The Scientific Manuscript and Presentation: Key Elements of Success

Preface

How to Write a Research Paper
Cerebrovasc Dis 2004;18:135-138

How to Handle a Rejection
Cerebrovasc Dis 2013;35:209-212

Suggestions for Reviewing Manuscripts
Cerebrovasc Dis 2009;28:243-246

Writing Good Abstracts
Cerebrovasc Dis 2007;23:256-259

How to Prepare and Deliver a Scientific Presentation
Cerebrovasc Dis 2013;35:202-208

S. Karger
Medical and Scientific Publishers
Basel · Freiburg · Paris · London · New York · Chennai · New Delhi · Bangkok · Beijing · Shanghai · Tokyo · Kuala Lumpur · Singapore · Sydney

KARGER

S. Karger
Medical and Scientific Publishers
Basel • Freiburg • Paris • London • New York •
New Delhi • Bangkok • Beijing • Tokyo •
Kuala Lumpur • Singapore • Sydney

Printed in Switzerland
on acid-free and non-aging paper (ISO 9706) by
Reinhardt Druck, Basel

KARGER

E-Mail karger@karger.com
www.karger.com

Cerebrovascular Diseases

Preface

The dissemination of information to the scientific community at large is a critical aspect of the research process. Effective communication not only contributes to the wider body of knowledge, it also provokes thought, stirs discussion and stimulates further research. In the present era of information explosion, clear communication can tip the balance in favor of success.

The scientific manuscript and symposium presentation of recent research still remain the core tools with which we communicate our findings. But how can we maximize the impact of our conclusions? How can we get our message across in print and in person? And how do we handle criticism? While the process of writing a manuscript or presenting a slideshow in front of a live audience can be daunting, these skills can be both taught and learned.

This compendium of articles covers the key aspects of preparing a scientific manuscript and a symposium presentation. The first article, 'How to Write a Research Paper', is followed by two complementary articles, 'How to Handle a Rejection' and 'Suggestions for Reviewing Manuscripts'. The final two articles are geared towards symposia communications, namely, 'Writing Good Abstracts' and 'How to Prepare and Deliver a Scientific Presentation'.

Although they are targeted to the field of cerebrovascular research, the principles described here apply to all fields within the biomedical sciences. We hope that this compilation will provide a useful guide for researchers at all levels.

London, May 2013

Michael G. Hennerici
Editor-in-Chief of *Cerebrovascular Diseases*

KARGER

E-Mail karger@karger.com
www.karger.com/ced

Cerebrovascular Diseases

Cerebrovasc Dis 2004;18:135–138
DOI: 10.1159/000079266

Received: October 20, 2003
Accepted: February 6, 2004
Published online: June 23, 2004

How to Write a Research Paper

Andrei V. Alexandrov

Stroke Treatment Team, Houston Medical School, University of Texas, Houston, Tex., USA

Key Words
Peer review · Perfect manuscript · Writing skills

Abstract
Background: Busy strokologists often find little time for scientific writing. They sometimes develop a mental condition equivalent to that known by neurologists as writer's cramp. It may result in permanent damage to academic career. This paper provides advice how to prevent or treat this condition. ***Methods:*** Prepare your manuscript following the IMRaD principle (Introduction, Methods, Results, and Discussion), with every part supporting the key message. When writing, be concise. Clearly state your methods here, while data belong to Results. Successful submissions combine quality new data or new thinking with lucid presentation. ***Results:*** Provide data that answer the research question. Describe here most important numeric data and statistics, keeping in mind that the shorter you can present them, the better. The scientific community screens abstracts to decide which full text papers to read. Make your point with data, not arguments. ***Conclusions:*** Conclusions have to be based on the present study findings. The time of lengthy and unfounded speculations is over. A simple message in a clearly written manuscript will get noticed and may advance our understanding of stroke.

Introduction

By now you probably wrote an abstract and submitted it to a stroke conference. Your mentor reminds you several times to start drafting a paper, and you have no idea where to start. As a simple trick, copy and paste your abstract so that Background becomes your introduction. For the rest, follow the IMRaD principle: Introduction, Methods, Results, and Discussion [1–3]. Think what 'take home message' you'd like to deliver and to whom. The title sells the paper.

'Busy strokologists often find little time ... to treat this condition': this introduction concisely describes the study hypothesis, rationale, purpose, and objectives. A three-paragraph introduction is plenty for most topics. Expand with facts from papers previously published by others, among whom you may occasionally find your mentor. Do a thorough literature search for earlier sources dealing with your subject [4–6]. Tell here what is known in the field. You do not need to refer to every paper ever written on this topic. Select key references and remember that for publishing purposes, less is better than more. Consult your mentor as often as possible – he is the senior author after all.

The third paragraph should state the research question [7]. You may take an original paper already published in *Cerebrovascular Diseases* to use as a template. Formulate the research question clearly since data presentation should provide equally clear answers.

KARGER
Fax + 41 61 306 12 34
E-Mail karger@karger.ch
www.karger.com

1015–9770/04/0182–0135$21.00/0

Accessible online at:
www.karger.com/ced

Dr. A.V. Alexandrov
University of Texas
6431 Fannin St, MSB 7.044
Houston, TX 77030 (USA)
Tel. +1 713 500 7087, Fax +1 713 500 7097, E-Mail avalexandrov@worldnet.att.net

Subjects and Methods

The first author drafts the manuscript and determines co-authors [8]. Although general guidelines are available [8], the reality often demands seeking advice from your mentor. Inappropriate inclusion of authors will decrease the likelihood of manuscript acceptance.

Describe subject selection criteria and data collection tools. Make this description detailed enough so that if someone wants to repeat the study, it will be possible. If new imaging technology was used, tell how and by whom these tests were validated. Avoid presenting actual data in this section: 'Study subjects were recruited from 1,215 patients admitted to our stroke unit from August 1999 through August 2002'. Instead say: 'Study subjects were recruited from consecutive patients admitted to our stroke unit. Inclusion criteria were ...'. Methods may disclose power calculations, estimated sample size, and stopping rules.

Provide additional evidence that would increase confidence in the reliability of your methods. Control for biases, validation of research tools, 'blinding' of observers – all of these facts, if established before the study initiation, will strengthen the manuscript. Describe in detail the outcome models or dependent variables. For clinical outcomes or surrogate markers, reference a pivotal trial or study that established their relevance.

Documentation of protection of research subjects is essential. Clearly state if a local ethics committee approved your study. This ensures patients or animal rights protection, particularly if experiments were performed. The author also needs to disclose funding sources and potential for commercial bias such as connections with the pharmaceutical industry. Data safety monitoring, independent data acquisition and analysis during clinical trials and appropriate overseeing committees should be mentioned if applicable.

Major scientific journals currently accept less than 25% of submitted manuscripts. If rejected, it does not necessarily mean your manuscript is poor. Rejection means that reviewers did not give it a high enough priority. You should not be too disappointed because, after all, you got very good advice how to improve your manuscript. Follow reviewers' suggestions and you increase the likelihood that another esteemed journal will accept it. The most important factors for publication are the quality, novelty, reliability and scientific or clinical importance of your work. A manuscript should disclose new information or a new way of thinking about old information. If not, it will not be published – regardless of how well it is written. Avoid redundant or duplicate publications since these should not be published. Scientific publishing is extremely competitive, and chances are that by the time you conceived the project, 10 other groups were already doing it and 5 others have already published it. Stay on top of current literature and know the limitations of research done by others.

The last paragraph of this section should describe tools of statistical analysis appropriate to study design. Consult a statistician before embarking on a project, work with a statistician to analyze and interpret the data, and have a statistician reviewing the whole manuscript for clarity of statistical analysis and data presentation.

Results

Your results are the most important part of the manuscript. Present them clearly by avoiding long and confusing sentences. The shorter you can present your data in tables and figures, the better. Remain focused and disciplined. The flurry of numbers and 'p' values should follow simple logics. Start by describing your study subjects, use actual numbers for study demographics. Avoid opening sentences like: 'Table 1 summarizes our findings in subgroup C'. This makes reviewers frustrated since they have to flip back and forth through pages to understand what was done to study subjects.

Make data presentation so clear and simple that a tired person riding late on an airplane can take your manuscript and get the message at first reading. Very few people can write a perfect manuscript on the first draft. Return to the draft, read it, change cumbersome parts, read other papers and change the draft again, and again, and again. I still do it before I give the manuscript to my co-authors. But do not hold it for too long. Remember, '10 other groups ...'.

Present results to colleagues since they would likely ask for more data or analyses. Most likely the reviewers of any esteemed journal would do the same, so include data in the first draft of your manuscript. The internal review is helpful to determine sufficient data to answer the research question.

Most importantly, provide data relevant to the research question. Observations beyond the primary research question can be included in the manuscript, if they strengthen your case. Remember to stay in focus. If you get lost from the aim of the study, so will be reviewers. Prestigious journals have a strict word limit for papers they accept. You need all this space to deliver the key mes-

sage, so do not mess around but concentrate on the essential. Packing manuscript with data is better than splitting the paper into separate small ones.

Mention a statistical test that generated specific 'p' values or coefficients. Show absolute numbers as well as percentages so that reviewers can judge the significance of your observations. Remember that statistical difference does not necessarily translate into clinical significance.

Make your point with data, not arguments.

Discussion

This section should start with: 'Our study showed ...' to lucidly summarize *your* study findings. Discussion is often the weakest part of the manuscript. Do not repeat the introduction. Do not present any new data that were not shown in the results section and avoid repeating data presentation. There is no reason to underline how terrific your results are – let them speak for themselves.

The second paragraph may describe the novelty of your findings or if they parallel previous research. Remember, only the beginners try to refer to all published papers in the field. No esteemed journal can afford the space needed for this. A skillful selection of the most pertinent references demonstrates a command of the relevant literature. Confirmatory research makes passing the review process more difficult. Arbitrarily, the ratio of abstracts to original papers in curriculum vitae should be less than 3 to 1. If there are too many abstracts, you either have writer's cramp or the quality of your research is insufficient for publication.

The third paragraph may describe how your study contradicts previous research or established dogmas. If there was disagreement about study interpretation by co-authors, mention different conclusions drawn from your results or other studies [9, 10]. Avoid general statements that are not founded in data. Do not provide your opinion how to solve a problem that was not directly evaluated in your study. Do not write a review of all possible mechanisms that you have not accounted for in your study. You can write a short but to-the-point Discussion.

The fourth paragraph should describe study limitations. If you do not discuss study weaknesses, the reviewers will. Study limitations may be contrasted with study strengths. This part may also mention unresolved questions and direction of future research.

The concluding paragraph can summarize the potential significance of your findings and what changes to research or clinical practice your data may support. This is a critical part since it is easy to overestimate the significance of your research. Avoid broad claims and strong statements. Remember that even pioneer break-through studies require independent confirmation. Publication in a peer-reviewed journal means completion of your project and dissemination of research results [11, 12].

Clinicians need to develop skills in scientific writing. If you make a significant observation, a proper and fast scientific communication is required [12]. Improving your scientific writing is a life-long process. If and when your papers are rejected, remember that most manuscripts face the same fate. Avoid choosing an inappropriate journal for your manuscript submission. Common reasons for rejection include inappropriate or incomplete statistics; over-interpretation of results; inappropriate or sub-optimal instrumentation; a sample too small or biased; difficult-to-follow writing; insufficient problem statement; inaccuracy or inconsistency of the data reported; incomplete, inaccurate, or outdated review of the literature; insufficient data presented, and defective tables or figures [13–15]. When reading criticism, learn from your mistakes or the advice given to you. While wrestling with reviewers, you will become a better scientific writer but also a better, more critical scientist. In the long run this will make a major difference to your academic career, and probably will also improve your patient care. Most likely, your way of writing will become more evidence based.

An anonymous and probably frustrated academician once said: 'Publish or perish!'. This brutally honest statement should motivate you to learn yet another set of useful skills. Good luck!

Acknowledgment

The author is not a native English speaker. I am indebted to John Norris, MD, FRCP, for – among many things during fellowship training – his patience with my 'a's and 'the's, and the first lessons in study design, analysis, and presentation. The infamous 'Norris Rules' that he taught his fellows are partly reflected in this paper.

References

1 Pakes GE: Writing manuscripts describing clinical trials: A guide for pharmacotherapeutic researchers. Ann Pharmacother 2001;35:770–779.
2 Pamir MN: How to write an experimental research paper. Acta Neurochir Suppl 2002;83:109–113.
3 Kern MJ, Bonneau HN: Approach to manuscript preparation and submission: How to get your paper accepted. Catheter Cardiovasc Interv 2003;58:391–396.
4 Cummins RO: Learning to write: Can books help? J Med Educ 1981;56:128–132.
5 Linney BJ: The three R's of writing: Reading, 'riting,' and risking. Physician Exec 1997;23:59–61.
6 Cupples SA: Publishing the research report. Alzheimer Dis Assoc Disord 1999;13(suppl 1):S123–S130.
7 Wojner AW: Outcomes Management: Applications to Clinical Practice. St Louis, Mosby 2001, pp 69–88.
8 Anonymous: Policy on papers' contributors. Nature 1999;399:393.
9 Horton R: The hidden research paper. JAMA 2002;287:2775–2778.
10 Clarke M, Alderson P, Chalmers I: Discussion sections in reports of controlled trials published in general medical journals. JAMA 2002;287:2799–2801.
11 Bossuyt PM, Reitsma JB, Bruns DE, Gatsonis CA, Glasziou PP, Irwig LM, Lijmer JG, Moher D, Rennie D, De Vet HC; STARD Group: Towards complete and accurate reporting of studies of diagnostic accuracy: The STARD initiative. AJR Am J Roentgenol 2003;181:51–55.
12 Pearn J: Publication: An ethical imperative. BMJ 1995;310:1313–1315.
13 Bordage G: Reasons reviewers reject and accept manuscripts: The strengths and weaknesses in medical education reports. Acad Med 2001;76:889–896.
14 Samet JM: Dear author – advice from a retiring editor. Am J Epidemiol 1999;150:433–436.
15 DeBehnke DJ, Kline JA, Shih RD: Research fundamentals: Choosing an appropriate journal, manuscript preparation, and interactions with editors. Research Committee of the Society for Academic Emergency Medicine. Acad Emerg Med 2001;8:844–850.

Cerebrovascular Diseases

Cerebrovasc Dis 2013;35:209–212
DOI: 10.1159/000347106

Received: January 15, 2013
Accepted: January 15, 2013
Published online: February 28, 2013

How to Handle a Rejection

Teaching Course Presentation at the 21st European Stroke Conference, Lisboa, May 2012

Narayanaswamy Venketasubramanian[a] Michael G. Hennerici[b]

[a]Neuroscience Centre, Raffles Hospital and Division of Neurology, Department of Medicine, National University Health System, Singapore; [b]Department of Neurology, UniversitätsMedizin Mannheim UMM, University of Heidelberg, Mannheim, Germany

Key Words
Publication · Acceptance · Rejection

Abstract
The rejection rate by scientific journals may be rather high, sometimes up to 70–90%. On receipt of notification of rejection, one may experience various stages of the Kübler-Ross grief cycle – denial, anger, bargaining, depression and acceptance, with an initial shock and an intermediate 'testing' stage. A paper may be rejected because of several reasons, such as the following: (1) it was submitted to an inappropriate journal, (2) journal format was not followed, (3) reading was not interesting or scientific/clinically sound, (4) topic was not current, (5) research was not novel, (6) low publication priority despite the absence of major flaws, (7) poor English/writing style, (8) poor methods and statistics, (9) unbelievable results that were not properly discussed and (10) 'recycled' paper. Plagiarism is not tolerated. Simultaneous submission to 2 or more journals is not allowed. Outright rejection sometimes occurs in 70–80%; for 10–15%, the editor rejects without sending the paper to reviewers for obvious reasons as mentioned. For the majority, reviewers give feedback that leads to the editor rejecting the paper. On receiving notification of rejection, one should read the feedback and consider its contents prior to rewriting and submitting the paper to another journal (sometimes reviewers may see the same manuscript several times if asked by different editors). An invitation to resubmit 'de novo' occurs in only 1–5% of submissions; it requires substantial revision before resubmission. Being rejected but invited to resubmit a revised version occurs in 5–20% of submissions – it indicates a good chance of acceptance; one should carefully read the feedback and respond/comply with all suggestions. Papers rejected repeatedly may have 'fatal flaws' and are best abandoned.

Introduction

There are increasing numbers of submissions to increasing numbers of journals, with thousands of research papers being published across a myriad of medical journals every year. In the current 'publish or perish' world of academia, researchers may feel the pressure to publish as many papers as possible in the shortest possible time for the purposes of promotion, application for research funding or just to retain one's job [1]. Certain journals may be also be preferred, e.g. those with higher impact factors. The rush to write many papers within a limited period may result in poorer quality writing. This may lead to rejection of the paper as the standards demanded by the journal may not be met.

An author may feel that he/she has written the best possible paper, and that no respectable journal should re-

KARGER

E-Mail karger@karger.com
www.karger.com/ced

1015–9770/13/0353–0209$38.00/0

Narayanaswamy Venketasubramanian
Neuroscience Centre, Raffles Hospital
585 North Bridge Road
Singapore 188770 (Singapore)
E-Mail drnvramani@gmail.com

ject it. However, rejection is part and parcel of academic life. Few authors, no matter how well known, would have had all their submitted papers accepted fully at first submission. Rejection allows for reflection; it is a humbling experience and provides an opportunity for self-improvement. A thoughtfully reviewed paper with insightful feedback makes for a better revised paper, and may even translate to better research. Generally, rejection rates fall with increasing writing experience. Acceptance rates vary across journals, generally in the range of 20–30%. The journal *Stroke* has publically stated its acceptance rate as 19% similar to *Cerebrovascular Diseases* [2].

The Stages of Grief

Dr. Elizabeth Kübler-Ross, a medical doctor in Switzerland, spent a lot of time with the dying. In her book *On Death and Dying,* she described the now well-known 5 stages of the grief cycle – denial, anger, bargaining, depression and acceptance [3]. This has been extended to include an initial shock stage and an intermediate 'testing' stage before acceptance.

The receipt of notification of rejection, usually by email but occasionally by letter or fax, may lead to an initial state of shock and immobilization. At this stage, it may be best to sit down if you are not already seated, or even to lie down if needed. One should stay calm and take a few deep breaths as one carefully reads the notification again for the reasons for rejection.

In the denial stage, one may deny the occurrence of the rejection, and believe rejection is not true. One should put away the notification in a safe place, not discard it completely. There is probably little value in rechecking the notification to see if it was addressed correctly, referred to the correct paper, or was from the correct journal – editorial offices rarely make such grave errors. One should not wait for a second notification apologising for the error with the first, and saying the paper is actually accepted without revision, as this is unlikely to happen!

During the stage of anger, one should let out one's emotions in a controlled manner. One might curse the editor, but sending a strongly worded letter/email is ill-advised. One may curse the journal, but one should not spam or hack into the website. One may curse the research project, the project leader/supervisor, or research as a whole. Such ventilation may actually be cathartic.

When bargaining, one may try to seek a way out. One could write to the editor asking for a second review/acceptance, but this is usually in vain. One could rewrite the paper and resubmit to the same journal, but this is unlikely to succeed unless one is asked by the journal to resubmit the paper.

As one realizes the inevitable truth of rejection, one may become depressed. One should take a break, cheer oneself up, avoid self-blame. Accept sympathy and support from colleagues and co-authors, especially those who have gone through a similar experience before.

In the final testing and acceptance stages, one seeks a realistic solution to the situation, a reasonable way out, e.g. decide to revise the paper based on the feedback of the reviewers and submit to another journal. This will lead to a return to stability, and one can attend to the matter at hand.

Not all authors will experience grief reactions, and not all who do so will go through all the stages mentioned above. If one has a grief reaction, one should try to get to the acceptance stage as quickly as possible.

Why Papers Are Rejected

While it varies according to the journal, rejection rates are generally high, more so with the more sought-after journals. There are a number of reasons why papers are rejected [4–9]. Understanding these reasons would aid the author in the initial choice of journal and so avoid the situation of immediate rejection and also understand why the journal rejected the paper:

(1) Inappropriate journal – the paper may not be in the journal's particular focus/area of interest. A too low/high impact journal for this paper was inappropriately chosen.
(2) Journal format not followed – journals have set formats that should be strictly adhered to.
(3) Issue not interesting or of scientific/clinical value – the topic may not be of general interest to that journal's readership, or not of value to the readers in the course of their clinical or research work; the question being answered by the paper is not a clinically/research-wise important one.
(4) Topic not/no longer 'hot'/current – interest in a recent 'hot' topic may have already faded.
(5) Not original/novel/new – the area being addressed has been well described before, in particular in the journal to which the paper was submitted.
(6) Journal priority – based on priority decisions for publication for a journal, many manuscripts without any major flaws may still be rejected.

(7) Poor writing style – very poor English; no 'oomph'/punch; a poorly written or unfocused paper with no clear message, where the writing does not flow logically, further suggesting that the topic was poorly researched or thought through; the various sections Introduction/Methods/Results/Discussion not all equally well written; dated references; poor quality tables/figures.
(8) Poor methods and statistics – methodology not rigorous enough, resulting in serious biases.
(9) Results not believable/clinically or scientifically unsound – when findings go against the grain of known data or popular opinion, the authors need to make a very strong case in their discussion with rigorous methodology and analysis of their results.
(10) 'Recycled' paper – many editors and reviewers sit on the review boards of more than 1 journal; they may be asked to review a paper they had reviewed before and rejected for another journal, and this 'new' submission is resubmitted without any amendments after the other journal's rejection/comments for improvement.

It is far less likely that papers are rejected for political reasons – authors are able to indicate whom they do *not* wish to review the paper; the editor may be wary of that reviewer's comments but may still ask him/her. While there is reviewer variability, 2–3 reviews are usually sought and differences in opinions looked at. Papers are not rejected primarily due to poor grammar, but an ungrammatical paper is hard to read. Plagiarism is not tolerated. Simultaneous submission to 2 or more journals is not allowed – if it is done, the editor should be informed.

Outright Rejection

This occurs 70–80% of the time. For about 10–15% of submissions, the editor makes a decision to reject without sending to the reviewers, usually for reasons 1–5 above. However, for the majority 60–75%, it is the reviewers who give feedback that leads to the editor rejecting the paper. On receiving the notification of rejection, one should read the comments of the editor and reviewers and rewrite the paper considering these comments.

The paper should then be submitted to another appropriate journal. One should avoid resubmitting without rewriting, i.e. 'recycling'. The title may need to be tweaked; the journal's format instructions should be closely followed. The comments of the previous review should be addressed – avoid recycling the same paper as the reviewer may be the same person! Reviewers often spend a lot of time improving the manuscript and even recommend acceptance after revision to the editor. Parts of the study may need to be redone, additional data may need to be collected/generated, or reanalysis may be needed with the aid of a statistician. Reference lists may need updating or illustrations made more appropriate.

Do consult successful authors, co-authors and members – even the head – of your department, and be honest in all aspects of the paper: you may get valuable comments and recommendations. In case your native language is not English, contact a native English speaker and ask for his/her support. This can be very useful, in particular if he/she is familiar with the topic of the manuscript.

Rejected, Invited to Resubmit 'de novo'

The invitation to resubmit afresh to the same journal occurs for about 1–5% of submissions. This approach is generally used when there is a need for substantial revision of the paper including new analyses and presentation of data of an important piece of work. It indicates that a decision cannot be made as the manuscript currently stands – the revised work is needed to take an editorial decision, which may be positive or negative, i.e. rejection may still occur. One should carefully read the comments of the editor and the reviewers, rewrite the paper considering these comments, and resubmit as soon as possible – most journals allow a 3- to 6-month timeline for resubmission.

Rejected, Invited to Resubmit

This 'happy' situation occurs for about 5–20% of submissions. While not confirmatory, it indicates a good chance of acceptance. One should read the comments of the editor and the reviewers carefully – all of them are experts in their field, so it would be advisable to make all suggested changes. These changes should be clearly highlighted in the accompanying 'thankful' cover letter, describing the change as well as the page and line in the text where the changes were made, and highlighting in the text the changes, in bold/underline/colour/track-changes mode, with an accompanying 'clean' copy. Each journal will have its instructions on resubmissions, which should be strictly followed.

If one strongly disagrees with the comments by the editor or reviewer, one can politely explain why and this may actually be accepted. One should adhere to the over-

all format of the journal. Resubmit as soon as possible, usual timelines are within 3–6 months. While unlikely, the paper may still be rejected. At times, a further resubmission is requested to clarify a few key issues. Thereafter, one merely has to await the most welcome notification of acceptance!

Abandoning the Paper

Repeated rejections by various journals may reflect 'fatal flaws' where the paper is not salvageable due to incorrigible problems with methods, results/analysis – such a paper may best be left unpublished. Most papers have 'non-fatal flaws', a redeemable paper, which a less rigorous journal may accept. A long, hard, honest look at the comments by the editors and reviewers would be most revealing. One should not give up too easily; not publishing important new information is unethical and unscientific [10, 11].

Conclusions

Rejection is part of academic life. Grief reactions are explicable and should be overcome as soon as possible. There are many fundamental reasons for rejection. If there is outright rejection, look at all comments, rewrite the paper, and resubmit to an appropriate journal. If the paper is rejected but the authors are advised to resubmit, follow all advice and resubmit as soon as possible. Consider abandoning only if the paper has fatal flaws – try, try again. The only way not to face rejection is to avoid submitting one's work altogether [12]. Even if a rejection is received, one should have the satisfaction of knowing that efforts were made by the authors and the editor/reviewers; some papers never get that far. Persistently trying to publish will help one become a better writer with fewer rejections and make one a valuable contributor to the scientific and clinical literature.

References

1 Brandon AN: Publish or perish. Bull Med Libr Assoc 1963;51:109–110.
2 http://stroke.ahajournals.org/site/misc/stats.xhtml (accessed December 9, 2012).
3 Kübler-Ross E: On Death and Dying. New York, MacMillan, 1969.
4 Bosch X, Alfonso F, Bermejo J: Why was our manuscript rejected? Rev Esp Cardiol 2002; 55:782–783.
5 Gupta P, Kaur G, Sharma B, Shah D, Choudhury P: What is submitted and what gets accepted in Indian Pediatrics: analysis of submissions, review process, decision making, and criteria for rejection. Indian Pediatr 2006; 43:479–489.
6 Wyness T, McGhee CN, Patel DV: Manuscript rejection in ophthalmology and visual science journals: identifying and avoiding the common pitfalls. Clin Experiment Ophthalmol 2009;37:864–867.
7 Catai AM, Grossi DB, Mancini MC: My manuscript was rejected, and now? Rev Bras Fisioter 2011;15:V–VI.
8 Dogra S: Why your manuscript was rejected and how to prevent it. Indian J Dermatol Venereol Leprol 2011;77:123–127.
9 Morgan PP: How to get a rejected manuscript published. Can Med Assoc J 1985;133: 86–87.
10 Cleophas RC, Cleophas TJ: Is selective reporting of clinical research unethical as well as unscientific? Int J Clin Pharmacol Ther 1999;37: 1–7.
11 Savitz DA: Failure to publish results of epidemiologic studies is unethical. Epidemiology 2000;11:361–363.
12 Gay JT, Edgil AE: When your manuscript is rejected. Nurs Health Care 1989;10:459–461.

Cerebrovascular Diseases

Cerebrovasc Dis 2009;28:243–246
DOI: 10.1159/000228588

Received: March 9, 2009
Accepted: March 13, 2009
Published online: July 14, 2009

Suggestions for Reviewing Manuscripts

Andrei V. Alexandrov[a] Michael G. Hennerici[b] Bo Norrving[c]

[a]Comprehensive Stroke Center, University of Alabama Hospital, Birmingham, Ala., USA; [b]Department of Neurology, University of Heidelberg, Mannheim, Germany; [c]Department of Neurology, University Hospital, Lund, Sweden

Key Words
Peer review · Ethics · Validity

Abstract
Background: Scientific reviewing is a voluntary process to determine if a manuscript deserves publication. REVIEW means: Responsibly Evaluate, Verify and Improve the manuscript, Educate the authors and editors, and Weigh your expert opinion against the submitted work. Provide your review in a respectful, unbiased and timely manner. ***Review Methods:*** Make sure editors know about your willingness to review and your particular area(s) of expertise. If you find yourself in a conflict of interest, decline to participate in reviewing. If you accept, complete reviews on time. Determine and rate (1) the methodological validity, (2) originality, (3) significance of findings, (4) the style and clarity of presentation and (5) the findings' interest to the readership of the journal for which you are asked to review a manuscript. Specifically evaluate (6) if the results support any claims or conclusions made and, most importantly, (7) if the abstract correctly reflects the full content of a manuscript. Summarize your review in specific comments to the authors. Make recommendations whether to accept, revise or reject the manuscript to the editor only. ***Review Results:*** Start with a brief summary of the manuscript's subject, strengths and key findings/claims. Present your specific criticisms and suggestions in numbered lists for the authors to address. Never use demeaning and offensive words or sarcasm since, in the first place, this reflects upon your own ethics and integrity as well as upon the journal's. Use a constructive tone, and if you see any deficiencies, educate the authors in a respectful manner so that, even if a manuscript is rejected, they will learn from you, improve the manuscript or conduct a better study in the future. Also include ratings from 1 to 7 in your comments to the authors, as far as they are relevant and may explain your final decision. ***Conclusions:*** Judge others as you would like to be judged yourself. We hope these suggestions serve to help new reviewers and refresh the willingness of battle-hardened veterans to continuously serve the medical literature.

For with the judgment you pronounce you will be judged,
and with the measure you use it will be measured to you.
Matthew 7:1–3

But who are the judges?!
Aleksandr Griboedov (1794–1829)

Introduction

It is an understatement to note that reviewing is a touchy subject. Given the wide range of publications subject to review, we hope the following suggestions for reviewing are understood as guidelines. Although many reviewers have worked at a high level from the beginning, the steady increase in submissions forces them to plan and become a bit more focused. We also provide these suggestions for future referees of scientific writing.

KARGER

Fax +41 61 306 12 34
E-Mail karger@karger.ch
www.karger.com

1015–9770/09/0283–0243$26.00/0

Accessible online at:
www.karger.com/ced

Dr. A.V. Alexandrov
Comprehensive Stroke Center
UAB Hospital RWUH M226, 619 19th Street South
Birmingham, AL 35249 (USA)
Tel. +1 205 934 2401, Fax +1 205 975 6785, E-Mail avalexandrov@att.net

If you are thinking about becoming a reviewer, this paper will introduce you to this process and outline some of the – often unspoken and implied – principles. Senior members of the scientific community often pass invitations for review to their junior colleagues. Read this paper if you are faced with your first-time invitation and do not know where to start or how to express your opinion. If you are a seasoned reviewer, you may find some validation of what you are doing or some suggestions to improve your reviews. In any case, reviewing is an integral part of scientific progress, and we should all contribute to its quality. The publication of research results – whether positive, neutral or negative – is an ethical imperative [1]. Reviewers must always seek ways to improve the manuscript, help the editors and readership to understand its importance and generalizability [2], and to determine if it reaches the level of priority to be published in a given journal.

In this spirit we propose the time-honored term 'REVIEW' as an acronym for: Responsibly Evaluate and Verify the findings and statistics as much as possible, Improve the manuscript, Educate the authors and editors, and Weigh your expert opinion against the submitted work. Reviewers benefit through this process by learning and becoming better scientists themselves. Reviewers are often challenged to deal with new thinking, novel data or innovation, and they have to critically rethink the process that the authors have gone through and judge the validity of their findings.

Review Methods

Editors send invitations that inform potential reviewers about the manuscript title and contents of the abstract so that prospective reviewers can decide if the manuscript falls within their areas of expertise. Citing your particular area(s) of expertise saves editors time and spares you the disappointment of receiving requests for subjects that bring you to decline an invitation.

Any conflict of interest (COI) difficult for the editors to assess in advance is ample reason to decline to participate in a review. Conducting your own research or being interested in the same area as the authors of a manuscript does not constitute a COI. What constitutes a COI is if you collaborate, or have recently collaborated, with the authors in research projects or if you, in your own judgment, are unable to take a balanced and unprejudiced view.

Authors can list suggested reviewers as well as those to whom the manuscript should not be sent at all. This yields reviews of a quality similar to those that have been written by reviewers chosen by editors; however, the authors' suggested reviewers were more likely to recommend acceptance [3, 4].

If you already reviewed a manuscript in the same or a substantially unchanged form for another journal, please inform the editor in advance and ask for his recommendation on how to proceed. A copy of the previous review is sometimes more suitable than a second review.

If you agreed to review a manuscript, the authors much appreciate the timely completion of the assignment, as you would do as an author awaiting a similar decision.

After considering the manuscript's appropriateness to a given journal, determine and rate these self-explanatory aspects:
(1) methodological validity,
(2) originality,
(3) significance of findings,
(4) style and clarity of presentation,
(5) interest to readership,
(6) if results support claims or conclusions, and
(7) if the abstract correctly reflects the full content of the manuscript.

Start with the determination of the findings' methodological validity, novelty and significance. These tasks contribute to your learning since, as you critically evaluate methods and analyses, you may 'dig in' deeper into specific methodologies, statistics, etc. Stay on top of current developments in your area of expertise. We often look up sources referenced in manuscripts as well as other papers that may have eluded the authors' attention. This helps you to gain a deeper understanding of the study's subject and of the progress made in the area, and to offer any insights useful to the authors in revising the manuscript. Approach each manuscript with an open mind. Even if you think you know most of the research in this area, you may occasionally be surprised by an unconventional approach. Even if you disagree with the authors a priori, try to objectively evaluate the strength of the data and the validity of their conclusions.

Specifically evaluate if the results support any claims or conclusions and if the abstract correctly reflects the content of the manuscript. Summarize your review results in specific comments to the authors and provide a separate recommendation to the editor whether to publish this manuscript or not.

Most journals, including *Cerebrovascular Diseases*, support a web-based review process with forms that reviewers have to fill out. These forms often have structured questions that help editors to streamline the pro-

cess and provide some journals with quantifiable results of your review.

Your suggestions about analytic methods and about statisticians with expertise in the study's subject are always appreciated. In fact, a study suggested that reviewers who had been trained in epidemiology and biostatistics might provide better quality reviews as judged by the authors [5]. Younger reviewers tended to provide higher quality reviews [5, 6], and those spending up to 3 h reviewing a manuscript [5]. However, there are no strong predictors overall to identify those who will provide higher quality reviews, and the whole process remains ill defined [6]. Contrary to expectations, an attempt to improve the review skills in a short workshop for active reviewers did not yield any desirable results [7].

The comments to the authors are the most important part of the review process. Assume you write to a colleague who will find your name at the end of the review, even though our reviewers are not mentioned that way. Some authors often believe they recognize certain compositional styles and assume the reviewer's name, even in error!

Be honest and communicate without humiliating the authors, no matter how wrong or insignificant the results are in your opinion. Your comments, first of all, reflect upon you and the journal which asked you to review the manuscript. Acceptance or rejection is a recommendation to be communicated to the editors only.

Review Results

Start your comments to the authors with a brief summary of the manuscript's subject, strengths and key findings/claims. This section shows that you grasped the content of the manuscript and realized its significance. Comment positively on the manuscript's importance, strengths and generalizability.

The abstract is read more often than the full paper [8, 9] so please comment on its clarity.

If the manuscript seems to be in need of revision, present your specific criticisms and suggestions as a numbered list for the authors to address. If the authors attend to all your points of criticism and suggestions, numbering will help you to follow as you read their reply. Use a constructive tone, and if you see any deficiencies, educate the authors in a respectful manner so that, even if a manuscript is rejected, the authors will learn from you, improve it and either submit a better version to another journal or conduct a better study in the future.

Always check if the research question is clearly stated. If not, ask for clarification. Examine the study's methods in detail to verify if the approach taken is valid. Should you feel the need to ask the authors for more information, please indicate if the information has to be inserted in a revision or directed to the reviewer only in a letter of response.

Research has been done on the quality of manuscripts with masked before-and-after-review assessments [2]. The most substantial improvements were seen in the discussion of study limitations, generalizations, use of confidence intervals and the tone of the conclusions [2].

Some standard rewriting is sometimes needed, such as: 'our study showed …', as well as advice to the authors to lucidly summarize their key findings [10]. Ask the authors to shorten the discussion, if necessary. Discussions (like introductions) are not supposed to be extensive reviews with numerous references [10]. The discussion is also the weakest part of the manuscript, so efforts to prune any digressive and expansive conclusions should be noted.

Most authors anticipate questions about the limitations of their study, but if not, it is useful that they be noted in the review. An analysis of a study's limitations says something about the authors' and reviewers' integrity and scientific approach to the problem. You may suggest to the editor to write a comment or an editorial alongside the accepted manuscript if you feel that the discussion of the limitations, significance or impact needs to be taken further.

For those authors clearly inexperienced in manuscript composition, advice can be found in the literature [8, 9, 11].

Sad to say, sometimes references are cited erroneously, even at times the key one(s). A tactful note of the error is usually sufficient for the embarrassed author. You are not required to check every reference but a careful look at the sources and foundation for the arguments is a must.

Journals may have blinded and structured review policies [12, 13]. In this case, follow the instructions. If a journal offers an unblinded review, evaluate the fairness of your contribution to the manuscript as well as any potential bias. *Cerebrovascular Diseases* and other journals expect that the authors of a manuscript should acknowledge those who contributed to the study (i.e. the list of sites and researchers) and those who were helpful to the authors (i.e. funding agencies, expert consultants and volunteers). It is also prudent to have disclosures of the authors' conflicts of interest [14] so that the study's findings and interpretation can be put into perspective by the

readership (this could be part of the editorial office's responsibilities with blinded reviews). As an unblinded reviewer, you can insist upon a more detailed assessment of contributors and conflicts. Some journals also require the authors to disclose the contribution of each author to the final manuscript, and leading publishers offer criteria for who should be the authors [15].

Final Suggestions

Partition your review into an introductory section, major comments and minor comments. This way, it is easy for the editor and authors to see where the main problems are and what needs to be done to reach the priority level for publication. If revision is recommended, state that you are willing to look at the manuscript again. In re-reviewing, check if the authors have responded adequately to your comments and if any required changes have been included in the manuscript (and not only in the response to the reviewers). Do not bring up any new issues at the time of re-reviewing (unless possibly prompted by the authors' comments); all your pertinent comments on the manuscript should have been made at the time of the first review.

We hope these suggestions serve to help new reviewers and refresh the willingness of those battle-hardened veterans to continuously serve the medical literature.

Acknowledgments

We are indebted to our colleagues and friends, editors and many experts, whose reviews and decisions we had a chance to read and occasionally disagree with. We are also grateful to the associate editor of *Cerebrovascular Diseases*, Dr. Jay P. Mohr, an outstanding mentor and accomplished scientific writer, for his insightful comments and encouragement.

This publication is the third installment of a series of papers aiding those involved in scientific reporting, writing and publishing [8, 10], and it is meant to be used with other sources available to authors [9, 11, 16, 17] and reviewers (specific instructions can be found on the websites of each journal or in any invitation to review a manuscript).

References

1 Pearn J: Publication: an ethical imperative. BMJ 1995;310:1313–1315.
2 Goodman SN, Berlin J, Fletcher SW, Fletcher RH: Manuscript quality before and after peer review and editing at *Annals of Internal Medicine*. Ann Intern Med 1994;121:60–61.
3 Schroter S, Tite L, Hutchings A, Black N: Differences in review quality and recommendations for publication between peer reviewers suggested by authors or by editors. JAMA 2006;295:314–317.
4 Wager E, Parkin EC, Tamber PS: Are reviewers suggested by authors as good as those chosen by editors? Results of a rater-blinded, retrospective study. BMC Med 2006;4:13.
5 Black N, van Rooyen S, Godlee F, Smith R, Evans S: What makes a good reviewer and a good review for a general medical journal? JAMA 1998;280:231–233.
6 Callaham ML, Tercier J: The relationship of previous training and experience of journal peer reviewers to subsequent review quality. PLoS Med 2007;4:e40.
7 Callaham ML, Schriger DL: Effect of structured workshop training on subsequent performance of journal peer reviewers. Ann Emerg Med 2002;40:323–328.
8 Alexandrov AV, Hennerici MG: Writing good abstracts. Cerebrovasc Dis 2007;23:256–259.
9 European Stroke Conference: http://www.eurostroke.com/submission_instructions.html (accessed July 2, 2009).
10 Alexandrov AV: How to write a research paper. Cerebrovasc Dis 2004;18;135–138.
11 International Stroke Conference: Writing good abstracts. 2009. http://strokeconference.americanheart.org/portal/strokeconference/sc/writinggoodabstracts.
12 Justice AC, Cho MK, Winker MA, Berlin JA, Rennie D: Does masking author identity improve peer review quality? A randomized controlled trial. PEER Investigators. JAMA 1998;280:240–242.
13 Schriger DL, Cooper RJ, Wears RL, Waeckerle JF: The effect of dedicated methodology and statistical review on published manuscript quality. Ann Emerg Med 2002;40:334–337.
14 Holloway RG, Benesch C: When disclosures are more interesting than the evidence. Stroke 2009;40:e44.
15 Anonymous: Policy on papers' contributors. Nature 1999;399:393.
16 Pakes GE: Writing manuscripts describing clinical trials: a guide for pharmacotherapeutic researchers. Ann Pharmacother 2001;35:770–779.
17 Pamir MN: How to write an experimental research paper. Acta Neurochir Suppl 2002;83:109–113.

Cerebrovascular Diseases

Cerebrovasc Dis 2007;23:256–259
DOI: 10.1159/000098324

Received: December 6, 2006
Accepted: December 6, 2006
Published online: December 29, 2006

Writing Good Abstracts

Andrei V. Alexandrov[a] Michael G. Hennerici[b]

[a]Stroke Research Program, Barrow Neurological Institute, Phoenix, Ariz., USA; [b]European Stroke Conference

Key Words
Abstracts, stroke · Peer review · Outcome

Abstract
Introduction: Writing an abstract means to extract and summarize (AB – absolutely, STR – straightforward, ACT – actual data presentation and interpretation). Thousands of abstracts are submitted to stroke conferences each year. The following suggestions may improve the chances of your work being selected for presentation, and to communicate results in the most efficient and unambiguous way. ***Title and Structure:*** Make the title dynamic and informative, rather than descriptive. Structure the abstract following the IMRaD (Introduction, Methods, Results and Discussion) principle for your future original paper where background would become Introduction and conclusions would enter Discussion. Select the appropriate category for submission carefully. This determines which experts grade the abstract and the session where your competitors represent their work. If selected appropriately, your abstract is more likely to be graded by peers with similar interests and familiarity with your work or field. Methods should describe the study design and tools of data acquisition shortly, not data. ***Results:*** Provide data that answer the research question. Describe most important data with numbers and statistics. Make your point with data, not speculations and opinions. Abbreviations should be avoided and only be used after they have been spelled out or defined. Common mistakes include failure to state the hypothesis, rationale for the study, sample size and conclusions. Highlight the novelty of your work by carefully chosen straightforward wording. ***Conclusions:*** Conclusions have to be based on the present study findings. Make sure your abstract is clear, concise and follows all rules. Show your draft to colleagues for critique, and if you are not a native English speaker show it to a person who can improve/correct your text. Remember that accepted abstracts of completed original research should be followed by published original papers – if this is not intended or fails, it may indicate an impaired ability to succeed in scientific writing and an academic career.

Introduction

Congratulations! You joined a stroke research team, got your first data set and analyzed a database by yourself using statistical software or, preferably, together with an expert in biostatistics. You discussed data and statistics with your colleagues. Your mentor tells you that you got results worth reporting. It is time to draft an abstract. Although the recommendations below come from experiences in writing about stroke, they could be applied to any medical field.

Wondering where to start? You should have taken notes when you conceived the project, selected methods, analyzed data and came up with conclusions while work-

KARGER

Fax +41 61 306 12 34
E-Mail karger@karger.ch
www.karger.com

1015–9770/07/0234–0256$23.50/0

Accessible online at:
www.karger.com/ced

Dr. A.V. Alexandrov, Director
Stroke Research and Neurosonology Program, Barrow Neurological Institute
Suite 300 Neurology, 500 West Thomas Rd
Phoenix, AZ 85013 (USA)
E-Mail avalexandrov@att.net

ing with your mentor and co-authors in the past several months. If not, ask your mentor again what the research question was, why the project is important, how subjects and methods were selected, why certain tools of analysis were most appropriate, and what the meaning of the results is. And write these thoughts down, particularly if you are new to research or trying to multi-task on several projects.

Think about the title of your abstract since it sells your submission. Make the title dynamic and conclusive, rather than descriptive. Try to avoid questions in the title, unless the issue remains unsettled or you came up with a clear answer. Think about the 'take home' message you'd like to deliver with your abstract.

Writing an abstract means to extract and summarize (think AB – absolutely, STR – straightforward, ACT – actual data presentation and interpretation). Introductory statements sum up what is known or remains unsettled in the field, and a goal of your study. Try to compress these messages into one or two sentences. Thousands of abstracts are submitted to stroke conferences each year. Follow the European Stroke Conference [1] or the American Stroke Association recommendations [2], and you may improve the chances of your work being selected for presentation. Preparation of conference abstracts is mainly a responsibility of the researcher with virtually no possibilities for a rater of conference abstracts to check for data quality (there is nothing else available, no manuscript). Abstracts linked to scientific papers are peer reviewed, and it is possible to assess if the abstract adequately reflects what is stated and concluded in the manuscript body. Although this paper mainly provides advice how to prepare a conference abstract, similar principles can be applied to drafting abstracts for original paper submissions, though format and requirements may differ between peer-reviewed journals. In any case, the goal is to report and convey research findings in the most efficient and unambiguous way.

All authors must have contributed to the work, approved the text and given permission to submit the abstract including copyrights to the conference publishers. The presenting authors should be named first – if the abstract is submitted for oral presentation, this person should be able to discuss your contribution in a lively discussion – both from his knowledge of the subject as well as the conference language. Carefully consider specific regulations made by the conference organizers which are different for many meetings in style and context. If you do not adhere to these rules, your submission is at high risk to fail.

Methods

Various scientific conferences may provide different rules regarding the recommended structure of abstract submission. Keep in mind that whatever the rules are, you must follow up the conference abstract with an original manuscript submission. We view the conference abstract and the final original manuscript abstract as part of the same process. So, try to make the first one as good as the final one.

Unstructured abstracts challenge quick understanding what was accomplished in the project. A structured abstract has advantages [3, 4] and can include Introduction (or Background and Purpose), Methods, Results and Conclusions. This closely follows the IMRaD (Introduction, Methods, Results and Discussion) principle introduced early in the 20th century [4] and currently used in about two thirds of structured abstracts published in major medical journals [5, 6]. This format is recommended for original papers [7, 8] where D stands for discussion instead of conclusions in your abstract. Even if structured abstracts could appear longer, they are considered more informative and judged to be clearer by their readers [9].

When drafting the first sections of the abstract, think about where you are going with this, i.e. key results and conclusions. Ask your mentor and co-authors for suggestions. Avoid writing points for discussion in your abstract, or statements like 'this is the first study to demonstrate …'. Chances are that ten other groups are doing similar projects and five more have already presented their results at meetings you did not attend. To overcome the initial 'writer's cramp', i.e. the mental inability to start scientific writing, you may download an abstract on a similar subject or comparable study design that was published in proceedings of a previous stroke conference or a peer-reviewed paper. Abstracts presented at major international meetings are generally of high quality since they passed competitive review with less than 30% chance of acceptance. Look how previous authors described their subjects and methods, and follow the lead: after all, imitation is the best form of flattery. Add specifics of your patient population so that reviewers can understand the novelty or applicability of your findings. Be specific, yet brief. Remember, space (number of words or characters allowed) is limited and so is the readers' and reviewer's attention span. Reviewers often have to rate >100 abstracts, not all are native English speakers and they appreciate a clear, simple and straightforward style strengthening the originality of your work and statistically sound presentation of the results reported.

State the type of study conducted, i.e. retrospective analysis, case series, cohort, phase I or II clinical trial. Describe subject selection criteria and data collection tools concisely, yet with enough details for peers to understand what was done. There is no need to add a literature reference that describes study methods; it is often not even wanted. As many conferences tend to avoid peer reviewer's bias, anonymous reviews are common (e.g. for many years for the European Stroke Conference). Thus, any hints at the organization submitting the abstract are considered unfair and against the rules. Avoid presenting actual data in this section, i.e. number of subjects and their baseline characteristics. Presentation of data belongs to the Results section. Instead, describe scales or methods used for assessment and recruitment as well as outcomes or dependent variables.

Protection of research subjects is implied, yet often omitted in abstracts due to space limitations. You have to have a local ethics committee approval before study initiation. With abstract reports, it is assumed that this is the case. When you present data at a meeting, clearly mention local ethics or institutional review board approval and informed consent signed by participants for human studies.

The most important factors for abstract acceptance to a prestigious and competitive meeting are the quality, novelty, reliability and scientific or clinical importance of your work. Also, a bias was noted that reviewers may favor well-written abstracts like those submitted from the USA or English-speaking countries [10], so if you are not a native English-speaking person, show your draft to those who can edit spelling, grammar and style. Clearly state the type of study design that largely implies the choice of statistical analysis tools and saves space for the following key section.

Results

Your results are the most important part of the abstract. Present them clearly, avoid long and confusing sentences, and follow simple logics. Start here by describing your study subjects with actual numbers for study demographics. Then lead the reader to the main findings.

Accurate presentation of data in the abstract is extremely important. A recent survey of 243 abstracts for original research articles published in selected pharmacological journal issues identified 25% of abstracts containing omissions, a third containing either an omission or inaccuracy with a total of about 60% of abstracts classified as deficient in terms of accurate data reporting [11]. Another group suggested the need for journals to include in their editing processes specific and detailed attention to abstracts [12].

There are several options how to present data. If two or more groups of subjects were studied, present data consistently so that you can save space on repeating which finding was seen in which group. Name groups clearly, i.e. target or controls, or A, B and C for brevity. If too many analyses were generated, present only key data points and leave the rest for writing a paper. For example, if pretreatment characteristics of patients in a controlled clinical trial were similar between the groups, there is no need to show all of them for each group. Overall key median or mean values would suffice with a statement NS, i.e. nonsignificant.

A table or figure can be uploaded with electronic abstract submission. Include a table or figure only if data presentation is markedly improved this way; however, if understanding the figures/table takes more time than reading the abstract, you should not consider them. If you choose to do so, select the most representative data set that delivers the key message or summarizes most important data and leaves space for other details in the text.

Discuss results with your mentor and co-authors since this internal review will help to determine if generated data were sufficient to answer the research question in the abstract. Most importantly, stay focused by including data relevant to the research question. Packing one abstract with data is better than splitting data and submitting two or three weaker abstracts from the same data set.

Avoid statements like 'two groups were significantly different'. Instead, show absolute numbers and percentages. Then add p values, coefficients, ratios and confidence intervals after these absolute numbers so that reviewers can judge the significance of observations. Mention statistical tests if space permits. Details of statistical analysis are usually left to the research paper and presentation at a meeting. Abstracts without such data are given low priority! Make your point with data, not arguments. While drawing conclusions from your results, remember that statistically significant difference does not necessarily translate into clinically significant difference.

Conclusions

Your conclusions should be straightforward, brief and specific to your observations. Quite often they consist of two sentences. The first concisely summarizes the main findings, and the last states interpretation or clinical implications. Readers and reviewers commonly check the title and, if become interested, skip right to the last sentences before they read the full abstract in detail.

Clear formulation of conclusions attests to your ability to interpret data and understand the evidence-based approach. If space permits, you may begin with an opening statement: 'Our study showed …' and lucidly summarize *your* study findings. Avoid repeating data. There is no reason to stress how novel or terrific your results are – let them speak for themselves. On the contrary, there is also no need to say that 'further research is needed'. Scientists never stop explorations, even if a subject is considered written in stone.

Do not overestimate the importance of your research findings. Avoid broad claims and strong statements since even pioneer breakthrough studies require independent confirmation. Instead, be specific and focused on your study findings and what they mean. There is no need to discuss findings by others in this section, or what questions remain unsettled. Conclusions logically connect the

title, study methods and results all together to deliver the 'take home' message.

Your abstract is the first step towards publication, communication and dissemination of research results that is imperative for advancement of science [13]. The scientific community reads more abstracts than full-text papers since simply there is not enough time to read all published papers. Instead, scientists screen abstracts and select which papers are essential to read in full text. Providing a clear, accurate and lucid abstract would help to get your research noticed.

Several clinical specialties noticed that 60–75% of abstracts presented at national meetings are not followed by publication of original papers [14–16]. Although not directly applicable to major stroke conferences, a survey of orthopedic investigators who had not had a full-text article published after presenting the abstract at a national meeting showed that the failure to publish was due to one of three main reasons:

1 investigators did not have enough time to prepare a manuscript for publication (the reason most frequently given);
2 almost one third of the studies that had not been submitted for publication were ongoing;
3 relationships with co-authors sometimes presented a barrier to final publication [16].

The authors concluded that thorough preparation before the study and the establishment of stricter guidelines to limit presentations of preliminary data at major meetings may improve publication rates [16]. Also, there is a publication bias that often only positive findings get published, and negative results are less likely to be accepted as original papers, although they are needed to avoid mistakes in interpreting positive studies or planning new trials.

Finally, remember that shortly after submission of your abstract, your mentor should ask you to draft a research paper regardless whether the abstract is going to be accepted or not. Although conferences may accept work-in-progress, interim reports and other communications that are not suitable for original papers, completed original research has to be communicated with more than a conference abstract. Successful researchers follow abstracts with original paper submission to peer-reviewed journals. Failure to do so may result in problems with your academic career. Advice on how to write a research paper is available [7, 8, 17]. The greatest risk here is not trying to write at all.

Acknowledgements

We owe to our trainees and colleagues who struggled with scientific writing – their efforts, frustration and unpublished works provided observations shared in this manuscript. A.V.A. is also indebted to Dr. John W. Norris who taught him first lessons in scientific writing.

References

1 http://www.eurostroke.org/esc_abstracts.htm.
2 http://strokeconference.americanheart.org/portal/strokeconference/sc/writinggoodabstracts.
3 Taddio A, Pain T, Fassos FF, Boon H, Ilersich AL, Einarson TR: Quality of nonstructured and structured abstracts of original research articles in the *British Medical Journal,* the *Canadian Medical Association Journal* and the *Journal of the American Medical Association.* CMAJ 1994;150:1611–1615.
4 Wong HL, Truong D, Mahamed A, Davidian C, Rana Z, Einarson TR: Quality of structured abstracts of original research articles in the *British Medical Journal,* the *Canadian Medical Association Journal* and the *Journal of the American Medical Association:* a 10-year follow-up study. Curr Med Res Opin 2005;21:467–473.
5 Sollaci LB, Pereira MG: The introduction, methods, results, and discussion (IMRAD) structure: a fifty-year survey. J Med Libr Assoc 2004;92:364–367.
6 Nakayama T, Hirai N, Yamazaki, Naito M: Adoption of structured abstracts by general medical journals and format for a structured abstract. J Med Libr Assoc 2005;93:237–242.
7 Pakes GE: Writing manuscripts describing clinical trials: a guide for pharmacotherapeutic researchers. Ann Pharmacother 2001; 35:770–779.
8 Pamir MN: How to write an experimental research paper. Acta Neurochir 2002;83(suppl):109–113.
9 Hartley J: Applying ergonomics to *Applied Ergonomics:* using structured abstracts. Appl Ergon 1999;30:535–541.
10 Ross JS, Gross CP, Desai MM, Hong Y, Grant AO, Daniels SR, Hachinski VC, Gibbons RJ, Gardner TJ, Krumholz HM: Effect of blinded peer review on abstract acceptance. JAMA 2006;295:1675–1680.
11 Ward LG, Kedrach MG, Price SO: Accuracy of abstract for original research articles in pharmacy journals. Ann Pharmacother 2004;38:1173–1177.
12 Pitkin RM, Branagan MA: Can the accuracy of abstracts be improved by providing specific instructions? A randomized controlled trial. JAMA 1998;280:267–269.
13 Pearn J: Publication: an ethical imperative. BMJ 1995;310:1313–1315.
14 Li SF, Umemoto T, Crosley P, Cassidy C: SAEM abstracts to articles: 1997 and 1999–2001. Acad Emerg Med 2004;11:985–987.
15 Eloubeidi MA, Wade SB, Provenzale D: Factors associated with acceptance and full publication of GI endoscopic research originally published in abstract form. Gastrointest Endosc 2001;53:275–282.
16 Sprague S, Bhandari M, Deveraux PJ, Swiontkowski MF, Tornetta P 3rd, Cook DJ, Dirschl D, Schemitsch EH, Guyatt GH: Barriers to full-text publication following presentation of abstracts at annual orthopaedic meetings. J Bone Joint Surg Am 2003;85A:158–163.
17 Alexandrov AV: How to write a research paper. Cerebrovasc Dis 2004;18:135–138.

Cerebrovascular Diseases

Cerebrovasc Dis 2013;35:202–208
DOI: 10.1159/000346077

Received: October 5, 2012
Accepted: November 22, 2012
Published online: March 5, 2013

How to Prepare and Deliver a Scientific Presentation

Teaching Course Presentation at the 21st European Stroke Conference, Lisboa, May 2012

Andrei V. Alexandrov[a] Michael G. Hennerici[b]

[a]Comprehensive Stroke Center, University of Alabama Hospital, Birmingham, Ala., USA; [b]Department of Neurology, UniversitätsMedizin Mannheim UMM, University of Heidelberg, Mannheim, Germany

Key Words
Science · Presentation · Quality

Abstract
Background: A scientific presentation is a professional way to share your observation, introduce a hypothesis, demonstrate and interpret the results of a study, or summarize what is learned or to be studied on the subject. ***Presentation Methods:*** Commonly, presentations at major conferences include podium (oral, platform), poster or lecture, and if selected one should be prepared to PRESENT: *P*lan from the start (place integral parts of the presentation in logical sequence); *R*educe the amount of text and visual aids to the bare minimum; *E*lucidate (clarify) methods; *S*ummarize results and key messages; *E*ffectively deliver; *N*ote all shortcomings, and *T*ransform your own and the current thinking of others. We provide tips on how to achieve this. ***Presentation Results:*** After disclosing conflicts, if applicable, start with a brief summary of what is known and why it is required to investigate the subject. State the research question or the purpose of the lecture. For original presentations follow a structure: Introduction, Methods, Results, Conclusions. Invest a sufficient amount of time or poster space in describing the study methods. Clearly organize and deliver the results or synopsis of relevant studies. Include absolute numbers and simple statistics before showing advanced analyses. Remember to present one point at a time. Stay focused. Discuss study limitations. In a lecture or a podium talk or when standing by your poster, always think clearly, have a logical plan, gain audience attention, make them interested in your subject, excite their own thinking about the problem, listen to questions and carefully weigh the evidence that would justify the punch-line. ***Conclusions:*** Rank scientific evidence in your presentation appropriately. What may seem obvious may turn erroneous or more complex. Rehearse your presentation before you deliver it at a conference. Challenge yourself to dry runs with your most critically thinking colleagues. When the time comes, ace it with a clear mind, precise execution and fund of knowledge.

Introduction

Over time communication standards between scientists have evolved along with improved scientific method, increasing scrutiny of analyses and upholding to the highest level of evidence anything we call research. Scientific presentation is a professional way of sharing your observation, introducing a hypothesis, demonstrating and interpreting the results of a study, or summarizing what has been learned or is to be studied on the subject. Professional presentations help disseminate research, make peers aware of novel approaches, findings or problems. These presentations make conferences memorable for both presenters and the audience. Anyone can recall the most exciting and most boring,

KARGER

E-Mail karger@karger.com
www.karger.com/ced

1015–9770/13/0353–0202$38.00/0

Dr. A. Alexandrov
Director Comprehensive Stroke Center
UAB Hospital RWUH M226, 619 19th Street South
Birmingham, AL 35249 (USA)
E-Mail avalexandrov@att.net

the most clear and most convoluted, the most 'seriously?!' and the most 'wow!!' presentations. Most presentations, however, fall in the in-between level of 'so what?', 'I did not quite get it …', or 'maybe'. This means that all the work the authors have put in did not result in a paradigm shift, advancement, or even 'well, this is good to know' kind of an impact. We struggle to shape up our young presenters to make their science clear and visible, their presence known and their own networks grow.

Having initially struggled in preparing and delivering presentations ourselves, and having seen the many baby steps of our trainees now accomplished or shy of a track record, we have put together these suggestions on how to start, organize and accomplish what at first sight looks like a daunting task: presenting in front of people, many of whom may have expertise way beyond your own or who are scrutinizing every bit of data and ready to shred any evidence you might have to pieces. Unfortunately, there is no other way to advance science and become recognized than to survive this campaign from conception of a project to publication. This campaign has its own (often interim and hopefully not singular) culmination in a scientific presentation. This presentation also comes with question and answer sessions and importantly, with you and the audience possibly coming out of it with new messages, new thinking and even energy for breakthroughs, no matter how small or large the leap would be. So let's explore how to prepare and deliver a scientific presentation.

Presentation Methods

Currently, the common types of presentations at major conferences include podium (oral, platform), poster or lecture. Although seemingly different and at times some being more desirable over others, they all share the same prerequisites and challenges for successful execution. We will examine common threads and identify unique aspects of each type of these presentations. However, the first prerequisite for any scientific presentation (successful or not) is you, the presenter.

An effective presenter should have led the study, participated in the analysis and drafting of the abstract and manuscript, i.e. the presenter should know the subject of his or her talk inside out. One should therefore be prepared to PRESENT:

*P*lan from the start (place integral parts of the presentation in logical sequence);

*R*educe the amount of text and visual aids to the bare minimum;

*E*lucidate (clarify) methods;

*S*ummarize results and key messages;

*E*ffectively deliver;

*N*ote all shortcomings, and

*T*ransform your own and the current thinking of others.

So, as the scuba-diving instructors say: plan the dive, and dive the plan. The most important parts of scientific presentations should follow the logic of delivering the key messages. For the original presentations (platforms or posters), it is easy to simply follow the accepted abstracts, most often structured following the IMRaD principle: Introduction, Methods, Results and Discussion (Conclusions).

Lecture format, content and logical flow of information often depend on the topic choice, which should be appropriate to the level of audience [1], time allotment and the target audience. Most competitive conferences offer short times even for invited lecturers as experts are expected to demonstrate cutting edge science, which assumes that the audience is already knowledgeable and the expert is capable of delivering information that sparks new thinking. The suggestion here to both novice and experienced speakers is to quickly summarize why the subject of presentation is important (catch audience attention [2, 3]), where we are now (show the landscape of completed studies that established the common knowledge or conundrums, equipoise, etc.) and to move then to the latest advancements (this may include just-in publications, ongoing or planned future research or the most provocative take on the evidence out there).

Turning back to original presentations, advice is available on how to write abstracts following the IMRaD principle [4] and how to draft subsequent manuscripts [5]. We cannot stress enough the need to quickly follow-up the abstract submission with drafting the full manuscript. If the authors complete a manuscript before the presentation at a conference, the presenter will have a luxury of material to work with to compile either a set of slides for the podium or text and illustrations for the poster. If a manuscript was drafted and reviewed by coauthors, the challenge for a presenter is going to be a good one: trim down most sentences as both slides and posters benefit from short statements (not even full sentences) and large font sizes so that text can be easily read from a distance. Put yourself into the audience: your slides should be readable from the last row of a large room or a huge ballroom and your poster should be still readable from at least 2 m.

The latter will allow better poster viewing by several people during guided poster tours or when a small group gathers spontaneously to view it.

This logically brings us to the second step: use *bare minimum* of any type of information to deliver your presentation. Minimum text, minimum lines, minimum images, graphs, i.e. provide only the essential information as the audience attention span is short. Brevity, however, should not compromise quality: you should always stride to have the highest quality visual aids since these leave an impression on the audience [6] and good quality graphics are attributes of effective presentations [3].

At the same time, we cannot overemphasize the need to stick to time limits set for a specific presentation. Presenters should test their presentation in 'real life' at home to their friends or at work in front of colleagues and ask for criticism. It is better to get criticism from members of the department (including your boss) than in a huge auditorium. Use a simple rule: an average talking time is 1 min per slide in oral presentations. You can then see how little you really can allocate to each slide if you load your talk with the most complicated visual presentation of data.

Let's go to the specifics. The 'Introduction' slide usually includes a very brief description of background and should explicitly state the research question. Call it 'Introduction and Study Purpose'. Adding a separate slide for study aims lengthens the talk. Fewer slides also reduce the chance of making an error when advancing them on the podium that can send presenters into further time deficit and stress, a commonplace even with those who know how to right-click.

Methods should have bullet points, not necessarily full sentences since you will be speaking over slides projecting or in front of the poster to connect brief statements showing behind you. The basic rule is not to read your slides or poster, nor tell the audience to read what the slide or poster says. Think of your slides or display material as a reminder to yourself of what you are supposed to say in detail and leave the noncritical words out of the slide and off the poster as it is an even easier source to pack with unreadable information. When you develop a presentation imagine you are a novice to the field who would like to be educated and taken on a journey while seeing and hearing the presentation. What can I learn in these few minutes? As the presenter, also think 'what can I pass to the audience in these few minutes?' Further advice on how to plan, focus and arrange material to support key messages is available [7, 8].

Results are the key part of any scientific presentation, podium, poster or lecture, and the most time, space and careful ascertainment should be allotted to this section as is necessary and feasible. It is vital to pack your presentation with data that support your key messages. Remember, a picture is worth a thousand words but show only quint-essential images or graphs. If appropriate include statistics and make this easy in structure, i.e. use formats or values known by everybody such as odds ratios, Kaplan Meier curves, etc. (do not forget to include these data in the abstract as abstracts without data, numbers and calculations are often low rated or rejected). After presenting data, show what you think of that or what the limitations are since you thought more about this than the audience, at least through preparation of your own presentation.

The last two concluding paragraphs (poster), comments (this section of a lecture), or slides (podium) are supposed to cover study limitations and conclusions. These should be the most carefully thought through, strategically worded and evidence-based part of your presentation. Your reputation depends on the quality of data interpretation. Also, think about a take-home message with the main message you want to be remembered. When practicing your presentations, deliver your talk to your nonmedical spouse, boyfriend or girlfriend: by the end of your presentation he or she should be able to repeat the take home message with best-prepared presentations.

After conclusions, an 'Acknowledgements' slide is nice to have at the end showing whom you are grateful to, but it will not rescue a hopeless presentation. The 'thanks to my colleagues' should not come at the expense of time, quality and content of your scientific presentation. There is no need to thank multiple people like they often do at the Oscars. You have to rationally consider who and when to acknowledge if their functions were important to your work but they were not listed among coauthors. If you received funding to support your work, it is very important where appropriate or at the end of the presentation to acknowledge your sponsors or grant providers (such as NIH Institute and grant number, MRC grant, INSERM or DFG labels, etc.). The higher the scientific level of the grant donors, the more your presentation will be recognized.

While preparing any part of your presentation, remind yourself to check whether the included material is any good and worthy of inclusion. You can simply ask, 'am I wasting time during the oral presentation or space in the poster by including this and that?' The answer lies

Table 1. Basic structure for a podium presentation of an original paper

Slide	Comment
1. Title slide	List the full title of your project, last names and initials of all listed coauthors and affiliation(s).
2. Conflicts	Most competitive conferences now require disclosure or conflicts such as unapproved/off-label use and personal conflicts of interest in regards to the research subject – follow templates that organizers usually provide.
3. Introduction	Brief bullet points about background. State clearly the aim of the study or research question.
4. Methods	One-line, brief bullet points. No more than 10 lines per slide (the fewer the better – this enlarges font size); add more slides if necessary.
5. Results	Brief lines of numeric data. No more than 10 lines per slide. Use graphs or images with high resolution and large axis value/numbers; add more slides if necessary.
6. Study limitations	Mention these instead of a general 'Discussion' slide – most critical questions after the talk point to study limitations – so be open about them to avoid negative discussion after the presentation.
7. Conclusions	Brief statements outlining the most important key messages.
8. Acknowledgements	Include this slide if you need to thank funding agencies and sources as well as people who were not listed as coauthors. If you wish to thank someone among coauthors, do so briefly while showing the title slide.

in checking if this material is directly related to the study aim, data obtained, or in support of conclusions drawn.

Table 1 summarizes how you should structure the sequence of slides for the podium presentation. If you are only given 8 min to present + 2 min for questions (10 min total), you can see that with 8 mandatory slides you are already at the limit of 1 min per slide. In due course, we will give you tips on how to reallocate time within your presentation to expand the Methods and, most importantly, the Results section as needed.

Always clarify study methods. Posters offer a greater freedom since you can show details of your experimental setup or the methodology of your study design. A podium presentation often requires abbreviated mention of key elements of design, scales, inclusion/exclusion criteria, intervention or dependent variables and outcomes. This requires diligent work with your coauthors and biostatisticians to make sure that you are brief but clear and sufficient.

A well-assembled Methods section will lead to a shorter Results summary since your clear statement of the study aim and key methodology logically leads to audience anticipation of the primary end-point findings. There are key messages and delivered data points that distinguish effective and clear presentations from those resulting in confusion and further guesswork.

Delivering a Presentation

Effective presenters capture audience attention and stay focused on key messages [1–3, 6–8]. A study was performed at scientific conferences asking reviewers to identify the best features of effective presentations [3]. The most frequent comments on best features of presentations with respect to 'content' were identifying a key concept (43% of presentations) and relevance (43%). Best features in evaluations of 'slides' were clarity (50%), graphics (27.3%) and readability of the text and font size (23%). Finally, best features in 'presentation style' were clarity (59%), pace (52%), voice (48%), engaging with the audience (43%), addressing questions (34%) and eye contact (28%) [3].

Here are some tips on how to avoid forcing yourself to rush during a talk. Before you start (usually in the intermission or just before your session) familiarize yourself with the podium and learn how to advance slides and operate the pointer or point with the mouse. If you stumble at the beginning, you start your presentation with a time deficit.

Get to the podium while you are being introduced and start right away (it is the responsibility of the moderator to properly announce you, your team and the title of the talk and it is the responsibility of the conference organizers to have your title slide showing during the moderator's announcement). Do not read or repeat your study title. Thank the moderators and while the title slide is showing you may consider briefly thanking your coauthors/mentor here in just a few seconds.

Show the 'Conflicts of Interest' slide next and disclose if any conflicts are related to the study subject. If they exist, conflicts should be acknowledged briefly but clearly. Do not show a slide with several conflicts and tell the audience 'here are my conflicts' and switch to the next slide. It is important to simply say, 'pertinent to this study I have

…' or 'this study includes an off-label or investigational use of …'. Now you are logically ready to turn to the subject of your presentation.

Start with a brief summary of what is known and why is it important to investigate the subject. This introduces the audience to the subject of research and starts the flow of logic. If you are facing a challenge to present a complex study within in a short allotted period of time (such as 8 min for podium or a just a few minutes during a guided poster tour), do not waste time. You may cut to the chase and simply say why you did the study. Coming with straight forward messages, which are authentic and concerned about the scientific question, gets you more credit with the audience than careful orchestration of a perceived equipoise. However, we have digressed.

For an effective message delivery, identify two people towards opposite far ends of the audience and speak as if you are personally talking to one of them at a time and alternate between them. If lights shining in your face are too bright, still look towards the back of the room (or from time to time directly into the camera if your talk is being shown on monitors in a large ballroom) and do not bury your head into the podium or notes that you might have brought with you. The nonverbal part of any presentation and the presenter's body language are also important [6]. At all cost avoid bringing notes with you to any scientific presentation since you should have practiced your talk enough to remember it or you should be familiar with the subject of your lecture to the point that even if you have just been woken up, you can still maintain an intelligent conversation. Do not count on 'it will come to me' – practice your talk! Further advice on effective presenting skill is available [2].

Remember that at international conferences many attendees are not native English-speaking people. Thus speak slowly and train your voice for best possible pronunciation! This recommendation is applicable to natives of English-speaking countries too. Native English speakers from the UK, Commonwealth countries and the USA tend to speak fast, with a variety of accents that international audiences may not understand easily while the interpreters may not be able to keep up. When speaking, do not turn away from the audience and look at your slide projection on the main screen or at your poster all the time. If it is necessary to remind yourself what to talk about next, advance the slide, briefly glance at it, turn to the audience and continue your presentation. Turn to your slide again only if you have to use a laser pointer or a mouse on the computer screen. Do so briefly, underline the important finding, point to the key part of an image and avoid long circular pointer motions around the whole text line or big areas of graphic illustrations. It is distracting. Try to use the pointer only when necessary and do not read your slides with the pointer constantly aiming at where you are reading.

When presenting your methods, clearly state the type of study, e.g. retrospective analysis, case series, cohort or controlled trials, etc., and describe patient inclusion/exclusion criteria. If too numerous, only list the major ones. As an example, in a clinical trial of a fibrinolytic agent the list of exclusion criteria could be very extensive, so how can you present this on a dime? Your slide should focus on the key inclusion criteria since a patient who did not have those was obviously excluded, and an audience at a stroke conference is generally familiar with multiple exclusion criteria for tissue plasminogen activator treatment. So, your slide or poster may have the following in it (highlighted in **bold**) to which you may add the plain text in your (limited) verbal statements:

Study Methods

Our **Major Inclusion Criteria:** were

- total **Pre-treatment NIHSS score >6** points
- **Presence of mismatch on MRI** determined by (**EPTITHET**) trial criteria
- **Age <80 years** and
- **Time from symptom onset <8 h**

After that, you may omit including a slide with the long list of exclusions in favor of time. If there is a specific contraindication new to the treatment agent in your study, you could say 'in addition to well-known contraindications for systemic thrombolysis, patients were excluded if they had …' at the end of showing the 'Major Inclusion Criteria' slide as shown above. Similarly, in a poster, list only the most relevant inclusion and exclusion criteria and walk the audience through the methods without stumbling on too many detail disclosures. The audience will lose track of where you are going.

It is important to keep a balance between sufficient disclosure of study methods and the length of this part of your presentation. It is always helpful if you have a prior study that used a similar or from which you developed your methodology that has already been published – you may show a reference to this study and move on faster without sacrificing the quality. For example, 'ultrasound

tests were done by experienced sonographers using a previously published standard protocol', 'CT scans were read independently using the ASPECTS score', and 'sICH was defined by the SITS-MOST criteria'. Say this while showing or pointing to the line and published source reference on your visual aid.

Clearly organize and deliver the Results section. Include absolute numbers and simple statistics before showing advanced analyses. Remember not to show data in Methods and equally so do not introduce new methods when presenting Results. As a rule, describe characteristics of the general study population or balance/imbalances between target and control groups. Follow this by a slide that shows the primary end-point findings or observations that directly address the study aim or research question. This follows the logic of a scientific presentation and will help you avoid deviations to side observations no matter how unexpected or valuable they seem. Stay the course, address the main question first and only then show additional findings. When presenting a poster, point to the area where the key results are displayed. Unlike a slide presentation or lecture where the audience is forced to see one slide at a time, busy posters could be distracting. Posters that are heavily packed with graphs, images, tables and text are often difficult to follow during a brief guided poster presentation tour. It is the presenter's responsibility to drive the audience attention to key results in a logical sequence. When you present a graph, start by telling the audience what is shown and in what units on each access, and briefly point to the numbers on each axis.

Remember to present one point at a time. It makes common sense but sometimes may be difficult to follow if complex experiments or studies with multiple confounding variables have to be navigated through a brief presentation. Do not lose sight of your original research question or the objective of your lecture. Remember what you have shown so far, and what logically should be shown next. If you are pressed on time or made a mistake while advancing slides, take a deep breath and relax. Clear state of mind will buy you time. Racing thoughts such as 'I have to cover that and that, and oh, that too' are not helpful. Dry runs, or practice presentations are essential for you to master the material that you need to present.

After finishing the Results part of your presentation, remember not to introduce more new results in Discussion and Conclusions. That surprise is hard for the audience to process. If you'd like to reemphasize the main finding, use the following suggestion. Let's say your goal was to show the prevalence of a new syndrome in your study population and you found it to be 24% (your primary research question). Unexpectedly, you also found that patients with this syndrome have an increased risk of dying (RR 2.08, 95% CI 1.23–4.34). These numbers and statistics obviously belong to the Results section. However, you want to stress in your conclusion once again how important your finding is. You can present it as follows: 'Conclusions: nearly a quarter of stroke patients can be affected by this new syndrome and, if present, it doubles the patient chance of dying in hospital'. This recaps the main finding and makes practical interpretation of the relative risk estimate.

Before you jump into Conclusions, however, we always encourage presenters to note and openly discuss current study limitations. This improves your own assessment for biases and ranking of the level of obtained evidence. If you do not disclose the obvious study limitations, you will most likely receive questions after your presentation that will point to these shortcomings. Thus, instead of a positive discussion of how your study advances our knowledge, the discussion with the audience will focus on shortcomings and the key message may be lost with the negative audience response. Unlike Twitter™ or future media-based quick popularity scores, science can only advance when it endures the highest scrutiny (even though in the future presenters may be concurrently judged by the audience as our technologies improve). Regardless, if you are a good scientist, prepare yourself to stand the ground if the evidence is behind you. Be proactive, acknowledge study limitations and how you attempted to control for biases, etc.

In a lecture or a podium talk or when standing by your poster, always think clearly, have a logical plan for presentation parts that should be covered next, gain audience attention, make them interested in your subject, excite their own thinking about the problem, listen to questions and carefully weigh the evidence that would justify the punch-line. This will support your conclusions!

With posters, we often see a Discussion section but no conclusions listed, or they are listed in the abstract but not in the poster itself. This will lead to an obvious question after you stop presenting: 'So, what is *your* take on this?' Our advice is, have your conclusions listed and be prepared to defend them point-by-point as the question and answer part could be challenging. If you do not understand the question, ask for clarification rather than talk nonsense.

Discussion: Transform!

To arrive at the right conclusions, you have to rank scientific evidence in your presentation appropriately. What may seem obvious may turn erroneous or more complex at a closer look by experts. Helpful hints here include you maintaining careful documentation while you are conceiving the project, designing it with your colleagues and consulting with a biostatistician on all steps taken in ascertaining the study population, interventions, end-point data collection and bias verification. Put all methodological issues against your findings and this will give you an idea of the strengths and weaknesses of your study. Preparing and delivering your presentation is a great experience to see if your knowledge and gained expertise stand up to peer scrutiny.

Rehearse your presentation before you deliver it at a conference. Challenge yourself to dry runs with your most critically thinking colleagues. Quite often, it is not the presentation itself but these questions, comments and subsequent late night debates with your colleagues that bring new thinking, advance our understanding and spark new ideas. This is the chance to transform your own current thinking and that of your peers. Think about your upcoming presentation, whether it is a podium, poster or lecture, as an opportunity, a launch pad, a reward for the hard work you did to bring this project to the attention of the scientific community.

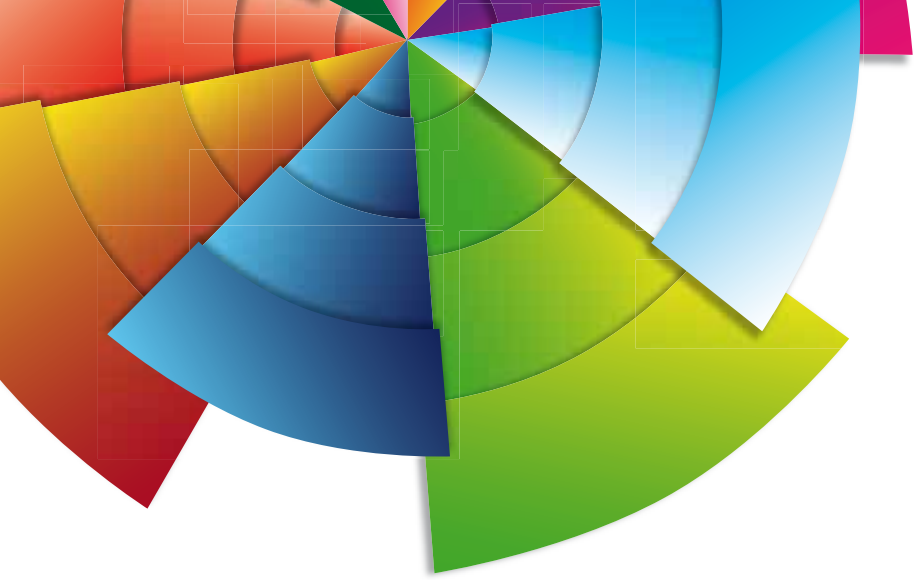
When time comes, ace it with a clear mind, precise execution and fund of knowledge.

Acknowledgements

Before his first oral presentation in English, Dr. Alexandrov was nervous and asked his mentor, Dr. John W. Norris, for a dry run. Dr. Norris generously came to listen to him at 10 p.m. the night before, and Dr. Alexandrov survived his talk.

References

1 Spinler SA: How to prepare and deliver pharmacy presentations. Am J Hosp Pharm 1991; 48:1730–1738.
2 Garon JE: Presentation skills for the reluctant speaker. Clin Lab Manage Rev 1999;13: 372–385.
3 Estrada CA, Patel SR, Talente G, Kraemer S: The 10-minute oral presentation: what should I focus on? Am J Med Sci 2005;329: 306–309.
4 Alexandrov AV, Hennerici MG: Writing good abstracts. Cerebrovascular Dis 2007; 23:256–259.
5 Alexandrov AV: How to write a research paper. Cerebrovascular Dis 2004;18:135–138.
6 Mayer K: Fundamentals of surgical research course: research presentations. J Surg Res 2005;128:174–177.
7 Thompson WM, Mitchell RL, Halvorsen RA Jr, Foster WL Jr, Roberts L: Scientific presentations: what to do and what not to do. Invest Radiol 1987;22:244–245.
8 Collins J: Education techniques for lifelong learning: giving a PowerPoint presentation: the art of communicating effectively. Radiographics 2004;24:1185–1192.



Biomedicine Hub

Introducing the new interdisciplinary Karger journal

Biomedicine Hub is an interdisciplinary journal: a ‚hub' for researchers, clinicians and public health professionals across biomedical disciplines to share research findings, ideas, theories, experimental results and clinical experience. *Biomedicine Hub* aims at facilitating the exchange of knowledge between disciplines, with a focus on translational science for the development of cutting-edge technologies and the improvement of health care. A further focus is on emerging interdisciplinary fields at the forefront of medicine.

Karger premium quality – open access – peer-reviewed – rapid publication

Get the full picture on **www.biomedicinehub.com**

- 16 internationally renowned senior editors
- over 170 Editorial Board Members
- from 35 countries
- specialized in 41 medical disciplines

We invite you to submit now!
There is currently no
Article Processing Charge (APC).
www.karger.com/bmh_guidelines

Join us on Facebook
Biomedicine Hub

KARGER

Karger Open access

KI 16220