

How to Write a Case Report

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Background: *Since before Hippocrates, case reports have provided a rich resource for teaching and research in medicine. Case reports are published by many prominent journals—more than 140,000 case reports are indexed in MEDLINE from 1996 to present—and a number of narrative guidelines for the preparation of case reports have appeared in the medical literature. To facilitate the preparation of case reports, we reviewed the existing guidelines and a random sampling of published case reports and created a fill-in-the-blanks worksheet for physicians to use to capture unique scientific observations. Although originally developed to assist family practice residents to write case reports, the case report worksheet can be used by physicians in any practice setting and any discipline to collect and report interesting, unusual, or newsworthy cases.*

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[A] striking anecdote was the case of Phineas Gage, the man who had a 4-ft iron bar blown through his frontal lobes and whose immortal remains are now in the Harvard Museum . . . Had it been realized that one could interfere with large masses of the cerebral hemispheres without killing the patient, and that great damage to the frontal lobes need cause no obvious intellectual defect, neurosurgery might have been conceived 40 years earlier.¹

Since before Hippocrates, case reports have made a valuable contribution to the advancement of medical science.¹⁻⁹ A search of the MEDLINE database from 1996 to the present using the Medical Subject Heading (MeSH) term *case report* retrieved more than 140,000 citations. Several prominent medical journals have demonstrated an interest in increasing the number and quality of published case reports.^{2-5,10-12}

Case reports are “scientific observations . . . that are carefully documented so that they may be a valuable education and research resource.”⁶ Sir William Osler, himself the author of many such scientific observations, encouraged other physicians to “Always note and record the unusual . . . When you have made and recorded the unusual or original observation . . . publish it.”⁶ A case report, published in the *American Journal of*

Dermatopathology in 1981, was one of the first published accounts of what is now called AIDS.¹³

To help practitioners write case reports, we developed an outline-style worksheet. We began by searching the MEDLINE database from 1966 to the present using the MeSH terms *case report* and *publishing* to extract citations about writing case reports.^{1-12,14-17} We also combined the term *case report* with keywords for various disciplines (eg, obstetrics and gynecology, pediatrics, neurology and neurosurgery, dermatology, general internal medicine, family medicine)¹⁸⁻³¹ and selected a random sampling of published case reports. We studied these articles to determine the content and format that comprises published case reports.

The Content

What Kinds of Cases Should Be Reported

Much has been written about what type of case is worthy of reporting and publishing. Nathan¹ makes a strong case for reporting cases that “appeal to the emotions.” He also points out that although an observation may be uncommon, unless it is reported, the frequency of its occurrence cannot be tabulated. Throughout history, reports of unusual cases have led to significant research and resulted in important clinical advances.^{1,6,7,12,13} What guidelines, then, should a potential author use for deciding whether “this” case is significant enough to warrant writing?

To answer this difficult question, we reviewed previous published guidelines and examined the content of published case reports. Most case reports concern

specialty and subspecialty topics that describe uncommon or unique clinical encounters, in keeping with the history of published case reports.^{18,20,22,24,25,28,30,31} (Only 184 out of more than 140,000 case reports in the MEDLINE database from 1996 to the present are indexed under primary care.) Other cases, although reporting unusual outcomes or events, went on to describe lessons learned from patient interactions and interventions.^{21,23,26,27,29,32-35} Clearly, there is room for both types of reports in the medical literature.

Our own review of published cases and existing guidelines suggest that case reports should describe a unique presentation, and its uniqueness should not simply be a variation from a previously reported case. For example, a new or unusual location for a previously recognized disease does not constitute a unique event unless it is accompanied by previously undocumented symptoms or unless it required a particularly lengthy and costly diagnostic process.^{2,10,14}

Examples of observations that meet the uniqueness criteria are cases with characteristics such as those shown in Table 1.

Most existing guidelines were published in the specialty and subspecialty literature.^{6,9,16} Two exceptions are a 1968 article in the *Journal of the American Medical Association*¹⁵ by Roland, who represented the Scientific Publications Division of the American Medical Association, and Squires' 1989 article that appeared in the *Canadian Medical Association Journal*.¹¹ Both of these articles state that the purpose of case reporting is to describe the unique, newsworthy, or unusual. Since much of family practice is caring for common problems, and it is the unusual or unique presentation that forms the basis for a case report, it would seem appropriate for the editorial boards of the various family practice journals to define the criteria for accepting case reports and describe those criteria in their instructions to authors.

The Format

Components of a Case Report

Most previously published material about how to prepare case reports identified three major components: introduction, case presentation, and discussion.^{11,14,15} Most also suggested that a brief, highly focused literature review be included, usually as part of the introduction. A detailed guideline for preparing a case report by DeBailey and DeBailey¹⁶ expanded this format to five sections: introduction, description of the case, discussion, literature review, and summary/conclusions.

None of the previously published guidelines for case reports suggested the inclusion of an abstract, and few journals include abstracts in the case reports they publish. We advocate for the inclusion of an abstract (perhaps in lieu of the introduction) so that more information about the case can be retrieved from electronic databases such as MEDLINE. Since about 1970, the

Table 1

Characteristics of Cases Suitable for Publication in a Case Report

- Cases that contribute to a change in the course of medical science¹³
- Cases that illustrate a new principle or support or refute a current theory and thus may stimulate research¹⁶
- Cases that present a therapeutic or diagnostic observation that elucidates a previously misunderstood clinical condition or response
- Cases that demonstrate an adverse response to drug therapies or presumed cause-and-effect presentations that have not been detected or reported^{8,16}
- An unusual combination of conditions, cascading events,³³ or presenting complaints that confused the decision-making process or created treatment dilemmas.²⁶ The first reported cases of toxic shock syndrome involved a strange melange of presenting signs and symptoms that established the need for detailed clinical research.⁸ A new observation of the impact of one disease process or condition on another, or of a treatment regime for one condition that results in an unexpected outcome of a different condition, are legitimate subjects for case reporting.³⁶
- Reports that describe the personal influence a particular event had on the patient, the physician, or both. A case that causes a physician to reevaluate how he or she cared for patients³⁷ or a case that suggests opportunities for patient education are examples.³¹

MEDLINE record has included abstracts with all indexed articles that have an author-written abstract attached. Squires noted that for a case report to be worth writing and publishing, physicians must be able to "anticipate its interest and relevance to them and their practice."¹¹ Without an abstract available in an electronically searchable database, the likelihood that physicians will be able to anticipate the relevance of a particular case is diminished.

Taking all of the suggestions from previous published guidelines together with the structural components of several recently published reports and our own observations, we recommend that these five sections be included in a case report: 1) abstract/introduction, 2) case history/description, 3) literature review, 4) discussion, 5) conclusions/recommendations.

Although previously published guidelines have been thorough, they have mostly been narrative. Only one guideline offered a graphic representation of a case report—that guideline was prepared from the perspective of the reviewer, which would be an excellent resource for revising and editing a case paper once the first draft has been written but does not present enough detail to serve as a worksheet.¹¹ Using the five basic sections as a framework, we built a detailed outline or template that can be filled in by physicians interested in writing and publishing a case report. We call this template the case report worksheet (Figure 1). The following subsections describe the content of each field

Figure 1

Case Report Worksheet (Content of a Case Report)

Author (s) _____

Title _____

1) Abstract

Clinical question/problem _____

Analysis of literature review _____

Summary _____

2) Case history/report

A. Description of patient _____

B. History of presenting condition _____

C. Physical exam _____

D. Relevant lab/X ray/other tests _____

E. Initial diagnosis and treatment _____

F. Expected outcome _____

G. Actual outcome _____

3) Literature search

A. MEDLINE/other database _____

B. Search terms _____

C. Results of search (# relevant, citations, what you learned) _____

4) Discussion (significance, why you're writing this)

A. Relevant literature _____

B. Hypothesis _____

C. Diagnostic process/course of illness _____

i. Table of diagnostic process _____

ii. Figures, photographs, imaging _____

D. Outcomes _____

i. Drug-drug interactions _____

ii. Drug-condition interactions _____

iii. Other conflicting outcomes/observations _____

5) Conclusions/recommendations (lesson learned) _____

References _____

of the template and provide examples to facilitate preparation of a case report using the worksheet.

1) Abstract

Along with the title, abstracts are an important component of the electronic bibliographic record of each article in databases such as MEDLINE. Abstracts allow readers to quickly scan the content of an article to determine whether it is sufficiently relevant to merit further reading. Without abstracts, many articles that may be pertinent to a clinical situation may be overlooked.

In lieu of or in addition to an introduction, we suggest adding a brief abstract that contains the clinical question or problem, an analysis of the literature review, and a brief statement summarizing why this case is unusual and noteworthy. Here is an example of an abstract of less than 100 words:

A 10 year-old-boy presented with a 4-year history of recurrent perioral rash. A MEDLINE search to answer the question, "What could cause intractable perioral rash in a 10-year-old-boy?" yielded several case reports describing unusual perioral rashes caused by the ingredients found in toothpaste. Given the history and unique pattern of the rash, the diagnosis of contact dermatitis caused by allergy to toothpaste was made. Minimal lifestyle changes resulted in resolution of the rash. Toothpaste allergy may be more common than currently thought, because of the difficulty of arriving at the diagnosis.

2) Case History/Report

The second section is the case history or case report, which is typically drawn from chart notes and is a central part of published case reports. It should begin with an introduction to the patient(s) and should provide a history of the current situation. Details about the physical exam and any test results that provide insights into the current case should be included, but authors should refrain from providing all test results and should be careful not to include "red herrings" unless they are likely to cause problems for other physicians.¹⁴ Include normal laboratory values for less commonly ordered laboratory tests.^{11,14,16} The goal is to include only the essential information to emphasize the striking features of the case.¹⁴ The initial diagnosis and treatment and follow-up plan should be included in this section.²⁸ Tables,²⁶ flow charts,²⁸ photographs,^{20,25,28,31} radiographs,^{18,21} and figures,^{30,31} can be included to elucidate the case.

3) Literature Review

The methods section for case reports is the formal, structured literature search, similar to that described for systematic reviews.³⁸ A well-built clinical question should be formulated,^{39,40} followed by a description of the index terms or MeSH headings used for the searches,

so others can reproduce the search. For example, MeSH terms to answer the clinical question, "In a 10-year-old boy, what are the possible causes of intractable perioral rash?" might be "dermatitis, perioral" or "facial dermatoses." The literature review itself should be brief and concise, designed to assure the uniqueness of the case and to provide a backdrop for and the position of the new information in the biomedical literature.

Many editors and authors of guidelines caution against structuring or titling manuscripts as "A Case Report and Review of the Literature."^{10,11} Case reports and literature reviews are two distinctly different article forms serving different information needs. Although a concise overview of the pertinent literature is necessary in a case report, a full-scale literature review is not relevant to the clinical question and the purpose of the case report, and it defies the critical need for case reports to be brief. All citations should be included at the end of the manuscript following the format required for the journal. (See "Barriers" below for a more complete discussion of the publication process.)

4) Discussion

The discussion section is the most important section of a case report. This is where the authors state the significance of the information. What about this patient was striking or unusual? Why is writing this up important? What will your colleagues learn? Note that not all subsets of the discussion section on the worksheet (Figure 1) will apply to all cases being reported. Choose the areas that best help elucidate your case, paying attention to the two watchwords of case reporting: brevity and clarity.^{11,14} Most published case reports are less than three journal pages in length, and the vast majority are one page or less.

The discussion section should discuss the relevant literature in the context of the current case, describing why the case being reported is a new and noteworthy or unique observation. A hypothesis about the new condition might be generated to present the new information in relation to existing information.⁹ The manner in which the data (scientific observations) were collected and assembled (eg, a chronology of events from the perspective of the physician or the patient) should be described as part of the diagnostic/revelation process. A short decision tree or algorithm might also be useful. Graphics can serve to replace words in these brief publications. A discussion of the outcomes of the case should be included. This section should justify the publication of the case report.

5) Summary/Conclusions/Recommendations Section

Finally, the paper should include a brief summary, conclusion, or recommendations section—the take-home message. Lessons the physician learned from caring for this patient—family, social or quality-of-life lessons, physician-patient communication barriers, or

compliance issues³⁷—should be described in this section. Ask questions like, “What would I do differently next time now that I’ve had this experience?” or “What recommendations can I offer to other clinicians?” Recommendations for research should also be included. This section should likewise be brief, generally only one or two paragraphs.

Overcoming Barriers to Writing Case Reports

Practitioners interested in writing case reports or other manuscripts for publication face a number of barriers. The greatest barrier is time. The case report worksheet can streamline the process of writing a case report by directing the clinician’s data collection (those scientific observations that comprise a case report). Once completed, the notes and observations can be readily formatted into a manuscript for submission.

Another obstacle is that practitioners may be intimidated by the publication process. The guideline published by DeBakey and DeBakey provides a simple and thorough discussion of the publication process.¹⁶ This guideline is especially useful for the novice author who would like a more in-depth discussion of the publication process than a more-experienced writer might need.

The case report worksheet has categories for all material appropriate for a brief case report (although not all information on the worksheet is appropriate for all topics) in a standard publication format. Instructions to authors for the journal should be consulted early in the writing process, so the manuscript can be prepared in the appropriate style. All journals print instructions for authors regularly,^{41,42} and many journals now publish their instructions on-line (eg, www.stfm.org/instruct.html and www.abfp.org/journal.htm). The “Uniform Requirements for Manuscripts Submitted to Biomedical Journals” form the basis for most journal instructions and should be consulted to answer format and content questions not addressed by the journal’s instructions.⁴³ The “Uniform Requirements” are also available on-line at the American Medical Association Web site (jama.ama-assn.org/info/auinst.html).

When the manuscript is received by the journal, it will go through a brief editorial review to determine potential suitability for the journal, followed, if appropriate, by a peer-review process, during which reviewers comment on the article’s significance and its relevance to the journal’s scope and readership. While many manuscripts are rejected, some are returned to the author with an invitation to revise and resubmit the manuscript for further consideration. The comments from reviewers help authors revise and edit manuscripts, which can then resubmitted for publication. A detailed letter to the editor describing how the reviewer’s comments were addressed should accompany the revised manuscript.

Table 2

Partial Listing of Primary Care Journals That Accept and Publish Case Reports

Academic Emergency Medicine

American Family Physician

Archives of Family Medicine

Archives of Internal Medicine

Journal of Family Practice

Journal of the American Board of Family Practice

Lancet

New England Journal of Medicine

A final obstacle is that physicians may not know which publications accept case reports. In Table 2, we have listed several primary care journals that publish case reports. *The New England Journal of Medicine* accepts case reports in the form of letters to the editor.³⁶ In addition, many local and state medical associations publish case reports,⁴⁴ as do specialty journals.^{30,31} *Pediatrics* publishes many case reports as e-pages (electronic pages) on its Web site (www.pediatrics.org).³⁵

Summary

The case report worksheet was designed to help guide the process of collecting observations of unusual cases in a scientific and structured manner and to overcome some of the barriers and anxieties physicians might encounter when preparing case reports. Adjusting the previously accepted structure of case reports (introduction/discussion/conclusion) to include an abstract and a brief literature review increases the usefulness and retrievability of case reports.

Case reports must be brief, present new or unique material, and follow a standard, structured approach to organizing and presenting clinical observations. Editors and editorial boards for primary care and family medicine journals should determine the specific criteria for accepting case reports (type of report, length, etc) and print those criteria in the instructions for authors for each journal. The case report worksheet provides a uniform approach to preparing case reports and can be used to collect and organize scientific observations into interesting and publishable case reports.

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REFERENCES

- Nathan PW. When is an anecdote? *Lancet* 1967;2:607.
- Pascal RR. Case reports—desideratum or rubbish? *Hum Pathol* 1985;16:759.
- Richtsmeier WJ. Case report. *Arch Otolaryngol Head Neck Surg* 1993;119:926.
- Friedell MT. The case report. *Int Surg* 1973;58:225.
- Morgan PP. Why case reports? *Can Med Assoc J* 1985;133:353.
- Coccia CT, Ausman JJ. Is a case report an anecdote? In defense of personal observations in medicine. *Surg Neurol* 1987;28:111-3.
- Treasure T. What is the place of the clinical case report in medical publishing? *J R Soc Med* 1995;88:279.
- Morris BA. The importance of case reports. *Can Med Assoc J* 1989;141:875-6.
- Simpson RJ Jr, Griggs TR. Case reports and medical progress. *Perspect Biol Med* 1985;28:402-6.
- Soffer A. Case reports in the *Archives of Internal Medicine*. *Arch Intern Med* 1976;136:1090.
- Squires BP. Case reports: what editors want from authors and peer reviewers. *Can Med Assoc J* 1989;141:379-80.
- Riesenberg DE. Case reports in the medical literature. *JAMA* 1986;255:2067.
- Gottlieb GJ, Rogoz A, Vogel JV, et al. A preliminary communication on extensively disseminated Kaposi's sarcoma in a young homosexual man. *Am J Dermatopathol* 1981;3:111-4.
- Riley HD. Preparing a case report. *South Med J* 1975;68:79-80.
- Roland CG. The case report. *JAMA* 1968;205:83-4.
- DeBakey L, DeBakey S. The case report. I. Guidelines for preparation. *Int J Cardiol* 1983;4:357-64.
- DeBakey L, DeBakey S. The case report. II. Style and form. *Int J Cardiol* 1983;6:247-54.
- Arakawa K, Akita T, Nishizawa K, et al. Anticoagulant therapy during successful pregnancy and delivery in a Kawasaki disease patient with coronary aneurysm: a case report. *Japanese Circulation Journal* 1997;61:197-200.
- Pasternak AV IV, Graziano FM. Neurosarcooidosis: case report and brief literature review. *J Am Board Fam Pract* 1999;12:406-8.
- Bradway MW, Drezner AD. Popliteal aneurysm presenting as acute thrombosis and ischemia in a middle-aged man with a history of Kawasaki disease. *J Vasc Surg* 1997;26:884-7.
- Embil JM, Kramer M, Kinnear S, Light RB. A blinding headache. *Lancet* 1997;350:182.
- Hanzlick R, Nicholls L. The Autopsy Committee of the College of American Pathologists. Case of the month: mycobacterium tuberculosis. *Arch Intern Med* 1998;158:426.
- Hart AL, Kamm MA, Palmer JG, Talbot IC. An extraordinary cause of megacolon. *Lancet* 1997;350:110.
- Lee EY, Cibull ML, Hanzlick R. The Autopsy Committee of the College of American Pathologists. Case of the month: drug hypersensitivity reaction. *Arch Intern Med* 1997;157:2044.
- Matfin G, Berger KW, Adelman HM. Milky ascites in a former whiskey runner. *Hosp Pract* 1997;Aug 15:39-40,43.
- Melberg A, Mattsson P, Westerberg CE. Loss of control after a cup of coffee. *Lancet* 1997;350:1220.
- Sarkisian EC, Boiko S, Hood AF. Acute localized bullous eruption in a boy. *Arch Fam Med* 1998;7:11-2.
- Walker JS, Hogan DE. Bite to the left leg. *Acad Emerg Med* 1995;2:223, 231-7.
- Welch KMA. A 27-year-old woman with migraine headaches. *JAMA* 1997;278:322-8.
- Sauerbrei A, Müller D, Eichhorn U, Wutzler P. Detection of varicella-zoster virus in congenital varicella syndrome: a case report. *Obstet Gynecol* 1996;88:687-9.
- Ruvalcaba RHA, Kletter GB. Abdominal lipohypertrophy caused by injections of growth hormone: a case report. *Pediatrics* 1998;102:408-10.
- Schneeweiss R. Morning rounds and the search for evidence-based answers to clinical questions. *J Am Board Fam Pract* 1997;10:298-300.
- Lawler MK, Olay MP, Ramakrishnan K, Barton ED. Lions and tigers and bears, oh my! *Fam Med* 1998;30:329-31.
- Reilly KEH, McCarthy LH. Toothpaste allergy presenting as intractable perioral rash in a 10-year-old boy. *J Am Board Fam Pract* 2000;13:73-5.
- Huff GF, Bagwell SP, Bachman D. Airbag injuries in infants and children: a case report and review of the literature. *Pediatrics* 1998;102:2.
- Velasco M, Morán A, Téllez MJ. Resolution of chronic hepatitis B after ritonavir treatment in an HIV-infected patient. *N Engl J Med* 1999;340:1765-6.
- Mold JW, McCarthy LH. Pearls from geriatrics, or a long line at the bathroom. *J Fam Pract* 1995;41:22-3.
- Cook DJ, Mulrow CD, Haynes RB. Systematic reviews: synthesis of best evidence for clinical decisions. *Ann Intern Med* 1997;126:376-80.
- Richardson WS, Wilson MC, Nishikawa J, Hayward RSA. The well-built clinical question: a key to evidence-based decisions. *ACP J Club* 1995;123:A-12-A-13.
- Counsell C. Formulating questions and locating primary studies for inclusion in systematic reviews. *Ann Intern Med* 1997;127:380-7.
- Family Medicine* instructions to authors. *Fam Med* 1999;31:509-12.
- Information for authors. *J Am Board Fam Pract* 1999;12:101-3.
- Uniform requirements for manuscripts submitted to biomedical journals. *JAMA* 1997;277:927-34.
- Guo X, Dick L. Late onset angiotensin-converting, enzyme-induced angioedema: case report and review of the literature. *J Okla State Med Assoc* 1999;92:71-3.