and Canadian Classification of Health Interventions procedure codes. To assess its validity, the documented use of three life support modalities was compared with a reference

database, the Winnipeg ICU database, a prospectively collected database obtained from daily, manual chart reviews by trained abstracters, all of whom were trained critical care nurses (3). Data elements collected by the Winnipeg ICU database include daily assessments pertaining to the use of invasive mechanical ventilation, vasoactive medications, and renal replacement therapy, along with a wide number of other important variables. As the accuracy of these extensively studied life-support modalities has not been well-validated with hospital administrative datasets, they are an important focus for improved validation. Interestingly, the authors found that the administrative database was essentially incapable of accurately identifying vasoactive medication infusions, but somewhat better at identifying invasive mechanical ventilation and renal replacement therapy.

These findings highlight important concerns that have been raised about administrative data elsewhere. These data have been shown to be frequently inaccurate because of miscalculations at an administrative processing level (4), clinician misclassification or underreporting (5, 6), or limitations of the codes themselves (7), all resulting in failure to capture the true clinical picture. Variability among providers, hospital systems, and countries can translate to significant inconsistency in administrative data, which may, in turn, lead to incorrect or inaccurate conclusions being derived (8).

Considering these, and other, concerns, we propose an alternative approach. Administrative data are collected for every patient on every admission, as are data in the EHR. Improved integration of data derived directly from an EHR with administrative data, and with a robust understanding of the inherent data constraints in both, has the potential to produce a rich fund of observational data and improve patient care on a large scale. The Canadian Discharge Abstract Database may be an opportune setting for this endeavor, as it is centrally organized and includes nationwide participation. This integration could occur largely with existing



infrastructure, particularly if buy-in is achieved from key stakeholders and commercial EHR vendors (9). Integrated EHR and administrative databases would allow for more useful and generalizable information, not exclusively reliant on diagnostic codes or trained personnel to extract information.

This is particularly evident in the example of vasoactive infusion administration. As Garland and colleagues highlight, the use of vasoactive agents is challenging to identify in administrative data, as are many other important data elements for observational research studies involving critically ill patients. The Canadian Discharge Abstract Database lacks a specific Canadian Classification of Health Interventions procedure code for the use of vasoactive agents, leading the authors to propose using a surrogate marker; in this case, the diagnostic codes for shock. This surrogate marker clearly falls well short of expectations, even failing to identify the use of norepinephrine, a first-line therapy in septic shock (10). In this example, integration into the EHR not only could better identify the administration of vasoactive medications but also have the potential to supply highly granular and useful data, including duration and dosage of medications, all of which have been shown to be readily available in an EHR (11).

When using large administrative databases for observational research, it is critical to understand the inherent limitations of the underlying data. Ongoing

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assessments of underlying data quality will improve our ability to optimally use and understand these data sources to formulate appropriate hypotheses for these data. Consumers of data and

observational research derived exclusively from administrative data need to be appropriately critical. Moving forward, we need to work to foster better integration of data from the EHR into administrative

data in the hopes of significantly improving data quality. ■

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

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“Microclimates” of Care for Hospitalized Patients with Pulmonary Disease: An Idea That Will Bear Fruit?

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Growing grapes to make wine begins with careful selection of varieties to match the local climate. (1) Macroclimates, or local areas with particular temperature, solar, precipitation, and soil patterns, are often well-suited to particular types of grapes (e.g., Cabernet Sauvignon grapes thrive in the Napa Valley). Interestingly, this precise pairing of grape species and atmospheric

conditions often occurs down to individual vineyards (mesoclimates) and even specific rows of vines (microclimates) (2). The success of matching grape varieties to climate has significant consequences on yields and quality (3). In simple terms, grapes planted in the right fields produce the highest-quality wine.

Analogously, hospital leaders are increasingly paying attention to the fit between hospital units and the patients they serve. For example, under- and overtriage of critically ill patients can be problematic, both through potential direct patient harm (e.g., undertriage may delay important therapies early in critical illness, whereas overtriage may expose patients to unnecessary procedures) (4) and

through indirect harm (e.g., overtriage leads to less sick patients occupying ICU beds, causing capacity strain and necessitating suboptimal “boarding” of critically ill patients elsewhere) (5). It is now well accepted that even within a “macro” environment such as an acute care hospital, attentiveness to selecting the optimal patients for hospital “meso” and “micro” environments may provide higher-quality patient care.

The idea of caring for patients in the right location extends beyond acuity of illness alone. Patients have particular needs that may correspond to specific diagnoses, treatments, procedures, or organ systems dysfunction. Consider, for example, hospital oncology wards staffed by nurses specially

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