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A Study Sounds a False Alarm About America's Emergency Rooms

The claim of 250,000 deaths from misdiagnosis is based on a single fatality—in Canada, in 2004.

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A shocking headline recently claimed that every year 250,000 people in the U.S. die after misdiagnosis in the emergency room. Even more shocking, the statistic was extrapolated from the death of one man—in a Canadian emergency room more than a decade ago.

The figure comes from a Dec. 15 report by the Agency for Health Care Research and Quality. The AHRQ, part of the U.S. Department of Health and Human Services, produces research to improve healthcare in America.

The evidence doesn't support the magnitude of error suggested by the AHRQ report. The inaccurate estimate would put emergency-room misdiagnoses in the top five causes of death in the U.S., with 1 of every 500 ER patients dying because of physician error. There is no

reliable evidence to suggest anything close to this. These estimates undermine the patient-physician relationship and the dwindling trust in public-health reporting.

The statistical methods used to arrive at the report's estimate of 250,000 deaths are very bad, resulting in inaccurate findings that exaggerate potential harm in ERs. The estimate was derived from a single study that included only 503 patients discharged from two Canadian emergency rooms from August to December 2004. Researchers found that among the 503 patients, one person unexpectedly died related to a delay in diagnosis by an ER physician. The patient had signs of an aortic dissection—a tear in the major vessel that carries blood from the heart. For reasons we don't know, the diagnosis was delayed for seven hours.

The goal of the Canadian study was to measure all kinds of medical errors, not to estimate the death rate from erroneous or late diagnoses. The sample size wasn't big enough for that. Had nobody in the study sample died, would that mean that ERs never make fatal errors? Obviously not.

The AHRQ report misused this single death to estimate a death rate across the entire U.S. Dividing one death by 503 patients, the researchers estimate a death rate of 0.2%. They then multiply 0.2% by total annual ER visits in the U.S.—130 million—and come up with 250,000 deaths.

This is not how epidemiology works. One cannot extrapolate a death rate across a nation from a single death.

A standard analysis also reports a confidence interval—a statistical estimate of the uncertainty around the finding. The smaller the sample size, the wider the confidence interval, indicating more uncertainty in the estimate.

The AHRQ report calculated a confidence interval for the 0.2% death rate and found the “possible” range was anywhere from 0.005% to 1.1%, or 6,500 to 1.4 million deaths. The researchers dismissed that interval as “implausibly wide” and arbitrarily went with a new range—0.1% to 0.4%, 130,000 deaths to 520,000 deaths. This arbitrary range is also statistically invalid—statistical parameters come from objective analysis of the data, not guesstimates.

The AHRQ report tried to justify the new range by citing other sources, none of which hold up to scrutiny or were intended to measure ER misdiagnosis-related deaths in the U.S. The sources included a small study from Switzerland (33 deaths) that found an association with

increased mortality when the ER diagnosis and final diagnosis didn't match—but didn't review the medical charts. Another was a study of Medicare data that, if interpreted as ER physician error, effectively requires ER doctors to be clairvoyant. A third was a small study in Spain of patients returning to the ER after discharge that reported three deaths—again, way too small to calculate a nation-wide death rate.

Finally, the AHRQ report cited an estimate of U.S. hospital (not ER-specific) fatal misdiagnosis rates that is more than two decades old. It was based on a systematic review of autopsy studies from the last century that projected a “modern” estimate for the year 2000.

The estimate of 250,000 deaths a year from ER misdiagnosis is statistically specious speculation, not a carefully measured fact. It pulls data from very small studies, the majority of which are from other countries and past decades, and none of which were designed to assess the frequency of ER misdiagnosis-related death. The report then inappropriately extrapolates those numbers across an entire nation.

Misdiagnoses do happen, both in the ER and across the healthcare system. As an emergency physician and a patient, I know firsthand the frustration of having a major diagnosis missed. For years of doctor visits, I was told my symptoms of fatigue, back pain and mild fever weren't serious. Eventually I had surgery to remove a slowly growing tumor that was crushing my heart and lungs.

Our goal as emergency physicians is to provide patients the care they need and improve our practice. We also have a duty to correct the record when false statistics exaggerate harm and scare patients away from seeking care when they need it most.

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