Addressing the Effects of Adverse Events: Study Provides Insights into Patient Safety at Canadian Hospitals

We live in an exciting era, where new therapeutic discoveries move quickly from the research bench to the patient bedside. Yet in implementing these discoveries and providing care, defences sometimes fail, resulting in a preventable adverse event.

On May 25, 2004, the first national study to examine the problem of adverse events in Canadian hospitals, led by the authors of this paper and involving researchers from seven Canadian universities, was published in the *Canadian Medical Association Journal* (CMAJ). Funded by the Canadian Institutes of Health Research (CIHR) and the Canadian Institute for Health Information (CIHI), the Canadian Adverse Events Study found that, in 2000, the overall rate of adverse events was 7.5 per 100 patients admitted, not including pediatric, obstetric and psychiatric admissions. In other words, approximately 185,000 of the 2.5 million similar medical and surgical admissions in Canadian hospitals in 2000 were associated with an adverse event.

In the study, we used a definition of adverse event that has been applied to similar studies elsewhere. An adverse event is an "unintended injury or complication resulting in death, disability or prolonged hospital stay caused by healthcare management rather than the patient's underlying condition."

Study Design and Conduct

The Canadian Adverse Events Study is based on a 1984 protocol set out in the Harvard Medical Practice Study of adverse events in New York State hospitals. This protocol has since been applied and modified in subsequent studies in Australia, the United Kingdom, New Zealand, Denmark and other U.S. states (such as Utah and Colorado).

The team of investigators randomly selected one teaching hospital, one large community hospital and two small hospitals in each of five provinces: British Columbia, Alberta, Ontario, Quebec and Nova Scotia. Nursing or health record professionals examined 3,745 adult patient charts (not including pediatric, obstetric and psychiatric cases) to see if one or more specific criteria were present (everything from adverse drug reactions to development of a new neurological disorder to unplanned return to the operating room), which might indicate an adverse event had occurred. Physicians then reviewed the identified charts to determine any unintended injuries or complications and establish whether these resulted in death, disability at discharge or a longer hospital stay. They then evaluated the extent to which healthcare management, rather than the patient's disease, was responsible for the adverse event.

Key Results from the Study

We found that 65% of adverse events resulted in no physical impairment or disability, or minimal and moderate impairment with recovery in under a year's time. Forty-six adverse events were associated with the death of 40 patients, suggesting that 1.6% of people hospitalized in Canada died following an adverse event in 2000.

The study showed that adverse events occur more frequently in teaching hospitals after adjusting for differences between hospitals in their patients' age, sex and disease status. However, there were no significant differences in the numbers of preventable adverse events. These findings suggest that quality of care is not different between types of hospitals. Rather, care is more complex, and involves more caregivers in teaching hospitals, which increases the risk of adverse events.

One-third of the adverse events were associated with a surgical procedure, where the adverse event occurred either during the operation or in the month following surgery. One-quarter of the adverse events were associated with a drug/fluid-injection event.

Conclusions

Initiatives have already started to address problems leading to adverse events, including the creation of the Canadian Patient Safety Institute (CPSI) and the development of the Institute for Safe Medication Practices (Canada).

The CPSI was established in the 2003 Federal Budget and seeks to implement a national strategy for improving patient safety. Its development followed the findings of a report entitled *Building a Safer System: A National Integrated Strategy for Improving Patient Safety in Canadian Health Care*, drafted by the National Steering Committee on Patient Safety (NSCPS). The Institute for Safe Medication Practices (Canada) is a non-profit organization that collects and analyzes medication error reports and serves as a national resource for promoting safe medication practices in Canada. In addition, a number of provinces and professional bodies have created patient safety initiatives.

These efforts represent the first steps in a long-term process.

Based on the Canadian data, we suggest that more efforts are needed to improve the safety of medication and surgery procedures for patients in Canadian hospitals. More fundamentally, focusing on system change, rather than blaming those involved in adverse events, is a critical strategy for identifying patient safety issues and engaging caregivers and managers in the improvement of care.

About the Authors

Dr. G. Ross Baker is a Professor in the Department of Health Policy, Management and Evaluation in the Faculty of Medicine at the University of Toronto. His current research focuses on the incidence of adverse events and factors influencing patient safety in Canadian healthcare, and on the development and use of performance measurement and balanced scorecards in healthcare organizations.

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Drs. Baker and Norton are both CIHR-funded researchers.

References

Baker, G.R, P.G. Norton, V. Flintoft et al. 2004. "The Canadian Adverse Events Study: The Incidence of Adverse Events Among Hospital Patients in Canada." *CMAJ* 170(11): 1678–1686.