EDITOR'S CHOICE

Consensus abstracts for evidence-based medicine

Paul Fontelo

10.1136/ebm20003

Correspondence to:
Paul Fontelo
Office of High Performance Computing and Communications, Lister Hill National Center for Biomedical Communications, National Library of Medicine, 8600 Rockville Pike, Bethesda, MD 20894, USA;
fontelo@nlm.nih.gov

The worldwide dissemination of mobile phones, now reaching more than 5 billion connections,[1] enables healthcare providers to reach medical information resources on the internet. This is particularly significant because most doctors now believe that the internet is essential to the practice of medicine.[2] An abundance of clinical practice resources previously unavailable to clinicians in remote locations – journal citations and abstracts from the MEDLINE/PubMed at the National Library of Medicine among them – are now accessible at the point where care is given.

An unintended consequence of MEDLINE abstracts, originally developed only for indexing journals, is that they have become the *de facto* source of evidence for many.[3–5] The reasons are obvious – they are easy to read and readily accessible, and they give the reader a quick summary of the article. The IMRAD (Introduction, Methods, Results and Discussion) format which provided the logical structure to the abstract mirrored the full-text article and made them more informative.[6 7] Recent innovations, like *BMJ*'s pico[8] format, offer even more detailed information although they are not critically appraised, unless they are derived from systematic research.

For clinicians and academicians who want to practice evidence-based medicine (EBM) in an environment with unfettered access to full-text articles, the classical approach of deriving evidence through critical appraisal of the full-text article is still the ideal. However, it is not for everyone. It is difficult to practice and is disruptive and challenging to integrate into the daily workflow especially in a non-academic environment. It also requires expertise acquired through years of practice. Even the teachers of EBM at McMaster University acknowledge after years of experience with residents in their training programmes that high-level complex appraisal is not suited for everyone.[9]

However, clinicians who have some appraisal skills will benefit most from preappraised resources.

Clinicians who want to practice EBM but are neither confident of their appraisal skills nor having the time to do their own search and appraisal can obtain on the internet many summaries, reviews and preappraised resources either for free (TRIP Database, ACP Journal Club, Cochrane Library, etc) or through paid subscription (UpToDate, 5-Minute Clinical Consult, etc). Pointers to these resources can be found on many EBM web portals. Many of these websites are very useful references for clinicians although some of their user interface may be more suitable for desktop computers and not for the small screen on mobile devices. Some features, although free, require registration to access content. For clinical practitioners in remote locations with limited access to preappraised resources, unreliable or slow or metered connections to the internet or insufficient computer resources, MEDLINE citations accessed through smartphones and other internet capable portable devices may be useful.

The National Library of Medicine has developed 'consensus abstracts' (http://pubmedhh.nlm.nih.gov/consensus.php; short URL – http://go.usa.gov/xF0), a web application especially formatted for wireless mobile devices (cell phones, smartphones, tablet computers), whereby a clinician can search for current medical literature from MEDLINE/PubMed. A search is initiated by using either one of two interfaces: in 'PICO' (Patient, Intervention, Comparison, Outcome), the clinician determines the patient's problem or condition and indicates the intervention or management option and desired outcomes, if any. For example, in a child with severe generalised acute abdominal pain where the physician is considering giving an analgesic but concerned that it might mask the diagnosis of appendicitis, the query might be structured as: P 'child with generalised abdominal pain', I 'analgesics', O 'diagnosis of acute appendicitis'. A dropdown list prompts the clinician to select a publication type, such as, clinical trial, meta-analysis, randomised clinical trial, systematic reviews, practice guidelines, or not specify any at all for a broader but less evidence-based search. With '*ask*MEDLINE', a healthcare provider can search using free-text, natural language terms. For example, one could simply type, "In a child with acute abdominal pain, will analgesics mask the diagnosis of acute appendicitis?" The search algorithm parses the query then sends it to PubMed's database. Consensus abstracts then retrieves relevant articles from PubMed, which are displayed as a list of journal citations (author, title, publication date, PubMed ID). A checkbox next to each item allows the clinician to choose citations of interest, or, if the first series of articles are deemed relevant, they can be selected for display through a 'Submit' button. The exact number of articles can be entered in an input box.

After the selection is made, TBL ('the bottom line')[10] summaries of each abstract (one or more) are shown simultaneously in one web page for review. The search terms and publication types are displayed within the results page. The TBL and full abstract can also be displayed in the results page by clicking on the links, so the clinician will not need to leave the results page. Full-text articles (if available) and a list of related articles can be retrieved through convenient links from each citation. The TBL is derived through a computer algorithm, not summarisations by individuals. TBLs were originally created to shorten abstracts sent as SMS text messages.[11] In structured abstracts, the Conclusion is used as the TBL. If no Conclusion is found in the abstract, it is derived through a word counting algorithm, plus the abstract's two last sentences. Search results may be sent by text messaging or by email for reference and for sharing with colleagues.

Consensus abstracts, through the PICO search format, natural language searching features of *ask*MEDLINE, publication choices and easy-to-read text view of results may provide the clinician a convenient alternative to searching MEDLINE at the point of care. Concurring

abstracts from independently conducted randomised clinical studies and systematic research from meta-analysis and systematic reviews may enable the clinician to practice EBM while mobile.

Clinicians will still need some skill in making judicious use of consensus abstracts and in incorporating them in their management decisions. Often, these abstracts will not exactly mirror the patients they see, so medical acumen is still required to assess their applicability to their patients together with the patient's history and laboratory values. Abstract lengths are often limited by journals so these requirements will preclude full discussion of methods and results. They are also subject to authors' biases on what they might deem important. Drug dosage and interactions may not be available. This could be a challenge as the vast majority of queries will be about therapy. If dosage is not available, standard formularies could provide useful guides, and pharmacologic references will need to be consulted to learn more about adverse reactions and side effects. Many of them are available on the internet as well. Accuracy may be achieved further if all who are involved in the publication process – authors, reviewers and editors, do their utmost to ensure that the abstract is true to the full article.

Clinicians should also be aware that abstracts may not accurately represent the full-text article or may not even be a complete summary of the article. A review by Pitkin on the inaccuracy of data in six major journals showed that the discrepancies were "surprisingly large, ranging from 18–68%" although the errors discovered "were quite minor and not likely to cause serious misinterpretation." However, sometimes, they were found to be more serious.[12] Journals have taken steps to improve the quality and accuracy of published abstracts. *JAMA*'s efforts to improve abstract quality using quality criteria to review and edit abstracts accepted for publication seemed to be effective.[13] Wong *et al*[14] compared 54 abstracts published in *BMJ*, *CMAJ* and *JAMA* in 1991–1992 (same abstracts reviewed by Tadio *et al*[15] earlier) and in 2001–2002. They concluded that the abstracts from the three journals had 'superior quality scores'. Among several criteria evaluated, the most relevant to this discussion are the Intervention (criteria: information on intervention given, common names, description, duration) and the mean quality score of Conclusions (criteria: direct relation to purpose, consistency with results). They were found to be nearly 100% although the scores on the studies' limitations not being mentioned were poor. These inaccuracies, although mostly 'minor', emphasise the need to find multiple concurring abstracts from systematic studies or randomised controlled trials to support a clinical management plan. Clinicians should not base clinical decisions on just one abstract alone.

Consensus abstracts are probably best applied in confirming a clinician's management decision or as a guide to modifying one. In Sackett's study on the evidence cart, more than 50% of patient management decisions were confirmed or corrected by having access to information on the evidence cart.[16] The smartphone with its capabilities to connect to the internet in real-time and various stand-alone medical applications could now be the virtual evidence cart. The clinician with a preconceived management plan would therefore benefit most from consensus abstracts. At the very least, consensus abstracts can be a good starting point to pursue further research as links to full-text articles and related articles in MEDLINE are provided. It is probably best to avoid controversial topics, unless clinical necessity requires an immediate decision to be made.

The clinician could initiate a search for high-quality systematic studies (meta-analysis, systematic reviews) on the 'hierarchy of evidence' pyramid. If none is found, the search could progress down the evidence chain to randomised controlled trials or even lower in the evidence hierarchy. However, the search could also begin from less systematic research then up the evidence chain for confirmation or validation of randomised controlled trials, clinical trials and especially for less stringent research studies or reports. Consensus abstracts are designed, so the clinician could select abstracts of systematic reviews, meta-analysis, randomised controlled trials, practice guidelines and other publication types. The abstracts chosen to support or to modify a clinical decision, especially randomised controlled trials, should include sufficient detail (purpose, setting, population, methods, intervention, results and conclusion) to be useful.

Clinical evidence has to be accessible to be most useful – if it is not, clinicians will not use them even if the need is high.[16] The more effort is required, the less likely it will be used. Smith[17] found that most doctors prefer their information to be electronic, portable, fast and easy to use. They want it to access an authoritative medical knowledge database and an electronic medical record. In consensus abstracts, convenient, current evidence from MEDLINE/PubMed that could be useful for making clinical decisions is available at the point of care to any clinician anywhere in the world, even in the most remote areas with meagre computer resources through a mobile phone. It is probably in these areas where the need for evidence is greatest. Together with the patient's history, laboratory tests and other synthesised evidence sources available on the internet, consensus abstracts could enable the remote care giver to practice evidence-based patient care. As one physician practicing in a remote clinic puts it, "the Internet allows me to go outside of my academic jail."

Research to see how often consensus abstracts of randomised controlled trials reach the same conclusion as systematic reviews or meta-analysis and to see how physicians would interpret consensus abstracts would be a major contribution to this area of EBM. A randomised controlled trial to evaluate its use with simulated cases might be an appropriate next step.

The views and opinions of the author expressed herein do not necessarily state or reflect those of the National Library of Medicine, National Institutes of Health or the US Department of Health and Human Services.

Acknowledgements This research was supported by the Intramural Research Program of the National Institutes of Health (NIH), National Library of Medicine (NLM) and Lister Hill National Center for Biomedical Communications (LHNCBC). Drs Alex Gavino, Alvin B Marcelo and Michael Muin provided helpful comments.

Competing interests None.

References

1. **GSM World**. GSMA Announces that Global Mobile Connections Surpass 5 Billion. http://www.gsmworld.com/newsroom/press-releases/2010/5265.htm (accessed 4 December 2010).
2. **iHealthBeat**. What Percentage of Physicians Say the Internet Is Essential to Their Professional Practice? http://www.ihealthbeat.org/data-points/2009/what-percentage-of-physicians-report-that-the-internet-is-essential-to-their-professional-practice.aspx (accessed 4 December 2010).
3. Read MEDLINE abstracts with a pinch of salt. *Lancet* 2006;**368**:1394.
4. **Barry HC**, Ebell MH, Shaughnessy AF, *et al*. Family physicians' use of medical abstracts to guide decision making: style or substance? *J Am Board Fam Pract* 2001;**14**:437–42.
5. **Haynes RB**, McKibbon KA, Walker CJ, *et al*. Online access to MEDLINE in clinical settings. A study of use and usefulness. *Ann Intern Med* 1990;**112**:78–84.
6. **Ad Hoc Working Group for Critical Appraisal of the Medical Literature**. A proposal for more informative abstracts of clinical articles. *Ann Intern Med* 1987;**106**:598–604.
7. **Huth EJ**. Structured abstracts for papers reporting clinical trials. *Ann Intern Med* 1987;**106**:626–7.
8. **Groves T**, Godlee F. Innovations in publishing BMJ research. *BMJ* 2008;**337**:a3123.
9. **Guyatt GH**, Meade MO, Jaeschke RZ, *et al*. Practitioners of evidence based care. Not all clinicians need to appraise evidence from scratch but all need some skills. *BMJ* 2000;**320**:954–5.
10. **Tom O**, Fontelo P, Liu F. Do computer-generated summaries, 'The Bottom Line (TBL)' accurately reflect published journal abstracts? *AMIA Annu Symp Proc* 2007:1135.
11. **Fontelo P**, Liu F, Muin M, *et al*. Txt2MEDLINE: text-messaging access to MEDLINE/PubMed. *AMIA Annu Symp Proc* 2006:259–63.
12. **Pitkin RM**, Branagan MA, Burmeister LF. Accuracy of data in abstracts of published research articles. *JAMA* 1999;**281**:1110–11.
13. **Winker MA**. The need for concrete improvement in abstract quality. *JAMA* 1999;**281**:1129–30.
14. **Wong HL**, Truong D, Mahamed A, *et al*. 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**:467–73.
15. **Taddio A**, Pain T, Fassos FF, *et al*. 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**:1611–15.
16. **Sackett DL**, Straus SE. Finding and applying evidence during clinical rounds: the 'evidence cart'. *JAMA* 1998;**280**:1336–8.
17. **Smith R**. What clinical information do doctors need? *BMJ* 1996;**313**:1062–8.