The CARE guidelines: consensus-based clinical case reporting guideline development

Joel J Gagnier,1,2 Gunver Kienle,3 Douglas G Altman,4 David Moher,5 Harold Sox,6 David Riley,7 the CARE Group

INTRODUCTION
A case report is a detailed narrative that describes, for medical, scientific, or educational purposes, a medical problem experienced by one or several patients. Case reports present clinical observations customarily collected in healthcare delivery settings. They have proved helpful in the identification of adverse and beneficial effects, the recognition of new diseases, unusual forms of common diseases and the presentation of rare diseases.1 For example, our understanding of the relationship between thalidomide and congenital abnormalities2 and the use of propranolol for the treatment of infantile haemangiomas began with case reports.3 Case reports may generate hypotheses for future clinical studies, prove useful in the evaluation of global convergences of systems-oriented approaches and guide the individualisation and personalisation of treatments in clinical practice.4–5 Furthermore, case reports offer a structure for case-based learning in healthcare education and may facilitate the comparison of healthcare education and delivery across cultures.

Case reports are common and account for a growing number of articles in medical journals4; however, their quality is uneven.7,8 For example, one study evaluated 1316 case reports from four peer-reviewed emergency-medicine journals and found that more than half failed to provide information related to the primary treatment that would have increased transparency and replication.9 Written without the benefit of reporting guidelines, case reports often are insufficiently rigorous to be aggregated for data analysis, inform research design or guide clinical practice.7,9

Reporting guidelines exist for a variety of study designs including randomised controlled trials (Consolidated Standards of Reporting Trials, CONSORT),10 observational studies (Strengthening the Reporting of Observational studies in Epidemiology, STROBE)11 and systematic reviews and meta-analyses (Preferred Reporting Items for Systematic Reviews and Meta-Analyses, PRISMA).12 Empirical evidence suggests that a journal’s adoption of the CONSORT statement as a guide to authors is associated with an increase in the completeness of published randomised trials.13 Guidelines have been developed for adverse-event case reports14; however, general reporting guidelines for case reports do not exist. Our primary objective was to develop reporting guidelines for case reports through a consensus-based process.

METHODS
Research design
We followed the Guidance for Developers of Health Research Reporting Guidelines15 and developed a three-phase consensus process.16 This consisted of (1) a premeeting literature review followed by interviews to generate items for a case report checklist, (2) a face-to-face consensus meeting for drafting a reporting guideline, and (3) postmeeting feedback and pilot testing followed by finalisation of the case report guidelines.

Participants
We contacted 28 individuals who fulfilled at least one of the four criteria17–19 (1) publication of articles related to case reports; (2) publication of a manual, handbook or method guidelines related to case reports; (3) publication of a systematic review of methods or reporting related to case reports and (4) publication of other reporting guidelines for clinical research.

Consensus process
Phase I: Four of the authors, the steering committee (JG, GK, DM and DR), searched the literature for publications on the role of case reports, recommendations for their publication and surveys on reporting quality. A letter was sent to 28 potential participants explaining the purpose of the meeting, details of the consensus technique, and requesting their participation in generating specific recommendations for case reporting. Twenty-seven people agreed to participate and were scheduled for a telephone interview and sent a selection of key articles on case reports. During the telephone interview, participants were asked (1) what information was required to be included in case-reporting guidelines, (2) the rationale for their suggestions and (3) for references that supported their reasoning.

Three of the authors (JG, GK and DR) grouped the recommendations from the literature search and interviews by theme...
together with their rationale, references and operational definitions. No quantitative scoring was performed.

Phase II: The face-to-face consensus meeting at the University of Michigan in Ann Arbor (October 2012) included 18 participants from phase I, one research assistant and two student observers. The meeting began with a review of the blinded recommendations elicited during the phase I interviews, in whole group and small group sessions. On the second day, open discussion of each potential item continued, during which clarifications, opinions, justifications, operational definitions and new ideas were expressed. By the end of the second day, the group had agreed upon a set of preliminary reporting recommendations.

Phase III: The draft checklist was refined by the steering committee and sent for two rounds of review to the complete group (phases I and II participants). The finalised reporting guidelines incorporated the feedback from the entire CARE group.

RESULTS
The Case REport (CARE) guidelines checklist is structured to correspond with key components of a case report and capture useful clinical information (including ‘meaningful use’ information mandated by some insurance plans).

The checklist begins with a statement that describes the narrative of a case report. The meeting CARE group felt that a case report should tell a story using prose that has a consistent style across all cases where an ethics committee or institutional committee. There may be other circumstances where an ethics committee or Institutional Review Board (IRB) approval may be necessary. The CARE guidelines are shown in the following table 1.

DISCUSSION
This 13-item checklist provides a framework to satisfy the need for completeness and transparency for published case reports. We attempted to strike a balance between adequate detail and the concise writing that is one of the appealing characteristics of a case report. Our consensus process resulted in a set of essential items for authors to consider when submitting a case report for publication.

While case reports have long been an important source of new ideas and information in medicine,21 it appears that case reports are likely to begin to play a role in the discovery of what works and for whom. BioMed Central launched the Journal of Medical Case Reports in 200722 and a Cases Database in 2012 with more than 11 000 published case reports from 50 medical journals. In 6 months, it has grown to more than 26 000 case reports from 212 medical journals.23 The CARE guidelines checklist is part of a growing effort to improve the reporting of case reports.

There is substantial empirical evidence that reporting guidelines improve the completeness of published scientific reports.13 24 25 A recent Cochrane review examining the influence of journal endorsement of the CONSORT statement on reporting included 53 publications assessing 16 604 randomised controlled trials and found that CONSORT-endorcing journals consistently have better overall reporting.13 However, the potential impact of the CONSORT statement and related reporting guidelines has not been fully realised. A study examining the instructions to peer reviewers of 116 health research journals found that only 41 (35%) provided online instructions to peer reviewers. Of those, only 19 (46%) mentioned or referred to reporting guidelines as a useful resource.26 In response, the authors provide several recommendations for editors to improve the peer review of submitted manuscripts, suggesting that journals have a responsibility to support peer reviewers.26

The developers of reporting guidelines have a responsibility to plan a dissemination and implementation strategy that supports guidelines utilisation.13 Our efforts have several components:

▶ The CARE guidelines will be presented at international conferences and workshops including the Peer Review and Biomedical Publication Congress in Chicago on 10 September 2013.
▶ This article will be published simultaneously in multiple medical journals and outreach to the 212 journals depositing case reports into the BioMed Central Case Report Database.
▶ We will develop a more detailed explanation and elaboration article to outline the rationale for each item and include empirical evidence and examples of good reporting from published case reports.
▶ The CARE guidelines are being pilot tested, and preliminary results support the guidelines as currently written (personal communication with Helmut Kiene, Erica Oberg, Bill Manahan). Guidelines extensions for specialties are being developed.
▶ The CARE guidelines and related documents will be available on a dedicated website (www.CARE-statement.org), the EQUATOR Network website (www.equator-network.org) and translated into multiple languages.
▶ Authors, journal editors, peer reviewers and the wider medical community are encouraged to use the CARE checklist and provide feedback that can be incorporated into regular updates of the CARE guidelines.
▶ We will conduct and support research into the impact of the CARE guidelines on the reporting of case reports.

LIMITATIONS
The CARE guidelines and their development have several possible limitations. First, these guidelines were developed through a consensus method and thus represent the opinions of the participants. However, consensus was easily reached during our meeting, we referred to the empirical evidence where available, and we received feedback from a wide selection of individuals, beyond those involved


2
in our consensus meeting. Second, we recog- 
nise that causality determinations are a 
challenge for case reports even when fol-
lowing reporting guidelines.27 28 The 
CARE guidelines emphasise information 
quality independent of causality assess-
ments. Different specialties, practitioners, 
and patients are likely to require exten-
sions of the CARE guidelines with spe-
cialty specific information. We welcome 
discussions with groups interested in using 
the CARE guidelines as the basis for their 
specific reporting needs.

Though not mentioned in our guidelines, 
medical journals often require authors to 
address three issues: (1) potential compet-
ing interests, (2) de-identification of patient-
related data and (3) ethics committee or 
IRB approval if obtained or necessary.

CONCLUSIONS

Anticipating a long future for case 
reports, we have provided guidance in the 
form of reporting standards for use by 
healthcare stakeholders around the world. 
The growth of case reports in an era in 
which clinical trials and systematic reviews 
dominate the tables of content of medical 
journals indicates that case reports have 
value, particularly with the increasing 
importance of individualised care. Unlike 
randomised controlled trials, case reports 
are individual reports related to the care 
of individual patients where the sample 
size is one. When systematically collected 
and combined into larger datasets, they 
can be analysed, enhancing the early dis-
covery of effectiveness and harms.

We anticipate that the analysis of sys-
tematically aggregated information from 
patient encounters (now mandated by 
some insurance plans) will provide scal-
able, data-driven insights into what works 
for patients in real time, facilitating 
comparisons across medical systems and 
cultures. Practitioners will soon be able to 
provide—and in some cases they are 
required to provide—patients with infor-

Table 1  The CARE guidelines checklist

<table>
<thead>
<tr>
<th>Item name</th>
<th>Item no.</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>1</td>
<td>The words ‘case report’ (or ‘case study’) should appear in the title along with phenomenon of greatest interest (eg, symptom, diagnosis, test, intervention)</td>
</tr>
<tr>
<td>Keywords</td>
<td>2</td>
<td>The key elements of this case in 2–5 words</td>
</tr>
<tr>
<td>Abstract</td>
<td>3</td>
<td>a) Introduction—What does this case add?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Case Presentation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– The main symptoms of the patient</td>
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<tr>
<td></td>
<td></td>
<td>– The main clinical findings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– The main diagnoses and interventions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– The main outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Conclusion—What were the main ‘take-away’ lessons from this case?</td>
</tr>
<tr>
<td>Introduction</td>
<td>4</td>
<td>Brief background summary of this case referencing the relevant medical literature</td>
</tr>
<tr>
<td>Patient information</td>
<td>5</td>
<td>a) Demographic information (eg, age, gender, ethnicity, occupation)</td>
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<tr>
<td></td>
<td></td>
<td>b) Main symptoms of the patient (his or her chief symptoms)</td>
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<tr>
<td></td>
<td></td>
<td>c) Medical, family, and psychosocial history—including diet, lifestyle, and genetic information whenever possible, and details about relevant comorbidities including past interventions and their outcomes</td>
</tr>
<tr>
<td>Clinical findings</td>
<td>6</td>
<td>Describe the relevant physical examination (PE) findings</td>
</tr>
<tr>
<td>Timeline</td>
<td>7</td>
<td>Depict important dates and times in this case (table or figure).</td>
</tr>
<tr>
<td>Diagnostic assessment</td>
<td>8</td>
<td>a) Diagnostic methods (eg, PE, laboratory testing, imaging, questionnaires)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Diagnostic challenges (eg, financial, language/cultural)</td>
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<td></td>
<td></td>
<td>c) Diagnostic reasoning including other diagnoses considered</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) Prognostic characteristics (eg, staging) where applicable</td>
</tr>
<tr>
<td>Therapeutic intervention</td>
<td>9</td>
<td>a) Types of intervention (eg, pharmacologic, surgical, preventive, self-care)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Administration of intervention (eg, dosage, strength, duration)</td>
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<td></td>
<td></td>
<td>– Changes in intervention (with rationale)</td>
</tr>
<tr>
<td>Follow-up and outcomes</td>
<td>10</td>
<td>a) Summarise the clinical course of all follow-up visits including</td>
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<tr>
<td></td>
<td></td>
<td>– Clinician and patient-assessed outcomes</td>
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<td></td>
<td></td>
<td>– Important follow-up test results (positive or negative)</td>
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<td></td>
<td></td>
<td>– Intervention adherence and tolerability (and how this was assessed)</td>
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<tr>
<td></td>
<td></td>
<td>– Adverse and unanticipated events</td>
</tr>
<tr>
<td>Discussion</td>
<td>11</td>
<td>a) The strengths and limitations of the management of this case</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) The relevant medical literature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) The rationale for conclusions (including assessments of cause and effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) The main ‘take-away’ lessons of this case report</td>
</tr>
<tr>
<td>Patient perspective</td>
<td>12</td>
<td>The patient should share his or her perspective or experience whenever possible</td>
</tr>
<tr>
<td>Informed consent</td>
<td>13</td>
<td>Did the patient give informed consent? Please provide if requested</td>
</tr>
</tbody>
</table>

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Contributors JIG and DR wrote the first draft of the article. DGA, JIG, GK, DM, DR and HS critically reviewed and edited drafts. The entire CARE group participated in parts or all of the guidelines development process and contributed to the editing and revision of the CARE guidelines and this article.

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REFERENCES