



Antibiotic prescribing rates

James M. Hutchinson and Robert N. Foley have analysed data from the Newfoundland Drug and Medical Care plans and have concluded that factors other than medical indication, namely method of physician remuneration and patient volume, played a major role in determining antibiotic prescribing practices.¹ Unfortunately, their analysis is seriously flawed and cannot be used to make inferences about the *rates* of antibiotic prescribing.

The main problem is that Hutchinson and Foley have chosen the wrong population for the denominator in calculating their rates. If one wishes to compute antibiotic prescribing rates in a practice, one should compute the number of prescriptions per patient visit or per patient attending the practice. Instead, they have computed the number of prescriptions per patient who received an antibiotic prescription. This statistic says very little about the overuse of antibiotics.

Consider an example: Suppose a colleague and I each have 100 patients in our practices, and 50 of them present each year with complaints of sore throat. I choose to prescribe an antibiotic to every patient who complains of a sore throat, writing 50 prescriptions in that year. According to the authors, my prescribing rate is thus 50 divided by 50 unique patients, which equals 1 per patient per year. My colleague diagnoses strep throat in 1 of the 50 patients visiting him and prescribes an antibiotic to him, but not to the other 49. That patient returns twice with recurrent strep throat and receives 2 more prescriptions. My colleague's prescribing rate is thus 3 prescriptions per unique patient per year. According to the authors' method, my prescribing rate is one-third of that of my colleague. Quite clearly, the authors' method does not lead to useful policy conclusions.

Murray M. Finkelstein, PhD, MD CM
Toronto, Ont.

Reference

1. Hutchinson JM, Foley RN. Method of physician remuneration and rates of antibiotic prescription. *CMAJ* 1999;160(7):1013-7.

The article by James M. Hutchinson and Robert N. Foley presents an interesting approach with regard to determining the use of antibiotics.¹ If one is to interpret these data, it would be helpful to know whether the patient populations are comparable for the salaried physicians and the fee-for-service physicians. My impression (and I would be happy to be corrected) is that in general, fee-for-service physicians tend to see patients who feel their symptoms are acute, sooner than do salaried physicians, who might spend more time with a patient and thus have lower patient volumes but longer waiting times. The difference in waiting time may change the type of population seen by the 2 groups of physicians.

Patrick J. Potter, MD
London, Ont.

Reference

1. Hutchinson JM, Foley RN. Method of physician remuneration and rates of antibiotic prescription. *CMAJ* 1999;160(7):1013-7.

[One of the authors responds:]

Murray M. Finkelstein quite rightly points out a potential methodological flaw in our study of antibiotic prescribing practices in Newfoundland. I agree that the better denominator would have been total patients seen or total number of pa-

tients in a given physician's practice; however, these data were not available. In Newfoundland there is no rostering of patients, and salaried physicians are not obliged to report patient numbers.

Finkelstein also, quite rightly, points out that if a physician prescribes to 1 individual with a given condition 3 times in a year and 49 others with that same condition receive no prescription then the physician's rate of prescription is 3 using our methods. There is a possibility that this type of variance in physician behaviour explains the difference among Newfoundland physicians that cannot be refuted by our data. It is my opinion, however, that it is unlikely.

It must be remembered that all of the physicians in the province were studied and that to explain the large differences found between all the fee-for-service and all the salaried general practitioners using the proffered logic one must infer that the predominant pattern of practice among fee-for-service general practitioners is a high threshold before the first antibiotic is prescribed (conservative prescribing) and then a low threshold thereafter for those patients prescribed to once already (liberal prescribing) as in Finklestein's example. It is more likely that a given physician's pattern of prescription remains quite constant and that the associations described in our paper are valid.

As for Patrick J. Potter's concerns that the patient populations may be inherently different between fee-for-service and salaried practitioners, this may be true. I'm not sure that it matters

Park Davis

Lipitor

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from the overall perspective of the urgent necessity to reduce antibiotic prescription rates in Canada. This study was not perfect science and I do not, in general, advocate one type of physician remuneration over another. I am, however, extremely concerned with antibiotic prescription rates overall in Canada. Recently the first strains of vancomycin-resistant *Staphylococcus aureus* and *Streptococcus pneumoniae* were described. Will they appear in Canada? Of course they will. Yet we Canadian physicians continue to prescribe antibiotics at rates of close to 1 prescription per person per year.¹ It is time that we band together and markedly change this circumstance before it is too late. If that means discussing the influence of physician organization and remuneration then let's discuss it, quickly.

James M. Hutchinson, MD
St. John's, Nfld.

Reference

1. Controlling antimicrobial resistance: an integrated action plan for Canadians. *Can Commun Dis Rep* 1997; 23S7(Suppl).

"I need more power, Scotty"

Robert Patterson did a good job reviewing the workings of voice-recognition software.¹ Unfortunately, his conclusion that the "program did not save any money" is, in the current parlance of evidence-based medicine, not generalizable.

Patterson committed a cardinal error by using an underpowered computer system. The Pentium Pro 200-MHz machine with 64 MB of RAM that he used during his 3-month trial is woefully inadequate for the current generation of voice-recognition programs. Using the same dictation software as Patterson on a machine with the same power as his, I had virtually identical results. However, when I used the same software on a recently purchased computer with a Pentium II 400-MHz processor and 256 MB of RAM, both speed and accuracy were dramatically better.

A small but growing number of

physicians are now using voice-recognition software to create their medical-encounter notes. With the newest systems, most physicians can speak at their usual speed and achieve fairly accurate results.

Although the physician may choose to correct the raw transcription personally, most doctors find it more cost-effective to have a transcriptionist review the combined text and sound file and correct it. My own experiment over a 2-week period was cost-effective, although I was forced to discontinue using the program because of staffing problems.

At present, successful use of voice-recognition systems still requires that the physician and office staff be willing to withstand significant implementation hassles. As these programs continue to improve, however, increasing numbers of physicians will discover the benefits — both financial and time — provided by voice-recognition systems.

Mark Dermer, MD
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MD Management Ltd.
Ottawa, Ont.

Reference

1. Patterson R. Dictation software: we're not there yet. *CMAJ* 1999;160(6):885-6.

[The author responds:]

Mark Dermer's experience with dictation software seems to echo my own — he too mentions significant implementation hassles and predicts that further improvements are needed before there is wide acceptance in the medical community.

I was simply trying to cut through the advertising hype to see how the system worked in a real office setting. I appreciate Dermer's concern that speed matters, but I doubt that most physicians have a 400-MHz machine with 256 MB of RAM in their offices, nor would they want to run out and buy one to run a single program.

Dragon Systems recommends a minimal system configuration of a 133-MHz Pentium processor with 32 MB of RAM to run its NaturallySpeaking

Medical Suite. These requirements were exceeded by my Pentium Pro 200.

With time, the price of personal computers will continue to drop and performance will improve, and soon speech-recognition programs will be cost-effective and virtually hassle free for all users. Until then, one intermediate step suggested by Dermer is to have a local transcriptionist edit the dictation. Another option is to save the dictation as a sound file and ship it via the Internet to a transcription company, several of which use typists in countries where labour costs are low. As for me, I've gone back to my tape recorder and office assistant.

Finally, for those who wish to learn more, an excellent review of dictation software technology, with a comparison of different commercial products, was published recently.¹

Robert Patterson MD, MSc
Leamington, Ont.

Reference

1. Zafar A, Overhage JM, McDonald J. Continuous speech recognition for clinicians. *J Am Med Inform Assoc* 1999;6:195-204.

Stop building up our hopes

I am a 41-year-old man and enjoy reading my partner's copy of *CMAJ*. The headline for one of your recent letters¹ nearly jumped off the page: "New method for prostate exam." Like a blackjack player whose first card is an ace, I was captivated and hopeful about a much-needed breakthrough in medical science.

The prospect of an alternative to the conventional method of digital rectal examination for palpation of the prostate would no doubt change the psyche of all male patients as they approach their routine medical. The detailed description of the conventional procedure, while sounding much like Ben Hogan articulating the benefits of supination and pronation in the golf swing, evoked images of great pain and discomfort. After whimpering about the status quo and being wistful about a discovery of great proportions, how can



I ever pick up *CMAJ* again after reading that the "new method" is nothing more than being asked to shift to a right lateral position instead of the left?

How depressing. Next time, have your editors tone down the titles so as not to create expectations that cruelly vanquish your faithful readers.

Robert Plamondon
Ottawa, Ont.

Reference

1. Hotte N. New method for prostate exam [letter]. *CMAJ* 1999;160(12):1697.

Detecting adverse drug reactions

In a *CMAJ* editorial, Namrata Bains and Duncan Hunter used hospital separation and mortality data to estimate that 0.05% of in-hospital mortality is associated with coded adverse drug reactions.¹ They extrapolated their data to rank mortality associated with adverse drug reactions as the 19th leading cause of death in Canada. This contrasts with the findings of Lazarou and colleagues,² who ranked adverse drug reactions as between the 4th and 6th leading cause of death in the US (106 000 deaths per year).

The fundamental issue is whether

coding adverse drug reactions in the medical record provides reliable and valid data on the true numbers of adverse drug reactions. Several studies have shown that self-reporting only identifies 5% of events.³⁻⁵ Daily chart review and solicited reporting have detected 5 times as many adverse drug reactions as coding.⁶

Methodologically, the first stage involved in linking a drug to an incident is the screening and correlation of an adverse clinical event to a specific drug. Thus, an adverse drug event only indicates suspected incidents, not causation.⁶ Detection is better using a combination of complementary methods.^{4,7} Next, the probability of a drug causing the event is determined, and then the incident is classified as an adverse drug reaction,⁸ using systematic criteria such as the algorithm of Naranjo and colleagues.⁹

The annual number of deaths due to adverse drug reactions in Canada can be estimated using the 1:10 ratio of the population of Canada to that of the US. Bates and colleagues reported that 76 000 deaths are due to adverse drug reactions annually in the US.⁶ This estimate would rank adverse drug reaction fatalities as the 7th leading cause of death in Canada, after cancer, heart disease, stroke, pulmonary disease and accidents, using 1995 Statistics Canada data.

Adverse drug reactions prolong hospital stay by an average of 4.6 days in Canada, costing Can\$300 million annually.¹⁰ If one-third of adverse drug reaction deaths are preventable,^{2,6} then we should ensure that research dollars are used to minimize this problem.

David Rosenbloom, PharmD
Christine Wynne, BSc Phm
McMaster University Medical Centre
Hamilton, Ont.

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1. Bains N, Hunter D. Adverse reporting on adverse reactions. *CMAJ* 1999;160(3):350-1.
2. Lazarou J, Pomeranz BH, Corey PN. Incidence of adverse drug reactions in hospitalized patients: a meta-analysis of prospective studies. *JAMA* 1998;279:1200-5.
3. Keith MR, Bellanger-McCleery RA, Fuchs JE. Multidisciplinary program for detecting and evaluating adverse drug reactions. *Am J Hosp Pharm* 1989;46:1809-18.
4. Classen DC, Pestotnik SL, Evans RS, Burke JP. Computerized surveillance of adverse drug events in hospital patients. *JAMA* 1991;266:2847-51.
5. Cullen DJ, Bates DJ, Small SD, Cooper JB, Nemaskal AR, Leape LL. The incident reporting system does not detect adverse drug events: a problem for quality improvement. *J Qual Improvement* 1995;21:541-8.
6. Bates DW, Cullen DJ, Laird N, Peterson L, Small S, Servi D, et al. Incidence of adverse drug events and potential adverse drug events. *JAMA* 1995;274:29-34.
7. Dalton-Bunnow MF, Halfachs FJ. Computer-assisted use of tracer antidote drugs to increase detection of adverse drug reactions: a retrospective and concurrent trial. *Hosp Pharm* 1993;28:746-55.
8. Naranjo CA, Shear NH, Lanctot KL. Advances in the diagnosis of adverse drug reactions. *J Clin Pharmacol* 1992;32:897-904.
9. Naranjo CA, Busto V, Seller EM, Sandor P,

CMAJ index L'index du JAMC

The index for volume 160 (January-June 1999) of *CMAJ* will be mailed with an upcoming issue to paid subscribers and to CMA members who have requested it from the CMA Member Service Centre. Others may order single copies for \$15 (within Canada; add 7% GST/15% HST as applicable) or US\$15 (outside Canada).

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10. Bates DW, Spell N, Cullen DJ, Burdick E, Laird N, Petersen LA, et al. The costs of adverse drug events in hospitalized patients. *JAMA* 1997; 277:307-11.

[The authors respond:]

We are gratified by the attention paid to our discussion of adverse drug reactions in Canada.¹ Both the letter by David Rosenbloom and Christine Wynne and an earlier letter by Joel Lexchin² support our view that deaths associated with adverse drug reaction are probably underreported. We still believe, however, that the original estimate by Lazarou and colleagues³ was flawed for methodological reasons related to their meta-analysis. Their estimate is likely compromised by publication bias, by biases in the original studies, by reporting bias and because the application of US data to Canada was inappropriate. We used an alternative method, namely analysis of routinely collected hospitalization data, to argue that the true estimate of mortality associated with adverse drug reactions was likely to be lower than that reported from the meta-analysis.

We believe that the discrepant estimates of mortality associated with adverse drug reactions highlight the importance of this issue. In Ontario, the prevalence of adverse drug reactions is increasing.⁴ The inescapable conclusion is that a substantial number of Canadians suffer from adverse drug reactions, with a consequent risk of related mortality. The fundamental question remains: Who has the responsibility for monitoring these events? It is clear that current reporting methods are inadequate and that better methods are needed to accurately measure mortality associated with adverse drug reactions.

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2. Lexchin J. Rethinking the numbers on adverse drug reactions [letter]. *CMAJ* 1999;160(10):1432.
3. Lazarou J, Pomeranz BH, Corey PN. Incidence of adverse drug reactions in hospitalized patients: a meta-analysis of prospective studies. *JAMA* 1998;279:1200-5.
4. Hunter D, Bains N. Rates of adverse events among hospital admissions and day surgeries in Ontario from 1992 to 1997. *CMAJ* 1999; 160(11):1585-6.

Name that doctor

I read with interest Dr. Elizabeth Oliver's letter regarding Dr. Harold Griffith's correct name.¹ However, she in turn gave an incorrect name for Dr. Enid Johnson (not Walker), who was the resident involved in the pioneering use of curare as a muscle relaxant in anesthesia.

Dr. Enid Johnson became Dr. Enid MacLeod after marrying lawyer Innis MacLeod. She practised anesthesia in Nova Scotia and later she taught medical students as an associate professor in the Department of Physiology at Dalhousie Medical School until she retired. For her dedication to her work with medical students she has been given many awards and honours.

At the age of 79 years she wrote a book about the women doctors of Nova Scotia.² She will be 90 this year — a great lady.

Eileen N. Cambon, MD
 Vancouver, BC

References

1. Oliver E. Heroes in anesthesia [letter]. *CMAJ* 1999;160(10):1433.
2. MacLeod EJ. *Petticoat doctors*. East Lawrence-town (NS): Pottersfield Press; 1990.

Clarification

The government agency that hired Dr. Joan Mason for her work in Trenton with the Kosovar refugees¹ was in fact Customs and Immigration Canada, Immigration Health Services.

Reference

1. Sibbald, B. Flight 7 from Macedonia: trauma of a different sort lies ahead for Kosovar refugees. *CMAJ* 1999;160(13):1860-2.

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