

How to write a patient case report

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Published patient case reports provide essential sources of information for the optimum care of patients because case reports can describe important scientific observations that are missed or are undetectable in clinical trials, provide insightful information that expands our knowledge and spawns new research, and provide information that strays from the classical textbook case and leads to better and safer patient care. Indeed, a case report of Kaposi's sarcoma in a young homosexual man is the seminal observation to the development of acquired immune deficiency syndrome.¹ Seminal patient case reports linked the Food and Drug Administration-approved indication for the anorexic agents, fenfluramine and dexfenfluramine, with primary pulmonary hypertension and subsequently spawned trials that evaluated the mechanism, incidence, and risk factors of this adverse effect, culminating in their withdrawal from the market.²⁻⁵

Many biomedical journals publish case reports and provide authors with guidelines that provide instruction for acceptance criteria, content, and format. The types of relevant patient case reports that merit publication are listed in Appendix A. This article

Purpose. Guidelines for writing patient case reports, with a focus on medication-related reports, are provided.

Summary. The format of a patient case report encompasses the following five sections: an abstract, an introduction and objective that contain a literature review, a description of the case report, a discussion that includes a detailed explanation of the literature review, a summary of the case, and a conclusion. The abstract of a patient case report should succinctly include the four sections of the main text of the report. The introduction section should provide the subject, purpose, and merit of the case report. It must explain why the case report is novel or merits review, and it should include a comprehensive literature review that corroborates the author's claims. The case presentation section should describe the case in chronological order and in

enough detail for the reader to establish his or her own conclusions about the case's validity. The discussion section is the most important section of the case report. It ought to evaluate the patient case for accuracy, validity, and uniqueness; compare and contrast the case report with the published literature; derive new knowledge; summarize the essential features of the report; and draw recommendations. The conclusion section should be brief and provide a conclusion with evidence-based recommendations and applicability to practice.

Conclusion. Patient case reports are valuable resources of new and unusual information that may lead to vital research.

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will provide guidelines for writing patient case reports, with a focus on medication-related reports.

Format of the patient case report

Case reports should encompass the following five sections: an abstract, an introduction and objective with a literature review, a description of the case report, a discussion that includes a detailed explanation of the literature review, a summary of

the case, and a conclusion.^{6,7} Supplementary parts such as tables, figures, graphs, and illustrations provide essential data and will enhance the article's flow and clarity. Generally, most of the data contained in supplementary parts should not be duplicated in the text.^{6,7} Patient case reports can describe a single case report or a series of case reports. Case reports are generally 1500–2500 words in length with 20–30 references. The title of the

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case report should be descriptive, accurate, and succinct.

Abstract. Case reports should include an abstract of 100–250 words. The availability of an abstract will allow for easier retrieval from electronic databases and help researchers discern their levels of interest in the case report. The abstract should include the same four sections as the main text in a succinct form—introduction and objective, case presentation, discussion, and conclusion—but the format may vary depending on a journal's style if submitted for publication.

Introduction. The introduction section should be concise and salient and immediately attract the attention and interest of the reader. The introduction should provide the subject, purpose, and merit of the case report. It should present background information that provides clarity to the subject of discussion. This should be followed by an explanation of why the case report is novel or merits review. A focused comprehensive literature review that corroborates the author's claims should accompany the introduction. If few citations are found, they should all be cited chronologically; however, if many citations are found, the seminal, historical, and most pertinent references should be cited. The significant details from the literature review and how those details compare and contrast to the current case should be explained in the discussion, not in the introduction. A brief one- or two-sentence description of the patient case should be provided and is an excellent segue for the case presentation section. The introduction should not be more than three paragraphs and does not need to be labeled with a heading (i.e., Introduction).

A literature review should list the strategy and extent of the search and should include the database searched, the dates that the database was searched, the languages covered, and the search terms used.

The literature search should provide enough detail for the reader to easily reproduce the search. Databases that are commonly searched because of their comprehensiveness of biomedical content include MEDLINE and EMBASE. However, it is important that the breadth of the search uses databases that contain information that may not be found in MEDLINE or EMBASE. For example, a case report of an adverse drug event or medication error should include a review of an adverse reaction database such as Clin-Alert or databases that review pharmacy publications such as International Pharmaceutical Abstracts and Iowa Drug Information Service. A case report describing the collaboration of a pharmacist and a nurse that improves a patient's care should include a search in the nursing database such as the Cumulative Index to Nursing and Allied Health Literature. Furthermore, to maximize the literature search findings, authors should meticulously search the reference lists of review articles and meta-analyses. Finally, clinicians ought to be cognizant that early reports may not be detected in a literature search because of changes in concepts, nomenclature, and terminology since their publication date.

Case presentation. The description of the patient case is one of the most integral sections of the case report. It should describe the case in chronological order and in enough detail for the reader to establish his or her own conclusions about the case's validity. A case report that contains detailed and relevant patient information allows the reader with a different clinical expertise to uncover idiosyncracies that are not detected or described by the author and stimulates further inquiry and commentary. The case presentation should only include information that pertains to the case and refrain from providing confusing and superfluous data. Daily patient progress including normal vital signs,

routine laboratory results, typical consultation with other disciplines, step-down transfers to wards, and other irrelevant patient information must be avoided. The author should establish a causal and temporal relationship and indicate the effect of treatment, any unanticipated effects, the patient's final outcome, any further proposed treatments, and the patient's present status at the time of the report.

Patient's demographics and history. Patient demographics such as age, height, weight, sex, race, and occupation must be included. Although the race or occupation of the patient may appear as superfluous, this type of information may uncover pharmacogenomic or environmental influences. In order to limit the possibility of identifying the patient, the patient's initials, date of birth, and other identifiers must not be used. Precise dates, including the month, day, and year of admission or other important events, should be avoided—they can aid in identifying the patient and detract the reader from the case report by calculating elapsed time. In a brief summary and in a narrative form, the patient's chief complaint, present illness, medical history, family and social history, and use of recreational drugs should be listed. Headings for each part of the patient's history should not be used. The type of physical examination performed should be described, and any abnormalities should be reported.

Patient's laboratory and diagnostic data. The patient's laboratory values and diagnostic data that support the case report and rule out a differential diagnosis should be reported. Pertinent positive or negative laboratory results must be provided. When the reference range of a laboratory value is not widely known or established, it should be provided in parentheses. Diagnostic procedures, the timeline in which they were administered, and a brief report of the results should be included. A verbatim description

of a pathologist's report must not be used; instead, a salient report of the results should be included. Pictures of histopathology, roentgenograms, electrocardiographs, and other diagnostic tests; skin manifestations; wounds; and other anatomical parts may be provided and add to the interest of the report. Any identifying features of a patient's photograph should be blocked out. Institutional policies and patient permission for obtaining and using photographs must be followed.

Patient's medication history. The patient's medication history should include the medication's name, strength, dosage form, route, and dates of administration. The brand or generic name of the drug and the name of the manufacturer may be relevant to the case and should be listed. Brand and generic drugs may have different bioavailability factors or may contain different fillers, preservatives, additives, or dyes—all of which may be pertinent to cases regarding the drugs' pharmacokinetics, efficacy, and adverse effects. Since a medication history may often omit herbals, vaccines, depot injections, and nonprescription medications, the author should specify the history of each of these medication types. The dates a medication was discontinued should be identified, since medications may have lasting effects for months after discontinuation. The author should verify and inform the reader of the patient's history of medication adherence.

In order to evaluate the appropriateness of a medication's dosage regimen, laboratory values that describe renal and hepatic organ functions should be provided. Renal function values should include serum creatinine, blood urea nitrogen, and the total fluid volume intake and excretion when a urinary catheter is in place. Calculation methods used to estimate the patient's renal function should be identified. Liver function tests such as the International Nor-

malized Ratio, serum albumin, and albumin:globulin ratio and hepatic enzyme tests such as aspartate and alanine aminotransferases should be provided.

A comprehensive medication history should also include the patient's allergy status. The allergy history should include the date of the reaction, the name of the drug, and the type of allergic manifestation. The name of the drug should be listed as either the generic or brand name, and combination products should be listed as such. Allergies to combination products such as Unasyn and Zosyn can be mislabeled as a penicillin allergy rather than a sulfone allergy or vice versa. Similarly, an allergy to Septra or Bactrim can be mislabeled as an allergy to sulfonamide rather than to trimethoprim or vice versa. Some nonallergic adverse drug reactions such as drug-induced seizures may not be included in the allergy history; nevertheless, the author should investigate and report such data.

When available, drug serum levels ought to be listed along with the time they were drawn and their relationship to the dosage of the medication administered (e.g., trough, peak). Drug serum levels should delineate between total and free levels (e.g., phenytoin, valproic acid). Since there may be intralaboratory variations in drug serum reference ranges, the reference range should always be provided in parentheses. When pertinent to the case, the method of drug serum level assay should also be included.

Patient's diet. The patient's diet history ought to be included in the case report. Food can interact with medications, yielding lower or higher serum drug levels or increasing or decreasing the drug's pharmacologic effect. The patient's diet can have consequential effects on a disease state. Dietary causes of adverse events, such as allergic reactions, should be ruled out before suspecting a drug allergy.

Discussion. The discussion section is the most important section of the case report. The discussion should evaluate the patient case for accuracy, validity, and uniqueness; compare and contrast the case report with the published literature; and derive new knowledge and applicability to practice. The author must confirm that the case report is valid by ensuring the accuracy of the data presented and by establishing a temporal and causal relationship. For drug-induced adverse effects, a validated nomogram to establish the probability of causality such as the Naranjo nomogram must be used.⁸ The author should comprehensively list the limitations of the case and should describe the significance of each limitation.

The author should briefly summarize the published literature derived from the literature review and may provide a detailed summary of a few citations. A table listing the pertinent facts of the cases detected from the literature review is a simple method for providing extensive, detailed data in an interpretable form. The author should compare and contrast the nuances of the case report with the published literature and should explain and justify the differences and similarities. The discussion section of a case report is in no way designed to provide comprehensive details of each citation of an all-inclusive and extensive literature review—this should be saved for review articles. All the references cited should be critically evaluated. Transferring an unread reference cited in another article is unethical and will place the author of the case report at risk of error and embarrassment.

The author should next summarize the essential features of the case report, justify why this case is unique, and draw recommendations and conclusions.

Conclusion. Based on the evidence reviewed in the discussion section, the author must provide a justi-

fied conclusion. The author must be careful not to make firm judgments and sweeping recommendations based on speculation, on limited and tenuous information, or on a few case reports. However, justifiable evidence-based recommendations should be stated. The author may suggest that clinicians be cognizant of the insight learned from the case or suggest heightened vigilance, prudent management, avoidance, further study before taking action, or new ideas for investigation. How the information discovered from the case report will apply to the author's practice should be described. This section should be concise and not exceed one paragraph. Guidelines for writing patient case reports in a checklist format (Appendix B) can facilitate and enhance the manuscript writing process.

Summary

Patient case reports are valuable resources of new and unusual information that may lead to vital research and advances in clinical practice that improve patient outcomes. Case reports should contain an abstract and four sections—an introduction, case presentation, discussion, and conclusion. The introduction provides the subject, purpose, and merit of the case report and the strategy used for the literature review. The patient case presentation should be descriptive, organized chronologically, accurate, salient, and presented in a narrative form. The discussion should compare and contrast the case report's findings with the literature review, establish a causal and temporal relationship, and validate the case with a probability scale. The literature review should be extensive and should support the justification of the case report. The discussion section should end with a brief summary of the case with rational recommendations and conclusions. The conclusion section must provide a brief conclusion with evidence-based recommendations.

Conclusion

Patient case reports are valuable resources of new and unusual information that may lead to vital research.

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Appendix A—Criteria for publishable case reports

Publishable patient case reports include cases that:

- Advance medical science and spawn research;
- Describe rare, perplexing, or novel diagnostic features of a disease state;
- Report therapeutic challenges, controversies, or dilemmas;
- Describe a new surgical procedure;
- Report how a drug can enhance a surgical procedure;
- Teach humanistic lessons to the health care professional;
- Review a unique job description of a health care professional that improves patient care;
- Report new medical errors or medication errors;
- Discover a device malfunction that results in patient harm;
- Describe adverse effects and patient toxicity of a radiopaque agent;
- Describe life-threatening adverse events;
- Describe dangerous and predictable adverse effects that are poorly appreciated and rarely recognized;
- Describe rare or novel adverse drug reactions;
- Describe a therapeutic failure or a lack of therapeutic efficacy;

- Describe rare or novel drug–drug, drug–food, or drug–nutrient interactions;
- Report unlabeled or unapproved uses of a medication;
- Explore the use of pharmacogenomics to manage diseases;
- Use life-saving techniques not previously documented;
- Use pharmacoeconomic principles that improve patient care;
- Uncover barriers to patient adherence;
- Discover an interaction between a drug and a laboratory test that yields a false-positive or false-negative result;
- Describe the effect of drugs in pregnancy and lactation;
- Detect novel pharmacokinetic or pharmacodynamic principles; and
- Use technology to improve patient outcomes.

Appendix B—Guidelines for writing patient case report manuscripts

(The following checklist is comprehensive; some items may not apply to all types of case reports.)

I. Abstract

- Introduction and objective.
- Case report.
- Discussion.
- Conclusion.

II. Introduction

- Describe the subject matter.
- State the purpose of the case report.
- Provide background information.
- Provide pertinent definitions.
- Describe the strategy of the literature review and provide search terms.
- Justify the merit of the case report by using the literature review.
- Introduce the patient case to the reader.
- Make the introduction brief and less than three paragraphs.

III. Patient case presentation

- Describe the case in a narrative form.
- Provide patient demographics (age, sex, height, weight, race, occupation).
- Avoid patient identifiers (date of birth, initials).
- Describe the patient's complaint.
- List the patient's present illness.
- List the patient's medical history.
- List the patient's family history.
- List the patient's social history.
- List the patient's medication history before admission and throughout the case report.
- Ensure that the medication history includes herbals, vaccines, depot injections, and non-prescription medications, and state that the patient was asked for this history.
- List each drug's name, strength, dosage form, route, and dates of administration.
- Verify the patient's medication adherence.
- Provide renal and hepatic organ function data in order to determine the appropriateness of medication dosing regimens.

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- List the patient's drug allergy status, including the name of the drug (brand or generic) and the date and type of reaction.
- List the patient's adverse drug reaction history and the dates of the reaction.
- Provide pertinent serum drug levels and include the time of each level taken and its relationship to a dose.
- Provide the patient's dietary history.
- Provide pertinent findings on physical examination.
- Provide pertinent laboratory values that support the case.
- Provide the reference range for laboratory values that are not widely known or established.
- List the completed diagnostic procedures that are pertinent and support the case.
- Paraphrase the salient results of the diagnostic procedures.
- Provide photographs of histopathology, roentgenograms, electrocardiograms, skin manifestations, or anatomy as they relate to the case.
- Obtain permission from the patient to use the patient's photographs, or follow institutional guidelines.
- Provide the patient's events in chronological order.
- Ensure a temporal relationship.
- Ensure a causal relationship.
- Ensure that the patient case presentation provides enough detail for the reader to establish the case's validity.

IV. Discussion

- Compare and contrast the nuances of the case report with the literature review.
- Explain or justify the similarities and differences between the case report and the literature.
- List the limitations of the case report and describe their relevance.
- Confirm the accuracy of the descriptive patient case report.
- Establish a temporal relationship.
- Establish a causal relationship.
- Report the validity of the case report by applying a probability scale such as the Naranjo nomogram.
- Summarize the salient features of the case report.
- Justify the uniqueness of the case.
- Draw recommendations and conclusions.

V. Conclusion

- Provide a justified conclusion.
- Provide evidence-based recommendations.
- Describe how the information learned applies to one's own practice.
- List opportunities for research.
- Ensure that this section is brief and does not exceed one paragraph.