PSNet
PATIENT SAFETY NETWORK

Measuring and Responding to Deaths From Medical Errors

March 22, 2016
Ranji SR. Measuring and Responding to Deaths From Medical Errors. PSNet [internet]. 2016.
https://psnet.ahrq.gov/perspective/measuring-and-responding-deaths-medical-errors

Annual Perspective 2016

The Prevalence of Deaths Due to Preventable Adverse Events

The number of patients who die due to medical errors has been a controversial subject since the inception of the patient safety movement. The seminal Institute of Medicine *To Err Is Human* report estimated that between 44,000 and 98,000 Americans die every year due to preventable adverse events. Although there is no doubt that quantifying the magnitude of preventable harm galvanized the field, the mortality estimate drew criticism almost immediately (including from some of the researchers whose studies were used to derive the estimate).

Since the publication of the IOM report, multiple researchers and commentators have produced widely varying estimates of the death toll ascribable to safety problems. This controversy was renewed in 2016 with the publication of a widely publicized study in the *British Medical Journal* that estimated that more than 250,000 patients die every year in the United States as a result of errors. If true, this would make medical error the third leading cause of death in the US.

The 2016 study—and earlier studies that also put the death toll from medical errors in the hundreds of thousand—have drawn significant criticism from other patient safety experts. There are three primary critiques:

- There is considerable interrater variability in determining whether a medical error was responsible for a patient's death. Studies of the epidemiology of medical errors generally use a two-stage review process to determine if an error took place and how the error affected the patient's clinical course. Even experienced clinical reviewers achieve only moderate agreement on whether or not an error even occurred, and determining the clinical effects of the error is equally difficult.
- Estimates of the population toll of deaths from medical error are extrapolations from individual studies in which there were very few deaths. For example, one of the studies that formed the basis of

the *BMJ* article analyzed temporal trends in adverse events between 2002 and 2007. This study found only 14 deaths related to adverse events among 2341 admissions to 10 hospitals during that period. It is problematic to extrapolate from such small numbers of deaths to an estimate of inpatient mortality due to adverse events for the entire US population.

- The studies whose results were extrapolated to estimate deaths on a population level were not explicitly designed to determine if deaths were due to preventable adverse events. These studies were designed to estimate the prevalence of adverse events in specific patient populations and also reported the number of deaths—sometimes without explicitly stating if the death was due to the error. A Viewpoint by the former director of AHRQ estimates that about 75,000 patients experience preventable in-hospital deaths yearly—a high toll, to be sure, but much lower than the estimate in the *BMJ* study.

Regardless of the true magnitude of deaths from medical errors, it is clear that an unacceptably large number of patients die and experience significant morbidity from preventable adverse events. Even if the true population prevalence of deaths from errors is much lower than that estimated in the *BMJ* study, several preventable deaths still occur at each hospital in the US every year. How should hospitals and health care organizations seek to identify these patients, determine what factors precipitated their deaths, and try to prevent such events in the future?

Identifying and Analyzing Preventable Deaths

The Patient Safety Primer on Measurement of Patient Safety reviews several of the commonly used methods for identifying adverse events. One commonly used method for identifying preventable deaths is reviewing deaths in patients with diagnoses for which mortality is expected to be very low. Death Rate in Low-Mortality Diagnosis Related Groups is an AHRQ Patient Safety Indicator and is appropriate to use as a screening tool to identify cases meriting a more detailed review for potentially preventable causes. However, as discussed in a WebM&M commentary, the high rate of false positives makes this indicator unsuitable for comparing safety across hospitals.

Some hospitals conduct standardized reviews of deaths in order to identify individual clinician issues or systematic problems in care. These may be performed as part of trigger tool-based reviews to identify broader safety issues or as part of morbidity and mortality conferences. One example of a trigger that is frequently used to prompt deeper review is intraoperative or postoperative death, one of the triggers in the Institute for Healthcare Improvement Global Trigger Tool. Structured retrospective death reviews can potentially be very useful, but are also quite labor intensive as they require detailed chart review by multiple reviewers. This may not be feasible for many hospitals. An electronic death review process that relied on input from frontline clinicians has been shown to be feasible (needing only a few minutes of input from the treating clinicians) and can detect potential causative factors that were not identified through other data sources.

The autopsy has traditionally been the "gold standard" for identifying diagnostic errors that led to preventable deaths, but autopsy rates have progressively declined over the past few decades. Even academic hospitals now perform autopsies on fewer than 10% of inpatient deaths; a recent British study found that autopsy was performed on fewer than 1% of all patients who died in hospital. The factors behind

the decline of autopsies are complex, but the renewed focus on diagnostic error may yield greater use of this increasingly neglected tool.

It is important to recognize that no single detection method is able to identify all preventable deaths within a single organization, and reviewing deaths may provide only a limited view of patient safety problems within an organization. Identifying preventable harm through death reviews should be viewed as part of an overall strategy to detect patient safety issues. Classic studies have shown that multiple sources of information are necessary in order to provide a comprehensive view of patient safety at the institutional level. Structured reviews of inpatient deaths are an important part of this process, but they tend to identify a limited subset of issues, such as diagnostic errors, failure to rescue, or problems with communication between clinicians.

The above strategies are almost exclusively used to analyze deaths while patients are hospitalized, or shortly after hospital discharge. There is a paucity of literature on the epidemiology and analysis of preventable deaths in the outpatient setting. The epidemic of deaths due to prescription opioids—most of which occur in the outpatient setting—demonstrates the need for the safety field to develop mechanisms for identifying emerging causes of preventable deaths across different care settings.

Summary

The number of deaths due to preventable harm is controversial. Although some analyses claim that hundreds of thousands of patients may die every year in the US due to medical errors, these estimates rely on flawed methodology and are not supported by more rigorous studies. Regardless, individual hospitals almost certainly experience several preventable deaths each year, and they should implement formal strategies for identifying preventable deaths and analyzing these deaths to determine systematic problems in care. At a national level, the toll is clearly in the tens of thousands of deaths per year, perhaps more. Given this toll, more attention to this problem is needed. And, because most research has focused on preventable deaths in hospital care, and effort should go into identifying and analyzing the causes of preventable deaths in other health care settings.