

formation provides 3 references to support its position: 2 original research studies from the 1980s<sup>4,5</sup> and a review article that provides details on only 1 of 10 studies reviewed.<sup>6</sup> We are aware of 8 recent cohort studies that were not cited. Six of these reported mortality odds ratios for low- versus high-volume centres (low-volume centres treated fewer than 225 cases), and 5 had ratios very close to 1, which indicates an absence of a demonstrable volume-mortality relationship. For the other 2 cohorts, multiple regression analysis showed no volume effect on mortality after controlling for other factors. The odds ratios from early and recent cohorts together showed a linear progression over time, from -0.45 to 1. The most conservative conclusion at this time is that the available evidence does not provide a basis for a policy decision to centralize coronary artery bypass grafting surgery. It should be noted that these studies are concerned with hospital outcomes, not with those of individual surgeons.

We believe that there are 2 lessons to be learned. First, even highly regarded institutions may be subject to error or bias in presenting information. Second, bandwagons, buzzwords and self-interest often influence our thinking. Health care policymakers must avoid these effects and must base their decisions on careful review of the evidence, just as physicians are urged to do.

#### Norman Kalant

Department of Medicine  
Sir Mortimer B. Davis – Jewish General  
Hospital  
Montreal, Que.

#### Ian Shrier

Centre for Epidemiology and  
Community Studies  
Sir Mortimer B. Davis – Jewish General  
Hospital  
Montreal, Que.

#### References

1. Canadian Institute for Health Information. *Health care in Canada*. Ottawa: The Institute; 2001.
2. Derfel A. Quebec lacks heart-specialty facilities: report. *Montreal Gazette* 2001 May 9.
3. Comité de travail de cardiologie tertiaire. *Cardiologie tertiaire : situation actuelle, perspectives et*

*propositions*. Quebec City : Ministère de la santé et services sociaux; 2000.

4. Showstack JA, Rosenfeld KE, Garnick DW, Luft HS, Schaffarzick RW, Fowles J. Association of volume with outcome of coronary artery bypass surgery. *JAMA* 1987;257:785-9.
5. Hannan EL, Kilburn H, Bernard H, O'Donnell JF, Lukacik G, Shields EP. Coronary artery bypass surgery: the relationship between intrahospital mortality rate and surgical volume after controlling for clinical risk factors. *Med Care* 1991;29:1094-107.
6. Dudley RA, Johansen KL, Brand R, Rennie DJ, Milstein A. Selective referral to high-volume hospitals. *JAMA* 2000;283:1159-66.

#### [The Canadian Institute for Health Information responds:]

**K**alant and Shrier discuss findings regarding low-volume surgical procedures in a recent report by the Canadian Institute for Health Information.<sup>1</sup> We agree with their position that health care policymakers must base their decisions on careful review of the entire body of evidence.

In evaluating research findings, we believe that rigorous, systematic literature reviews are important. Well-established methods exist for conducting such reviews (e.g., the QUORUM statement<sup>2</sup> referenced by major journals). Use of similarly rigorous standards to synthesize the research literature minimizes the possibility of random or systematic error biasing conclusions.

In *Health Care in Canada 2001*, we cite several early articles in the field plus the only published recent broad systematic review of the literature on the relationship between volume and mortality. This review, published in *JAMA* in 2000,<sup>3</sup> summarized research on the relationship between hospital caseload and outcomes for 40 conditions based on findings from 72 studies that were evaluated for scientific merit and relevance according to explicit, predetermined criteria. Eleven published studies on coronary artery bypass graft surgery (CABG) met these criteria. All showed better outcomes with higher volumes; the difference was statistically significant in 9 of them.

In Canada, the number of both rare and common surgical procedures currently performed by individual hospi-

tals varies, often significantly. Some types of care are becoming concentrated over time. For example, as of 1998/99, no Canadian hospital performing CABG surgery had less than 200 cases per year, down from 5 hospitals in 1996/97.<sup>1</sup>

Volume-outcome relationships are clearly an area of current clinical and policy interest. Indeed, the recent Sinclair inquest found that “the limited number of cases [of pediatric cardiac surgery] that can be undertaken in a province like Manitoba with a population of just over 1 million increases the risk of morbidity and mortality.”<sup>4</sup>

Based on current evidence, we stand by our original conclusion that “deciding how much to centralize care requires us to strike a balance across [a variety of] issues. This balance is likely to vary from procedure to procedure and place to place.” In this context, systematic reviews of the research literature, an understanding of current Canadian volume patterns, and better information about patient outcomes at individual hospitals can all provide evidence to support decisions about how best to organize health services and distribute health care resources.

#### Richard Alvarez

President and CEO  
Canadian Institute for Health  
Information  
Toronto, Ont.

#### Charlyn Black

Director, Centre for Health Services and  
Policy Research  
University of British Columbia  
Vancouver, B.C.

#### References

1. Canadian Institute for Health Information. *Health care in Canada*. Ottawa: The Institute; 2001.
2. Moher D, et al, for the QUORUM Group. Improving the quality of reports of meta-analyses of randomised controlled trials: the QUORUM statement. *Lancet* 1999; 354(9193):1896-900.
3. Dudley RA, Johansen KL, Brand R, Rennie DJ, Milstein A. Selective referral to high-volume hospitals: estimating potentially avoidable deaths. *JAMA* 2000; 283(9):1159-66.
4. Provincial Court of Manitoba. *The report of the Manitoba pediatric cardiac surgery inquest: an inquiry into twelve deaths at the Winnipeg Health Sciences Centre in 1994*. Available: <http://www.pediatriccardiacinquest.mb.ca> (accessed 2002 Apr 12).