
Reports of case-control studies: What editors want from authors and peer reviewers

Bruce P. Squires, MD, PhD; Thomas J. Elmslie, MD, CCFP, FRCPC

In this editorial we do not intend to dictate to authors how they should carry out case-control studies. However, we believe that they must report their study well enough that the peer reviewers and the readers have all the information necessary to replicate the study exactly. Only with that information can they evaluate the study critically and assess its generalizability.

Reports of case-control studies describe retrospective studies. The authors compare people who have a clinical problem (case subjects) with those who do not have that problem (control subjects). Their goal is to determine whether the two groups differ in the proportion of people exposed to one or more specific factors. At the start of a case-control study the case subjects have the clinical problem of interest.

Thus, the validity of a case-control study depends on the authors' ability to make a fair comparison between the two subject groups in order to assess the exposure factor(s). The key issue, then, in assessing reports of case-control studies is bias. Indeed, peer reviewers assume the study is biased unless the authors have proven that the study was carefully designed and conducted. Authors must show that they have considered the many potential biases associated with case-control studies and have taken appropriate steps to minimize them, and they must provide evidence, if possible, that these steps have been effective. With this concern for bias in mind, the following specific points should be considered in preparing or reviewing manuscripts that describe case-control studies.

The introduction

Four features should go into the introduction: a clear statement of the problem, an assessment of the importance of the problem, a summary of the current relevant literature and a statement of the research question.¹ In the report of a case-control study the authors also need to explain their selection of the case-control approach, with its inherent potential for bias, over other, more rigorous study designs.

The methods

The main consideration in the methods section of a case-control study report is how the authors have selected the case and control subjects. For example, the authors must define their eligibility criteria — that is, what constitutes a case subject — and how such subjects were identified. They should also consider how representative the selected case subjects are.

The selection of concurrent control subjects is perhaps the main source of potential bias. The authors must identify clearly what method they used and why they believe that method was appropriate to their study. In addition, the authors must provide enough information about the control subjects so that readers can determine whether the groups are comparable in all aspects except the presence of the condition under study and the exposure factor.

The authors should describe clearly how they assessed the exposure factor(s). This is usually quite

Dr. Squires is editor-in-chief and scientific editor of CMAJ. Dr. Elmslie is assistant professor in the departments of Epidemiology and Community Medicine and of Family Medicine, University of Ottawa, and a scientific consultant with CMAJ.

Reprint requests to: Dr. Bruce P. Squires, CMAJ, PO Box 8650, Ottawa, Ont. K1G 0G8

difficult because of the retrospective nature of case-control studies.

As in all studies involving statistical analysis the authors must explain clearly what statistical methods were used. They must report the sample size calculated to ensure that the power of the study was great enough to identify clinically significant associations between the cases and the exposure factor(s).

The results

Reports of the results of case-control studies ideally contain several features. The authors should describe the results of their selection process (including nonresponders) and the general characteristics of each group. They should also describe the features of the exposure ascertainment, noting particularly any differences in the methods of assessing exposure within or between the two groups. The authors should report their estimates of the relative risk of the association between exposure and outcome by using odds ratios, including the 95% confidence intervals, while controlling for important potential confounding factors.

The discussion

In the discussion section the authors must identify and discuss the potential biases in the study and show how and by how much they might affect the results. Sackett² has described the biases that must be considered.

As with any study the authors should discuss their findings in consideration of discrepancies and similarities in the existing literature.

Finally, the importance of the study will boil down to what the authors can infer about causation from the observed association between the exposure factor(s) and the condition on the basis of their results and those of similar studies. But the authors must be very careful to remember that association does not prove causation. In interpreting their results the authors should remember that criteria for causation exist^{3,4} and must be applied before statements of causation are made.

References

1. Squires BP: Biomedical manuscripts: What editors want from authors and peer reviewers. *Can Med Assoc J* 1989; 141: 17-19
2. Sackett DL: Bias in analytic research. *J Chronic Dis* 1979; 32: 51-63
3. Department of Clinical Epidemiology and Biostatistics, McMaster University Health Sciences Centre: How to read clinical journals: IV. To determine etiology or causation. *Can Med Assoc J* 1981; 124: 985-990
4. Hill AB: The environment and disease. Association and causation. *Proc R Soc Med* 1965; 58: 295-300

Communicating electronically with CMAJ

For brief communications such as reviewer reports, inquiries, general correspondence and insertion orders for classified ads from within Canada (pre-payment will still be required for ads from outside Canada) use either of the following means.

- Telex; our number is 053-3152
- Fax (facsimile) machine; our number is 613-523-0937

For communications up to eight double-spaced pages use

- Envoy 100; our user ID is CMAJ

We will consider for publication all letters-to-the-editor, editorials, "Platform" articles and book reviews sent by Envoy 100.

For manuscripts that exceed eight double-spaced pages or are accompanied by tables and figures use a courier.

If you're uncertain which means to use, telephone us, at 613-731-9331, ext. 2129 (or 2127 for classified ads).



BRITISH COLUMBIA ROYAL COMMISSION ON HEALTH CARE AND COSTS CALL FOR RESEARCH PROPOSALS

The Commission, in carrying out its work, will be drawing upon both briefs from individuals and organizations, and research studies of particular issues and areas in health and health care. It is anticipated that the research program will be carried out in part by Commission staff, and in part through projects contracted out to the health and health care research community within and outside British Columbia.

The Commission would like to receive letters, to a maximum of three pages in length, from interested researchers, outlining potential projects relevant to the Commission's terms of reference. Letters should include a brief description of the project, an outline of the proposed approach and sources of data or other information, relevant experience and qualifications of the proposed research team, and a rough estimate of the cost. Of particular interest will be proposals which arise from presently ongoing research activities, established areas of expertise, or unique databases or other research resources. Since the Commission is to report by September 1, 1991, all projects must be completed by June 1, 1991.

The Commission's terms of reference are very broad. They include the analysis of trends in and determinants of utilization and costs of health services in the province, and their relationship both to the needs of the province's population, and to its economic capacity, present and future. This in turn requires consideration and evaluation of existing and alternative forms of organization of the delivery of and payment for health care services, of the types and amounts of personnel and capital facilities required now and in the future, and of the legislative and regulatory framework within which the development of personnel and facilities, and the delivery of services, takes place.

Further, the terms of reference recognize that health care is only one aspect of the health of any population, and require the Commission to consider the contribution to health of factors beyond the health care system — making specific reference to the concept of "healthy public policy" in the broadest sense.

Letters should be sent to the Director of Research, B.C. Royal Commission on Health, Ninth floor, 1285 West Pender St., Vancouver, B.C. V6E 4B1.