



Value of Epidemiology Studies in Critical Care

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Commentary

Epidemiology studies are often overlooked within the current world of evidence-based medicine. The studies don't rank within the hierarchy of clinical test data, they're rarely considered to influence clinical care and that they could also be considered merely 'descriptive' of a medical problem. Despite the restrictions of epidemiology studies, they continue to be a critical component of biomedical research without which the remaining 'higher order' studies, like cohort studies and controlled trials, couldn't be effectively conducted.

Critical care epidemiology studies, of which the present study from the medical care National Audit and research facility database may be an exemplar, serve a spread of purposes that advance the mission of both practicing medical care unit (ICU) physicians and scientific researchers. At the foremost basic level, epidemiology studies convey important information about disease characteristics, the sort of patients affected, and therefore the frequency and outcomes of the disease. Importantly, these studies keep medical events in perspective. Epidemiology studies report and reinforce the frequency of deaths associated with atherosclerotic disease, cancer and sepsis in developed countries, and of deaths from a spread of infectious diseases and sepsis in developing countries. These reminders are essential in an era of accelerating media attention on diseases like severe acute respiratory syndrome and avian influenza that are less immediate public health concerns.

Descriptive epidemiology studies also inform intensivists about the sort of conditions they ought to expect to encounter in their ICU (i.e. the frequency of disease) and that they guide clinicians in treating patients by reporting information on relative causality (such as *Streptococcus pneumoniae* being the foremost common explanation for community-acquired pneumonia). Local and regional epidemiology data have long been disseminated to tailor therapy for infectious diseases supported local organism resistance patterns. In contrast, larger epidemiology studies are invaluable for determining healthcare resource allocation and for the planning and conduct of both observational and interventional clinical trials.

Value of longitudinal epidemiology studies

Longitudinal studies add a vitally important characteristic to point-prevalence or time-limited epidemiology studies. They allow characterization of temporal changes in affected patients and in disease characteristics, like within the frequency, complications and outcomes of a disease. Longitudinal studies also permit more detailed planning for healthcare resource allocation, especially by matching temporal changes in disease or disease-specific outcomes with known changes

in underlying patient populations (e.g. HIV-positive) or consistent with rendered treatments (e.g. antibiotics, chemotherapeutics). Longitudinal epidemiology studies on an area level are often utilized for internal control purposes, to assess the impact of changes in health care delivery. Generally, longitudinal studies are invaluable for understanding how a disease is changing and the way it affects patients within the studied healthcare system.

Institutional, regional, national and international epidemiology studies

Epidemiology studies that cross physical and geopolitical borders permit broader comparisons than would be possible for observations that are geographically constrained. Most easily, they permit comparisons to be drawn for diseases consistent with different pressures, like differing underlying patient populations and different risk factors for disease. More broadly, when epidemiology studies are conducted they longitudinally create the power to look at healthcare quality and effectiveness of resource utilization on a regional scale or a national scale in reference to scientific advances. Data of this type are essential for determining the optimal ICU utilization for a given condition, tracking the effectiveness and efficiency of healthcare systems consistent with changes in disease incidence or outcome, and for planning research studies consistent with the characteristics of the disease.

Large-scale longitudinal studies in sepsis

In the present issue of Critical Care, investigators from the medical care National Audit and research facility report the results of a longitudinal study of severe sepsis encompassing England, Wales and Northern Ireland within the past 10 years. These data are indispensable as a baseline assessment for a standard and lethal condition within the respective countries, where severe sepsis occupies quite one-quarter of ICU beds and carries fatality rates approaching 50%. The info confirms previous secular trends within the incidence and mortality of sepsis and defines the severity of disease and heterogeneity of case-mix typical of sepsis. With these data in hand, scientists and healthcare administrators may assess the impact of community interventions designed to scale back the incidence of sepsis or medical therapies which will improve outcomes with sepsis.

The value of those data is even more apparent during a system of national healthcare insurance, where tracking of health-related outcomes associated with resource allocation is important to make sure appropriate health care delivery. Other large-scale epidemiology studies exist for sepsis, either by sampling locally, regionally, nationally or internationally. Few available studies cross systems of care or permit direct comparisons of health care delivery strategies. Those studies that include longitudinal data provide important additional insights into sepsis epidemiology while minimizing seasonal influences. Continued investigation is important to optimize healthcare quality and to match the effectiveness and efficiency of various ICU utilization and care strategies, both nationally and internationally.

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