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To cite this article: Lara Varpio, Jonathan Amiel & Boyd F. Richards (2016) Writing competitive research conference abstracts: AMEE Guide no. 108, Medical Teacher, 38:9, 863-871, DOI: [10.1080/0142159X.2016.1211258](https://doi.org/10.1080/0142159X.2016.1211258)

To link to this article: <https://doi.org/10.1080/0142159X.2016.1211258>



Published online: 05 Sep 2016.



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AMEE GUIDE

Writing competitive research conference abstracts: AMEE Guide no. 108

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ABSTRACT

The ability to write a competitive research conference abstract is an important skill for medical educators. A compelling and concise abstract can convince peer reviewers, conference selection committee members, and conference attendees that the research described therein is worthy for inclusion in the conference program and/or for their attendance in the meeting. This AMEE Guide is designed to help medical educators write research conference abstracts that can achieve these outcomes. To do so, this Guide begins by examining the rhetorical context (i.e. the purpose, audience, and structure) of research conference abstracts and then moves on to describe the abstract selection processes common to many medical education conferences. Next, the Guide provides theory-based information and concrete suggestions on how to write persuasively. Finally, the Guide offers some writing tips and some proofreading techniques that all authors can use. By attending to the aspects of the research conference abstract addressed in this Guide, we hope to help medical educators enhance this important text in their writing repertoire.

Introduction

Academic conferences provide scholars with the opportunity to present themselves and their work to peer communities. The conference presentation can be an important part of the scholarly process since it is often the first opportunity for scholars to introduce their work to an audience of interested and informed colleagues (Cartwright et al. 2010). The scholar can draw attention to specific accomplishments, can seek advice on problematic elements of a study, can promote new ways of thinking and/or acting to the medical education community, and can solicit help toward developing future research directions (Galer-Unti & Tappe, 2009). Furthermore, presenting at conferences is often a measure of academic productivity and so can be a step on the pathway to promotion (Wood & Morrison 2011).

A conference abstract is an important text in a scholar's writing repertoire (Galer-Unti & Tappe 2009; Wood & Morrison 2011; Jacinto et al. 2014). Be the scholar trained as a health care provider, research scientist, or educator, the conference abstract is a means of gaining access to, and standing within, the broader medical education community (Galer-Unti & Tappe 2009). The conference abstract communicates key information about scholarly projects—in an abridged format—so that reviewers unfamiliar with the project can compare it to selection criteria and to other abstracts to decide whether to include it in the conference program.

To be offered the chance to present at the meeting, the scholar must craft a conference abstract that peer reviewers and selection committee members deem worthy for inclusion in the program (Frazer 2012). For most conferences, only a small portion of submitted abstracts can be selected for inclusion due to limited space. As a result, even projects of excellent quality can be rejected. Of course, there

Practice points

- To write competitive research conference abstracts, authors should be familiar with the three elements of an abstract's rhetorical context: (1) purpose (i.e. to present key elements of the research study in a way that is persuasively and promotionally effective), (2) audience (i.e. peer reviewers, selection committee members, and conference attendees), and the (3) expected structure (i.e. introduction, methods, results, and discussion).
- Rhetorical appeals, when used judiciously, can increase the research abstract's persuasive power (i.e. ethos (appeals to credibility), pathos (appeals to emotions), and logos (appeals to logic)).
- Word choice and clear expression make a difference.
- Carefully checking the research conference abstract prior to submission can help the author find errors in the text before reviewers do. A checklist of considerations is provided in this Guide.

are many types of conferences and many levels of competitiveness. For example, local or regional conferences generally attract fewer attendees and are likely to be less competitive. National and international conferences, in contrast, attract many more attendees and abstract submissions. This translates to more abstracts being submitted, to more intense competition for available program spots, and to a higher standard of quality for abstract acceptance.

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Our goal for this AMEE Guide is to help medical educators write effective conference abstracts. To do so, we frame several parts of this Guide with principles of rhetoric. Rhetoric, simply stated, is the study and use of written, oral, and nonverbal communication to achieve specific purposes (Burton 2015). Rhetoricians examine how language is used (e.g. to convince, inform, influence, teach, etc.), and how that use persuades an audience to adopt specific ways of thinking and/or acting (Ryan 1992). Examining communication in this way “shift[s] attention from what is said (the content) to what is accomplished (the action)” (Lingard & Haber 1999). In this guide, we use rhetoric to examine the research conference abstract as a social action (Miller 1984) designed to achieve particular social goals. To that end, we (1) examine the rhetorical contexts of conference abstracts, (2) demystify common selection processes, (3) provide rhetoric-based, straightforward information and suggestions on how to write persuasively, and (4) share some practical advice and proofreading techniques.

Before we address these four topics, we have to share two caveats. First, just as there are multiple forms of scholarship, (Boyer 1990; Simpson et al. 2007; CAME 2012) there are multiple forms of conference abstracts (e.g. reports of research studies, descriptions of curricular innovation, etc.). Most of the concepts and advice we share in this Guide apply to abstracts for all types of scholarship since they share the goal of telling the story of the author’s work succinctly and persuasively. However, for the sake of brevity and clarity, we focus this Guide on writing abstracts for medical education and/or health-care professionals education research projects (henceforth referred to as “research abstracts”). Second, in this Guide, we focus on the abstract’s *form*—on what should be considered *in the writing of* an effective research abstract—and not on the quality of the scholarly work itself (i.e. the *content* of the abstract). This distinction is important for at least two reasons:

- Well-written abstracts generally cannot overcome deficiencies in the quality of the work, resulting in rejection. When peer reviewers and selection committee members encounter an abstract describing a research study they perceive as flawed (e.g. insufficient data collection), they are likely to reject the abstract even if well written.
- Even the most carefully crafted abstracts cannot overcome a lack of research rigor and/or innovation expected by conference planners and attendees.

Hence, we work from the premise that authors reading this Guide have done high-quality research and/or innovative work. Instead of focusing on content, we concentrate on maximizing the effectiveness of the abstract’s form.

The rhetorical context of research abstracts

A useful way to think about how to write effective research abstracts is to understand that every abstract is written within a rhetorical context. A rhetorical context is the set of circumstances or contextual elements that frame a writing situation (Hyland 1998; CSU Writing Studio 2015). It consists of many elements, but in this Guide, we focus on the following three: purpose, audience, and structure.

Purpose

A research abstract has many different purposes (i.e. reasons *why* the text is written). By definition, a research abstract is a brief overview of a research study. Thus, a primary purpose is to summarize succinctly and accurately the key elements of a larger research study so that readers will know what the investigation entailed.

Another equally important purpose is to describe the research in a manner that will help peer reviewers and selection committee members evaluate the study according to selection criteria (e.g. clarity, quality, relevance, etc.). In this respect, the abstract functions as a persuasive text to convince peer reviewers and the selection committee members that the research described is of interest to the conference participants—and in many cases, of greater interest than the research described in other abstract submissions.

Additionally, the research abstract functions as a promotional document for the author’s research findings, i.e. to sell a research product (Nkemleke 2010). The research abstract is often a stand-alone document that is disseminated to conference attendees via the meeting’s program; attendees read the abstract to decide whether the research warrants their attention. A compelling and accessible description of research may convince readers to engage more deeply with the work—be that engagement by attending the conference session where it is presented, by reaching out to the author for additional information, or by adopting the recommendations in their practice.

Audience

For these purposes to be achieved, authors must tell the story of their research. That story will construct a specific kind of relationship between the author and the reader, and a specific interpretation of the research presented. To craft that story, the author should carefully consider the reading audience(s) (i.e. *who* is reading the abstract). Thus far in the guide, we have identified at least three different audiences to consider in writing the research abstract: (1) peer reviewers, (2) conference selection committee members, and (3) conference attendees. These audiences engage with the research abstract at different times during the life of the abstract. In Section 3, we describe that process, including the specific concerns of these audiences at different stages.

Peer reviewers and members of the conference selection committee are, by and large, members of the medical education community. However, they are not usually experts in the particular domain addressed in the content of the research abstract. This means that the author cannot assume a wholly shared set of assumptions or premises. For example, the abstract may be summarizing qualitative research to a reader better versed in quantitative methods. Given this situation, the author has to strike a balance between demonstrating expertise and avoiding jargon that the reader may not understand. The research abstract needs to demonstrate rigor, but not overwhelm readers with too much detail. It must convey novelty to audience members whether they are well versed or naïve to the intricacies of the particular subdomain of the field.

Furthermore, peer reviewers and selection committee members are, universally, very busy. This means that each

reader has very little time to critically consider each research abstract. Based on our experiences, we estimate that readers (be they peer reviewers or a selection committee members) will spend approximately 2–3 minutes reading each research abstract. If their first-pass reading of the abstract leaves the readers confused, they will likely reject the submission. In effect, authors literally have minutes to make a strong impression.

Conference attendees represent an even more diverse group of people than peer reviewers or selection committee members. While conference attendees will be similar to peer reviewers and selection committee members in having similar levels of familiarity with the topic addressed in the abstract and having comparable time constraints, they often also have the challenge of deciding which sessions to attend out of a large pool of simultaneously presented topics. Conference attendees will search for, among other things, topics of personal interest and for sessions that will add to their understanding in different areas. They are dependent on the abstract to help them make informed choices.

Structure

Medical educators recognize a research abstract when they read one. This is largely thanks to a common understanding of the organizational structure that this genre follows: Introduction, Methods, Results, and Discussion (IMRaD). When a reader engages with this structure, they have certain expectations about the content they will find in each section, as we describe in Table 1.

In Table 2, we provide an example of a research abstract, divided by structural element (i.e. IMRaD), highlighting where and how the content expectations listed in Table 1 are fulfilled in the example text.

The IMRaD structure is typically the required format for research abstracts submissions to national and international medical education conferences. Indeed, the structure of the abstract is quite formulaic. It is up to the author to decide how strictly to follow the content expectations of the IMRaD structure (Table 1). For instance, the introduction of the abstract often mirrors the problem/gap/hook heuristic

used in scholarly papers (Lingard 2015). As Lingard explains, for readers to consider the content of a publication as an interesting work worthy of their attention, the introduction must “(1) Identify a *problem* in the world that people are talking about, (2) Establish a *gap* in the current knowledge or thinking about the problem, and (3) Articulate a *hook* that convinces readers that this gap is of consequence” [emphasis added] (Lingard 2015). The research abstract almost always has the problem and gap presented in its introduction. The hook can be part of the introduction, but it is also sometimes moved to the discussion to end the research abstract with emphasis on the importance of the research to the broader community. It is neither right nor wrong to move the hook to the discussion section. The hook is a persuasive technique that the author can choose to use (or not use) in any section of the research abstract that they feel achieves their purposes.

Another example relates to mixing content traditionally placed in the discussion with content in the results section of the research abstract. Some abstracts, particularly those reporting qualitative research, may include some discussion points in the results section if this allows the author to succinctly demonstrate connections between ideas. However, if an author chooses to break with IMRaD expectations, we suggest that he/she should do so with explicit purpose. If peer reviewers or selection committee members do not understand why IMRaD expectations were not followed, they are likely to dismiss the abstract as being poorly written and not worthy of inclusion in the conference. Further, some research abstract submission requirements must be followed. For instance, most conferences set word limits on research abstract submissions and those limits must be adhered to.

Summary

Understanding the purposes, audiences, and structures of the research abstract can make it easier to craft a clear, well-organized submission. Armed with this understanding, authors can improve the persuasive power of their writing.

Research abstract selection processes in medical education

To write an effective research abstract, it helps to understand how selection decisions are made. In many ways, these processes are straightforward. But, in our experience, many authors are unfamiliar with the specific ins and outs of abstract reviewing, ranking, and final selection. In this section of the Guide, we clarify these processes by describing what typically happens between when an author submits his/her research abstract through the conference website, and the accept/reject email that is sent out several months later. The two major steps of the selection process are (1) peer review and (2) secondary review by the conference selection committee.

Step 1: Peer review

In the peer-review stage, the conference organizers distribute each submitted abstract to two or three peer reviewers who are tasked with reading abstracts, rating them, and returning ratings to the conference selection committee.

Table 1. Elements of a research abstract’s structure and the content expectations of each structural element.

Structural element	Content Expectations
Title	<ul style="list-style-type: none"> • Include key terms of the research topic • A brief summary of content that arouses interest
Introduction	<ul style="list-style-type: none"> • Description of what is already known about the topic in question (i.e. a very brief overview of important literature on the topic) • Identification of a gap in the literature that requires filling (e.g. that there is a need for not-yet-conducted research / innovation to address the gap). • Statement of a research question that will address the gap.
Methods	<ul style="list-style-type: none"> • Description of how the study was conducted. • Explanation of how the methods used in the study provided data that answers the research question.
Results	<ul style="list-style-type: none"> • Report of data collection and data analysis methods. • Description of the essential data that answer the research question.
Conclusion	<ul style="list-style-type: none"> • Statement of the answer to the research question. • Discussion of findings in relation to the research question and to the debates going on in the field. • Report of a succinct take-home message (increasingly, these messages are related to translating findings into practice).

Table 2. An example of a research abstract (in grey/central column) divided by structural element and highlighting where and how content expectations are fulfilled.

Structural elements of the research abstract	Example content	Where and how content expectations are fulfilled
Title	A Hollow Promise: Assessing the Relationship Between Applicants' Self-Reported Humanitarian Dispositions and Their Performance in Medical School and Internship	Arouse reader interest Key terms included
Introduction	Medical school admissions committees often favour applicants who demonstrate empathy and dedication to community welfare. ^a However, researchers have yet to investigate if such humanitarian predispositions, often identified in medical school applications via self-report, predict future success. In this study, we ask: Is self-reported humanitarian disposition an indicator of future performance in medical school and internship?	Description of what is already known about the topic in question Identification of a gap in the literature that requires filling. Statement of a research question that will fill the gap
Methods	We collected data from seven year groups (2007–2014; $N = 1112$) and operationalised trainee performance as cumulative medical school GPA, USMLE Step 1 & 2 scores, and scores on a previously validated programme director's evaluation of intern <i>professionalism</i> . Next, we created four groups, taking students in the extreme thirds of undergraduate GPA and cross-tabulating this variable with self-reported humanitarian disposition (yes/no). We then compared the four groups on the four performance outcomes using a one-way MANOVA.	Report of data collection methods. Description of how the study was conducted. Explanation of how the methods used in the study provided data that will answer the research question.
Results	Results yielded performance differences between the four groups, $F(15,1181) = 2.06, p < .01$. In all comparisons, however, applicants who reported humanitarian dispositions performed no better than those who reported no such leanings. Further, students in the <i>low undergraduate GPA/humanitarian disposition</i> group had significantly lower cumulative GPAs upon graduation than any of the other groups, including those in the <i>low undergraduate GPA/no humanitarian disposition</i> group, $F(3632) = 7.93, p < .001$, Cohen's $d = -0.36$. On USMLE Step 1 scores, students in the <i>high undergraduate GPA</i> groups scored significantly higher than those in the <i>low undergraduate GPA</i> groups, regardless of self-reported humanitarian disposition. There were no group differences on USMLE Step 2 scores or internship professionalism.	Report of data analysis methods. Description of the essential data that answer the research question
Conclusion	These results indicate that self-reported humanitarian disposition is not necessarily an indicator of a better medical school candidate. In fact, on some outcomes, these applicants may actually perform worse than those who report no humanitarian dispositions. The assurance that humanitarian disposition will bode well for future student success appears to be a hollow promise. ^a Avery et al. (2012). Admission factors predicting family medicine specialty choice: A literature review and exploratory study among students in the rural medical scholars program. <i>The Journal of Rural Health</i> . 28: 128-136.	Statement of the answer to the research question. Report of a succinct take-home message.

The intent of the peer-review process is to assess each abstract according to predetermined criteria. This process generates uniform evaluations across all abstract submissions to inform the accept-or-reject decisions that must ultimately be made by the conference selection committee.

Each professional organization hosting a conference recruits a group of scholars working in the field to review abstracts submitted for presentation at its meeting. There are no universal qualifications for serving as a peer reviewer, but most organizations invite members of the academic community who attend their meetings with some regularity and/or submit their work for presentation. Some organizations also invite nominations for peer-reviewers.

Traditional criteria for peer review of research abstracts include measures of clarity, quality, and relevance:

Clarity refers to the grammatical, syntactical, and logical aspects of the abstract. Peer reviewers for academic meetings tend to be assigned 5–15 abstracts to be reviewed in a relatively quick turnaround period. This means that peer reviewers have little time to spend reading and interpreting each abstract. Therefore, authors need to write clearly so that a peer reviewer can understand the main points of the research through a quick read.

Quality refers to the choices of methodology and methods used in the research, as well as to the description and interpretation of results. Peer reviewers must consider the rigor with which the research was carried out and the appropriateness and significance of the conclusions drawn. The author must concisely describe and justify the basic study design and data interpretations so that the peer reviewer is satisfied that the research is of sufficiently high quality to be considered for inclusion in the conference.

Relevance refers to how pertinent and important the research is expected to be for conference attendees. Relevance is perhaps the most subjective of the three criteria described here, but it is also likely the most important. To be considered pertinent and important, the author should indicate how the research is relevant to the conference audience and how it advances the field's collective knowledge with a finding that is new and that fills a gap in understanding. The author must describe how the research conducted is relevant to the interests of a broad audience (e.g. how the findings are applicable to many medical schools, or admissions offices, or residency programs; how the research builds on appropriate theories; how findings are applicable beyond the local context; etc.). Authors are also advised, when applicable, to indicate in the research abstract how the research can inform practice (e.g. how the findings can translate into practical advice that audience members can put into action).

Abstract review criteria are most often evaluated using both quantitative and qualitative approaches; peer-reviewers are asked to apply Likert-scaled quantitative rankings in relation to each criterion, and to write a brief qualitative narrative summarizing the research, including evaluations of its strengths and limitations. For example, peer reviewers are often asked to judge the clarity, quality, and relevance of the abstract by choosing one of the following descriptors presented across a Likert scale for each criterion: "fair," "good," "very good," "excellent," or "outstanding." Once the peer reviewer submits his/her selections, the conference's computer software platform will convert selections for each criterion into a numerical score of 1–5. The software then aggregates scores across criteria

and across peer reviewers to generate an average overall score that is easily compared across submissions. Also, the peer reviewer is usually asked to write a short description in response to a prompt such as the following: "Please provide general comments or thoughts about the abstract, including an assessment of the overall clarity, the rigor of the study's design, and the relevance to the community."

Traditionally, selection committees have relied heavily on the quantitative rankings because they facilitate sorting a large number of abstracts by overall peer-review score. However, this dependence is coming under increasing scrutiny. Although the assigned peer-review scores have been valued for supporting objectivity, the anchors (e.g. "fair," "good," etc.) themselves are highly subjective and do not transparently convey an individual's peer-reviewer's intent. There is also little data to establish the validity and inter-rater reliability of these scaled scores.

Because of these limitations, some organizations are exploring ways to give more weight to qualitative evaluations. Narrative-based rankings can provide a more textured and nuanced evaluation. Thus, research abstract assessment forms given to peer-reviewers are increasingly moving toward using open-ended questions for each criterion. For example, peer reviewers may be asked to qualitatively respond to a prompt like: "Please describe if (and how) the authors make a convincing argument for the importance of their research to the conference audience."

Step 2: Conference selection committee

Once the peer-review process is complete, the conference organizers distribute the abstracts and the peer-reviewers' scores and comments to a selection committee tasked with deciding which research abstracts to accept for presentation. The selection committee often decides the format in which each accepted abstract will be presented, (e.g. poster presentation or podium presentation) and how to organize the accepted abstracts for presentation in relation to other accepted submissions.

Selection committees are generally populated with experienced scholars in the field who volunteer their time to advance the mission of the hosting organization. The committees often meet in-person, but sometimes virtually, at the conclusion of the peer-review process. Most selection committees start their deliberations by reviewing the theme and goals of the conference, the review criteria for the various modes of presentations to be offered at the meeting, and the capacity of the venue to present the work.

The theme and goals of the conference inform selection committees' work of integrating evaluation data from peer reviews with the vision of the hosting organization. Selection committees may find some highly rated submissions to be outside the scope of the meeting, or may find that submissions that did not receive positive reviews uniquely address some specific goals (e.g. promoting student scholarship or focusing on an emerging topic in which the organization is investing additional resources).

The review criteria serve as reminders to the selection committee of the qualities they seek in highly rated work and the aims of the various modes of presentation. For example, large group sessions should stand out as highly topically relevant and able to capture the attention of an

audience with many different interests. Small group sessions, in contrast, can be more specific and cater to a segment of the conference audience that has significant pre-existing expertise in the field.

Finally, the capacity of the conference's physical venue and its duration clearly defines the number of submissions the selection committee can accept in different formats. Many conferences have a smaller number of oral presentation times available because of physical venue capacity. In contrast, most conference venues often have a much larger capacity for poster presentations. Authors should consider the variable levels of competition for different presentation formats when deciding to which format they will submit their research abstract.

Based on these three main factors, the selection committee engages in an initial examination of the peer reviews. In this initial review, the committee determines what work clearly merits inclusion (i.e. what is "in"), what work is not appropriate for the meeting because of poor clarity, low quality and/or lack of relevance (i.e. what is "out"), and what work could be included if there is sufficient space (i.e. what "might be in"). Some selection committees audit a proportion of rejected abstracts, particularly if there was significant variability in ratings among the peer-reviewers or if the topic of the submission is a priority and/or is under-represented in the group of accepted submissions. Committee members review these abstracts and those that "might be in" a second time, usually with emphasis on the narrative comments from peer reviewers. Based on this second round of reviews, the committee agrees on a final set of acceptances and rejections.

In their submission forms, authors may be allowed to designate their preferred format for presentations (i.e. podium/short communications or poster presentation). They may also express their flexibility; for example, they may select an "oral or poster" option. The authors' format selection is considered and weighed against the peer-review rankings. Selection committees may sort higher-rated abstracts into the oral format, based on capacity, and lower-rated abstracts into the poster format. This is largely because poster sessions lend themselves to more individualized matching between interested attendees and authors.

Finally, the selection committee makes plans for decisions to be sent to all the submission authors. Authors of work selected for presentation will be notified of the date and time of their presentation, as well as the format and any logistical information they need to prepare for the conference. Selection committees vary on the amount of feedback they give to authors, but a best practice is to share the overall acceptance rates for the meeting and constructive comments generated by the peer review.

We must end this discussion by acknowledging that selection committee processes and procedures can be quite variable between conferences. In some of the largest conferences, for example, where hundreds, if not thousands, of research abstracts are submitted, the review process may be significantly abbreviated. In these large conferences, selection committees often rely heavily on quantitative peer-review rankings and may not be able to audit rejected submissions for variable ratings. In contrast, smaller meetings may weight qualitative comments more heavily, may search out submissions that address topics that are particularly relevant to regional interests, and may factor

inclusiveness into their deliberations (e.g. that submissions from many medical schools are accepted, so that no one school is over-represented in the conference program).

Using rhetorical appeals to write a more persuasive research abstract

Writing a research abstract that appropriately considers the conference's purposes, audiences, and organizational structures is important. Knowing how the selection processes function can help authors refine the submission to maximize its chances of successfully navigating through the system. But these considerations are often not enough to ensure that a research abstract will be accepted at a national or international medical education conference. Often it requires something less concrete but equally vital: persuasive power.

Persuasive power is perhaps the most challenging aspect of writing, at least for novice authors. Being able to write about research in a way that is persuasive without sounding artificial or arrogant requires strong writing skills. Rhetoricians have found that highly rated research abstracts position the author as a member of the targeted disciplinary community (Swales & Feak, 2009), and as a credible researcher (Berkenkotter & Huckin, 1995; Faber, 1996) with clear, high quality and relevant findings to report. But how do authors write abstracts that convince the reader that they occupy such a position? What techniques do authors use in the IMRaD structure to persuade readers of the value of their research?

Aristotle, the founding father of rhetoric, made a useful set of distinctions about the kinds of appeals authors can use in their writing. By considering the differences in ethos (i.e. appeals to credibility), pathos (i.e. appeals to emotions) and logos (i.e. appeals to logic), different techniques can be identified for increasing the persuasive power of a research abstract. Each of these three appeals has a different purpose and can be used in different structural parts of a research abstract.

Ethos/credibility

Ethos is an appeal that focuses on establishing the credibility of the author. In the context of a research abstract, ethos is the way the author conveys his/her credibility and authority on the topic being discussed. The author can build credibility by developing a positive reputation with the audience and using it to convince the audience that the research presented in the abstract should be taken seriously.

While ethos is present in the research abstract in a variety of ways, there are three effective techniques that are particularly noteworthy. In the introduction, the author can establish his/her credibility by presenting a summary of the literature that demonstrates a nuanced understanding of the known body of work related to the topic in question. The author demonstrates knowledge of the field by citing well-known and influential publications. This is a technique that can create affiliation with the individual reader and the broader medical education community. However, the author must also be aware that if they fail to cite seminal pieces of literature or fail to cite the most current publications of

note, this technique for building credibility can work against him/her. Given that the literature review is often only a single sentence in length in the research abstract, authors should carefully consider which publications to cite. This is a technique that requires the author to be keenly aware of the body of literature that should be cited in the abstract.

In the methods and results sections, the author can build credibility by demonstrating the rigor used to conduct the research study. Describing how rigor was ensured (i.e. the measures of validity, the trustworthiness assurances, etc.) shows the reader that the author is thoughtful about methodology. This builds the author's credibility in the eyes of the reader. In Table 2, one way that the authors build ethos is by using a previously validated tool for data collection. By informing the readers that the tool was validated, the author demonstrates awareness of the importance of a strong data collection tool to the rigor of the study. In so doing, the author suggests to the readers that he/she is a skilled quantitative researcher, thereby building credibility in the eyes of audience members.

Another way to build credibility is to incorporate theory into the research project, which can then be included in the research abstract. Scholars in medical education are increasingly calling for theory-informed research that can increase the ways of interpreting data and practically applying findings to practice (Kuper & Whitehead 2013; Rees & Monrouxe 2010; Gibbs et al. 2011). Authors can include references to the theories used in their research abstracts, thereby building credibility as researchers who follow best practice recommendations.

Pathos/emotions

Pathos is concerned with how an author appeals to the emotions of the audience. Pathos addresses the ways in which the author appropriately sways the audience by arousing specific affective responses to the content of the research abstract. While emotional appeals may seem out of place in scientific writing, pathos is an important part of the research abstract's persuasive power.

Pathos is particularly important in the title, introduction and conclusion of a research abstract. Authors spark the interest of readers by choosing titles that are controversial, pithy, or otherwise emotive. Bringing audience members on side quickly is an effective persuasive technique. A good title indicates the key topics addressed in the research and arouses an emotional response from the reader. In Table 2, the author appeals to the readers' emotions by referring to "a hollow promise" (i.e. a guarantee that is offered without sufficient evidence to make it possible for that guarantee to be fulfilled). The reader understands that the content of the paper will highlight how something (in this case, humanitarian disposition) fails to achieve the promised results or meet expectations. This is an appeal to the readers' curiosity—to know what promise is not being fulfilled.

In the introduction, the author can appeal to the audience's emotions by framing the research in ways that highlight how it is interesting and relevant to the community (e.g. by showing connection to "hot topics" in the field). The author can solicit feelings of urgency and value from the readers by choosing topics that are significant and

timely to the audience, and by aligning the research abstract with those topics.

Finally, authors can use the last line of the conclusion to revisit the emotional appeal set out in the research abstract's title; this is an artful way of showing the reader that the argument has come full circle. When done judiciously, such bookending of the research abstract with pathos in the title and the conclusion is a powerful way of conveying a sense of a coherent whole to the reader. This technique is illustrated in Table 2 when the "hollow promise" introduced in the title is revisited in the last line of the research abstract.

Logos/logic

Logos is an appeal to logic or the use of valid reasoning. Logos is the way in which the research abstract constructs a clear, coherent, and logically connected argument. This appeal refers to the quality of the author's reasoning (be that reasoning inductive or deductive), and the soundness of the logic that develops the position/argument presented in the research abstract.

Successful authors create a logical argument that connects all the different parts of the abstract (i.e. IMRaD) together. The introduction establishes that a research gap exists. The methods describe how the data collection and analysis approaches used generate data that can fill the research gap. In the results, findings provide insights that address the gap. The conclusion clearly describes the new, results-based knowledge developed that fills the gap. This set of logical connections is illustrated in Table 2. In this example, a logical thread can be followed from the research gap described in the introduction, to the methods used, to the results generated, and to the conclusion that fills the research gap. Across the four structures of the abstract, a logical argument progresses, connecting each IMRaD element to the research gap.

Summary

These rhetorical appeals provide useful ways of thinking about writing more persuasive research abstracts. These techniques are not sufficient for ensuring acceptance of the submission, but they can boost the abstract's persuasive power.

We should note that these appeals do not exist in isolation; instead, they are closely interrelated. For instance, if it is not clear how one idea logically connects to the next, the author will fail to develop a logical argument (thus creating poor logos) and will also diminish his/her credibility in the eyes of the reader (thus building poor ethos). Even if the author crafts an interesting title and is able to revisit it in the conclusion (thus generating effective pathos), the power

of that appeal will be lost if rigor is not conveyed in the methods (thus losing ethos).

It is vital to reiterate here that these considerations cannot overcome an abstract reporting a research study of low clarity, quality, and/or relevance. First and foremost, an author must be engaging in rigorous and innovative research, that is relevant to the community, and that is clearly described. Rhetorical techniques will rarely hide fatal flaws in the research itself.

Practical writing tips

This last section of the Guide attends to the importance of word choice and the value of carefully checking the final submission. In terms of word choice, two important elements of expression should be highlighted: transitional words/phrases, and shrewd use of language.

Transitions

As discussed in relation to logos, an important element of creating a logical argument is establishing relationships between ideas across the research abstract. One effective means of so doing is to use transitional words or phrases to show how different sentences connect to each other. Novice authors often assume that the connections between ideas are self-evident. However, connections between ideas are rarely sufficiently clear to help the busy peer reviewers, selection committee members, and conference attendees understand implicit connections. Table 3 lists some transitional words and phrases that explicitly show how different sentences connect ideas together. The use of transitions is illustrated in the sample research abstract presented in Table 2.

Shrewd word choice

The challenge, of course, is to successfully incorporate all the recommendations presented in this Guide within the given word limit. In Shakespeare's *Hamlet*, Polonius states (in Act 2, Scene 2) that "brevity is the soul of wit." In writing a research abstract, the author's wit is certainly put to the test.

The word limits imposed on research abstracts (usually 250–500 words, depending on the conference) demands that the author be brief. This translates into a specific writing style: one that is judicious (only include necessary information), concise (make language choices that are succinct), and straightforward (use simple sentence structures) (Anderson et al 2015).

Authors are well advised to remember that their readers—peer reviewers, members of selection committees, and conference attendees—may spend more time

Table 3. Transition words and phrases explained and examples provided

TRANSITION TO BE CREATED	EXAMPLES OF TRANSITION WORDS AND PHRASES TO USE
To show that the sentence builds on or adds onto the content of the previous sentence	Also; Furthermore; Moreover; In addition
To show that the sentence is part of a sequence of events, or arguments	Next; Then; First; Second; Third.
To show that the sentence is an illustration or example of the content of the previous sentence	For instance; Consider this example; Specifically
To show that the sentence stands in a cause-and-effect relationship with the content of the previous sentence	Accordingly; Thus; Since; Consequently
To show that the sentence stands in contrast to the content of the previous sentence	Although; However, Conversely
To show that the sentence is a concluding statement	Therefore; In sum; In short

reviewing and evaluating the methods section of the abstract than any other section. Given that the reader is a member of the medical education community but likely not an expert in the specific topic addressed, the readers may only have a superficial familiarity with the literature related to the research described. Since readers did not perform the research themselves, and since the abstract is a very short text, they will rely on the author's ethos to evaluate the credibility of the findings. Readers are most likely to have expertise in relation to the methods used to conduct the research, and attend closely to this section. Thus, the methods section may be longer and more fully developed than other sections of the abstract.

The power of presubmission checks

By understanding the context, the selection processes, and the kinds of appeals that can improve the persuasiveness of

Table 4. Research abstract checklist

Introduction	<ul style="list-style-type: none"> • What is the problem that the research addresses? • What is the research gap? • What is the research question? • What is the relevance to the field? • Are terms are used to have broad appeal to the audience?
Methods	<ul style="list-style-type: none"> • Is there sufficient detail about methods to suggest rigor and the author's expertise? • Do the methods include information about analysis processes? • Do the methods clearly demonstrate that the data collected and analysed provide sufficient information to answer the research question?
Results	<ul style="list-style-type: none"> • Is there sufficient data presented to demonstrate how the research gap is addressed?
Discussion	<ul style="list-style-type: none"> • Does the conclusion specifically state how the research gap has been filled? • Are the conclusions described as interesting/significant to the field?

the research abstract, the author should be well on his/her way to writing a competitive submission. But before the abstract is submitted, there are some simple checking and verification strategies that can be used to ensure the abstract is as effective as possible. Table 4 is a checklist that authors can use to check their own submissions. For each of the questions therein, the author should be able to identify the answer in the text of the conference research abstract.

Once the author has verified that the abstract answers each of these questions, he/she is well advised to ask a colleague who is not part of the research team to read through the abstract before it is submitted to the conference for consideration. Building a local peer-review circle is a great way to support success in the competition for presentation time (Varpio 2010). An external peer who was not involved in the study can bring a fresh perspective to the research abstract. They can often identify places where assumptions are made, jargon is used, or insufficient detail is provided. In Table 5, we share a second example of a research abstract, highlighting how the different pieces of advice from this Guide have been incorporated. A peer reviewer might use a similar layout strategy to identify where and how an abstract meets (or fails to meet) expectations.

Conclusion

This Guide describes ideas and practical advice to help authors write competitive research abstracts about the work they are doing, so that the abstract can achieve the purposes it was written to achieve (i.e. to have the abstract selected for inclusion in a medical education conference program, and to have attendees choose to engage with the research presented therein). When authors' research is truly of high quality and merits presentation, the peer reviewers,

Table 5. An example of a research conference abstract (in grey / central column) with elements of the Guides advice incorporated

Structural Element	Example	Element of Guide Advice Incorporated ^a
Title	The high cost of efficiency: How Computerized Provider Order Entry (CPOE) Diminishes Collaboration and Learning	Pathos (cost of efficiency); key terms (CPOE and learning)
Introduction	As medical centers adopt computerized provider order entry (CPOE) systems to support ordering patient treatments, educators have yet to study their impact on trainee development. We fill this gap by examining how the introduction and adoption of CPOEs impacts clinicians' communication practices (including educational communications). Incorporating genre theory, we examined how the move from an oral- and paper-based communication (i.e. pre-CPOE), to a computerized communication (i.e. CPOE) changed the type, quantity, and quality of information shared.	Problem; hot topic (computerization of communications) Research gap Filling the gap Use of theory (ethos)
Methods	This longitudinal, pre/post study used the constructivist grounded theory methodology. The study ran from 2011–2015 at an urban, tertiary-care, pediatric teaching hospital. Data collection focused on order entry-related communications, involving field observations (115 hours with 210 participants), think-aloud sessions (9), interviews (43), and document retrieval (73). Data analysis using open, axial, and thematic coding was conducted until the depth and breadth of order entry-related communications were categorized into themes and justified by practical- and/or theory-related interpretations.	Relevance to field How study was conducted; High quality methods reported; Builds ethos How methods can fill the gap Data collection methods Data analysis methods
Results	In their oral- and paper-based order entry activities (i.e. pre-CPOE), care teams shared treatment orders along with contextual considerations (e.g., social and physiological factors) that could impact the effectiveness of the treatment. Furthermore, the pre-CPOE order was regularly used as an educational moment for medical trainees to learn about the complexities of specific treatments. Therefore, the order acted as an opportunity for collaboration and trainee learning. When the CPOE was adopted, this collaboration and educational opportunity was lost. The CPOE restricted information sharing to be only about treatment orders. Trainees reported building workarounds to collect additional contextual information and education points.	Data reported that address the research gap
Discussion	CPOEs support clear communication of treatment order information across the care team. However, relying solely on CPOEs means that an opportunity for collaboration and for medical trainee learning has been lost. By emphasizing treatment data as the sole purpose for the order, CPOEs neglect the collaborative and educational purposes fulfilled by the original genre. Medical educators need to recover those lessons to ensure that efficiency of information sharing does not come at the cost of effective collaboration, nor trainees' ability to master complex orders.	Hook Research fills gap Succinct take-home message; High relevance related. Pathos (high cost of efficiency)

^aunderlining indicates logical argument thread (logos); italics indicates use of transitional phrases.

selection committee members, and conference attendees want the authors to succeed. It is frustrating for peer reviewers and selection committee members to have to reject submissions that seem worthy of inclusion but are spoiled by poor writing.

To summarize, an author should make sure he/she clearly understands the rhetorical context for the abstract before writing the abstract. Rhetorical context includes the purpose (i.e. to present key elements of the research study in a way that is effective both persuasively and promotionally), the audience (i.e. peer reviewers, selection committee members, and conference attendees), and the expected structure (i.e. introduction, methods, results, and discussion). The author should consider the three rhetorical appeals discussed in the Guide to maximize the persuasive power of the text: ethos (i.e. appeals to credibility), pathos (i.e. appeals to emotions), and logos (i.e. appeals to logic) when writing the abstract. And finally, the author is well advised to make the most of their word choices and to carefully check the final abstract prior to submission. By attending to the aspects of the research abstract's form addressed in this Guide, the author will hopefully find that this piece of their writing repertoire is more effective, thus securing them presentation time at prestigious medical education conferences.

Disclaimer

The views expressed herein are those of the authors and do not necessarily reflect those of the United States Department of Defence or other federal agencies.

Acknowledgements

We would like to thank attendees of the 2014 AAMC workshop on Writing Competitive Conference Abstracts for their thoughtful reflections and comments. The success of that session prompted the development of this Guide. We extend our sincere thanks to Dr. Dorene Balmer for her insightful and careful review of this Guide while it was in preparation. We also thank Dr. Anthony Artino for his generous and thoughtful contributions to this Guide.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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