Weingart et al., “Epidemiology of Medical Error”

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Summary points

• in the United States, medical error results in 44,000-98,000 unnecessary deaths and 1,000,000 excess injuries per year

• errors often occur when clinicians are inexperienced and new procedures are introduced

• extremes of age, complex care, urgent care, and a more prolonged hospital stay are associated with more errors

Prevalence and consequences in hospitals

Benchmark studies

• Harvard study of medical practice
  
  – benchmark for estimating the extent of medical injuries occurring in hospitals
  
  – reviewed medical charts of 30,121 patients admitted to 51 acute care hospitals in New York state in 1984
  
  – adverse events, injuries caused by medical management that prolonged admission or produced disability at the time of discharge, occurred in 3.7% of admissions
  
  – 69% of injuries were caused by errors

• study of the quality of Australian healthcare
  
  – modelled on the Harvard study
  
  – reviewed medical records of 14,179 admissions to 28 hospitals in New South Wales and South Australia in 1995
- adverse event occurred in 16.6% of admissions
- 13.7% disability and 4.9% death
- 51% were preventable

- results probably represent a lower bound on the prevalence of medical injury and error
  - definition of adverse event was stringent, requiring disability and injury
  - many errors don't produce injury

**Beyond chart review**

- there are errors not documented in medical records
- other methods include computerized models for adverse drug event detections and prompted self reports from clinicians
- using these methods, researchers have found much higher rates of adverse drug events (7.3%) than by only reviewing medical records (0.7%)
- observational studies have found a 45.8% of adverse events
- costs of errors are substantial: $5.6 million for a 700 bed teaching hospital
- 18,000 unnecessary deaths and 50,000 patients become disabled in Australia
- 44,000-98,000 unnecessary deaths and 1,000,000 patients become disabled in the United States

**Prevalence and consequences among outpatients**

- comparatively little is known about the prevalence of medical error outside hospitals
- in the benchmark Harvard and Australian studies 8-9% of adverse events occurred in a doctor’s office, 2-3% at home, 1-2% in nursing homes
- Australian study: quarter of errors caused disability or death, two-thirds could have been prevented
- since the studies included only errors that required admission, these figures underestimate the outpatient error rate
- little association between malpractice claims and medical error
- asking clinicians and patients about errors provides more useful information
• high prevalence (18-27%) of drug related problems

• drug related problems account for 116 million extra visits, 76 million additional prescriptions, 17 million ED visits, 8 million hospital admissions, 3 million long-term care admissions, 199,000 deaths

• total cost estimated at $76.6 billion

Types of medical error

• about half of adverse events among inpatients result from surgery

• most common non-operative events: complications from drug treatment, therapeutic mishaps, diagnostic error

• Australian study: cognitive errors are more likely to be preventable and result in permanent disability than technical errors

• adverse drug events are prevalent and preventable

• missed and delayed diagnoses are difficult to detect retrospectively, necropsy studies can uncover some of these

Clinicians who make errors

• little evidence that much medical error is due to “bad apples”

• no specialty is immune to errors

• procedural mishaps are common in surgical specialties, perhaps because difficult to disguise

• mistakes more common when clinician is inexperienced and when new techniques are introduced

• trainees and residents err more often

Risk factors for injury

• patients aged over 64 have a greater risk of serious injury (they have comorbid illnesses and are more frail)

• some interventions with high risk: cardiothoracic surgery, vascular surgery, neurosurgery

• other risk factors: complex cases, urgent care, life saving interventions, emergency department, duration of care, intensive care
Discussion

- adequate epidemiological information is limited to a few institutions, procedures, and specialties
- comparing studies is difficult because of lack of standardized methods
- systems for monitoring and reporting errors would be useful for more detailed studies
- the precise prevalence and magnitude of medical errors is unknown
- risk of medical errors is not homogeneous