

Evaluating the Evidence: Web Sites

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The Institute of Medicine advocates the use of evidence-based practice (EBP) as a means of improving patient safety, efficiency, and the effectiveness of health care,¹ but researchers are discovering significant gaps in practicing nurses' skills in identifying, accessing, retrieving, evaluating, or utilizing published evidence.² The 2004 National Sample Survey of Registered Nurses showed that more than 60% of practicing nurses graduated from their initial nursing education program prior to the 1990s when desktop computer access became common in health care settings.³ In addition, nearly two-thirds of nurses received their initial nursing education in non-baccalaureate programs where research and informatics were not required components of the curriculum.⁴

According to Pravicoff et al,⁵ the discipline of nursing demands professional practice that is based on up-to-date information. Health care providers, however, may be unprepared to meet this information demand. This creates a sig-

nificant dilemma. This article will help bridge the gap between research and practice by helping perioperative nurses become effective and efficient users of Internet information resources.

LEVELS OF EVIDENCE

Currently, EBP is the dominant philosophical approach for quality medical care because empirical evidence suggests that EBP improves patient outcomes. It evolved during the 1990s from the work of British epidemiologist Archibald L. Cochrane, CBE, FRCP, FFCM, and a clinical learning strategy initiated at McMaster University School of Medicine, Hamilton, Ontario, Canada.⁶ Evidence-based practice is a process quite similar to the nursing process with the addition of a step between assessment and planning that includes searching for, finding, and evaluating pertinent evidence to answer defined clinical questions.⁵

Evidence-based practice techniques create hierarchies to indicate the relative strength of published evidence. Medical evidence hierarchies usually include only research evidence. Meta-analysis of randomized clinical trials (ie, phase III trials) is placed at the top of the hierarchy, and nonexperimental research is placed at the bottom. This focus on research evidence exclusively is not without its critics. Currently, authors define EBP broadly, calling for integration of clinical expertise and patient values with the best research evidence.⁷⁻⁹

In comparison, when nurses develop scales for rating the strength of evidence, meta-analysis of randomized clinical trials also is placed at the highest tier of the hierarchy, but qualitative, experiential, and quality improvement (QI) evidence, is

ABSTRACT

EVIDENCE-BASED PRACTICE (EBP) is essential to improving patient safety and the effectiveness of health care practices, but a lack of computer literacy can hinder access to and availability of EBP in the clinical setting.

ACCURATE EVALUATION of web site content is essential, including determining bias, validity, and fit to a patient population.

METHODS TO EVALUATE WEB SITES and techniques for efficient access to web resources are presented and discussed. *AORN J* 87 (January 2008) 124-141. © AORN, Inc, 2008.

TABLE 1
Clinical Practice Model Resource Center's Interdisciplinary Strength of Evidence Hierarchy

Level I	Systematic review or meta-analysis of <u>multiple</u> controlled studies
Level II	<u>Individual</u> experimental study
Level III	<u>Individual</u> quasi-experimental study
Level IV	Systematic review of <u>multiple</u> nonexperimental studies
Level V	<u>Individual</u> nonexperimental study (including qualitative studies)
Level VI	Case report (eg, <i>Sentinel Event</i>) or systematically obtained, verifiable quality, or program evaluation data
Level VII	Opinion of recognized expert(s) or respected authorities.

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included on the lower end of the scale.¹⁰ Evidence-based nursing thoughtfully considers anecdotal case reports, QI data, and the opinions of experts, especially when expertise is needed from another health care discipline or biomedical technology vendor. Table 1 shows an example of a strength-of-evidence hierarchy used by interdisciplinary content development teams.

OVERCOMING BARRIERS TO EBP

Research has identified multiple organizational barriers to EBP, including lack of administrative support, lack of time for integrative review of evidence, and lack of access to resources (eg, the Internet, library resources, librarians).^{5,11-15} In the United States, these organizational barriers are being addressed by national efforts of the American Organization of Nurse Executives¹⁶ (Figure 1) and the US Congress.¹⁷ The evidence linking nursing care to quality patient outcomes is inspiring nurse executives to allocate resources to provide an information technology (IT) infrastructure in support of evidence-based nursing practice. Endorsing this trend, several bills advocating health IT as a method for reducing medical errors and improving patient safety were introduced in the 109th Congress of the United States.¹⁷ If passed, these bills will provide significant sources of grant funding for decision-support software. It is anticipated, therefore, that IT infrastructure in the form of networked computer hardware and clinical decision-support software will be more commonly available to clinical staff members in ORs in the United States in the future.

INDIVIDUAL BARRIERS

Data published in 2005 indicate that approximately half of US clinical nursing staff members already have access to the Internet on nursing units; however, many nurses seldom or never use it to obtain nursing information.⁵ Individual barriers limiting nurses' use of EBP techniques include

- lack of knowledge (eg, formal education in research and informatics);
 - resistance;
 - closed minds (eg, "we have always done it this way"); and
 - lack of a mentor.¹¹
- In general, nurses educated before 1990 or nurses



Figure 1 • The American Organization of Nurse Executives Guiding Principles for Future Health Care Delivery indicate that access to knowledge is essential to the practice of patient-centered nursing. Copyright 2005 by the American Organization of Nurse Executives. All rights reserved. Reprinted with permission.

Assessing Network-Based Resources

Before entering into an in-depth search for credible evidence on the Internet, it is useful to assess a health care organization's network-based resources. Decision support reference materials for health care professionals are designed to be used on a computer intranet platform. Clinical decision support (CDS) includes various interventions and tools such as computerized alerts and reminders, clinical guidelines, order sets, patient data reports and dashboards, documentation templates, diagnostic support, and clinical workflow tools.¹

Used to integrate evidence-based practice into professional practice, CDS has been effective in improving outcomes in some organizations but has been problematic in others.¹ The Clinical Practice Model Resource Center (CPMRC) is one example of CDS that has demonstrated desired organizational outcomes.² The evidence-based content, tools, and implementation strategies of CPMRC incorporate rigorous integrative review of primary and secondary clinical evidence, formal external review, and the participation of practicing clinicians from an international health care consortium.³ These all are characteristics of effective CDS.

The availability of effective CDS changes the type of web-based resources needed by perioperative nurses. When intranet-based decision support tools are provided, the focus becomes one of supplementing and not duplicating the resources available. Perioperative specific sites (eg, <http://www.aorn.org>, <http://www.surgical-tutor.org>) or quality improvement sites (eg, <http://www.apsf.org>, <http://www.jointcommission.org>) may be more useful than additional pharmacology or practice guideline resources.

1. Osheroff JA, Teich JM, Middleton B, Steen EB, Wright A, Detmer DE. A roadmap for national action on clinical decision support. *J Am Med Inform Assoc.* 2007;14(2):141-145.

2. Grigsby K, Westmoreland D, Shiparski L. Capacity building of leaders in healthcare organizations: monitoring organization-wide implementation of the clinical practice model. *J Nurs Adm.* 2002;32(7-8):398-404.

3. Westmoreland D, Wesorick B, Hanson D, Wyngarden K. Consensual validation of clinical practice model practice guidelines. *J Nurs Care Qual.* 2000;14(4):16-27.

whose formal education ended with less than a baccalaureate degree have little experience conducting independent literature searches.¹⁸

With the aging nursing workforce and efforts to quickly educate new nurses to enter practice,³ the barriers to using EBP are formidable. In a purposive study of older perioperative nurses, one respondent older than 50 years of age lamented the loss of the educator role in her workplace. She commented, "Our education programs are all [computer-based]. That's great, but who are these young girls going to ask a question of?"¹⁹ The answer is clear: nurses must learn to use IT resources to efficiently search the published evidence.

Little is known about how to increase the use of research by nurses, but it appears that demonstration tutorials by an opinion leader from the clinical practice setting or possibly a librarian may bring about the behavioral changes needed.^{20,21} Nurses younger than age 50 who have a baccalaureate degree or higher are most likely to possess the computer literacy skills^{4,18,22} that would position them as the opinion leaders who could mentor their colleagues in EBP techniques.

QUALITY IMPROVEMENT DATA ONLINE

The state of nursing science is such that there are relatively few experimental and quasi-experimental research studies to draw upon as evidence compared to what is available in other health care disciplines. As consumers of health care information, nurses look for any research-based publications at hand. Both QI resources and expert opinion have become essential to evidence-based nursing practice.

Two major types of QI organizations provide free access to clinical information online. Organizations such as the Agency for Healthcare Research and Quality, an arm of the National Institutes of Health, are supported by the government. Others are independent, not-for-profit organizations like the Joint Commission, the Institute for Healthcare Improvement, and the Anesthesia Patient Safety Foundation. The mission of these organizations is to improve the care given to patients by establishing standards, disseminating QI information, and reviewing patient complaints.

By developing the ability to use these national QI resources, staff nurses may be empowered

when they encounter physicians who resist QI changes. The OR is a work environment where professional nurses often are isolated from the collegial support of other nurses while, at the same time, they are organizationally positioned to implement new hospital policies that affect medical staff-member routines. When new standards are unpopular among physician colleagues, using EBP can help diffuse tension in the workplace that otherwise would be challenging and uncomfortable.

As an example, the following scenario could arise at a hospital where the Joint Commission's Universal Protocol for Preventing Wrong Site, Wrong Procedure, Wrong Person Surgery²³ is being implemented. The hospital's policy has been in place for several years; however, the time out for patient verification in the OR has been difficult to implement fully. One surgeon, in particular, is an outspoken critic of the policy. One day when staff members have fallen behind the schedule, this harried surgeon demands a scalpel before the time-out process has been completed. When the surgical technologist does not comply with his attempt to subvert the verification process, the surgeon gruffly complains,

This is much ado about nothing. I don't see why I have to be punished because a couple of people made a mistake more than 10 years ago. If you want me to keep doing this, you need to show me the data.

The circulating RN immediately responds, "I'll see what information is available." Before the end of the procedure, the nurse consults the Joint Commission's web site for current statistics about the occurrence of wrong site surgery. After four mouse clicks, the nurse discovers that 496 occurrences of wrong site surgery have been reported since 1995, and more than 70% of the time, the errors were attributed to faulty communication.²⁴ The nurse points out to the surgeon that the data she obtained from the Joint Commission support the hospital's policy. She confidently requests his full cooperation and offers to show him the online data. By these actions, the nurse actively uses evidence to protect a patient from potential harm.

EXPERT OPINION ONLINE

Many clinical questions can be answered efficiently by online consultation with a trusted source of health care information. Finding prompt answers to questions about the etiology of disorders, the usefulness of diagnostic tests, the prognosis of diseases, and the effects of various therapies are enhanced by efficient and effective Internet search strategies.⁸ There are even web sites that provide medical encyclopedias and videotaped clips of selected surgical procedures (eg, <http://medlineplus.gov>).

For example, a perioperative nurse may be assigned to care for a two-year-old girl who is undergoing a skin biopsy. The surgical schedule lists an admitting diagnosis of osteogenesis imperfecta (OI). The circulating nurse is unfamiliar with the diagnosis and treatment of OI. By quickly reviewing an online article, the nurse learns that her patient is undergoing a diagnostic workup for a congenital disease that usually is caused by genetic mutation.²⁵ This condition places the patient at high risk for injury during the perioperative period—specifically, her bones are susceptible to fracture. The nurse learns that preoperative assessment should include any history of fractures or allegations of child abuse; the color of the child's sclera; the presence of bruising; and any alterations in hearing, muscle strength, joint competence, or pain tolerance.

The nurse in this example learns from her quick online study that the child's parents need understanding and support from well-informed care providers who do not blame them for their daughter's medical problems. The nurse can effectively form a trusting relationship with both the child and her parents. The parents may even be able to provide valuable, practical information about how to prevent fractures perioperatively. Obtaining online information about OI is much more time efficient for the nurse than roaming the hospital hallways seeking another nurse who has cared for a patient with this rare disorder.

EVALUATION OF HEALTH INFORMATION WEB SITES

Several web sources such as the University of North Carolina web site (<http://www.hsl.unc.edu>) and the library at the University of Illinois at Chicago (<http://www.uic.edu>) have posted EBP tutorials, which can be especially useful to nurses

Nurses possess the required level of comprehension to understand health information available online; however, they may not possess the advanced computer search skills required to access this information or a method to evaluate the quality of the available information.

who were not schooled in EBP. Nurses who are beginning to use EBP techniques such as Internet searches also can be mentored to create a list of trusted health information web sites and access them through a web portal. A web portal is a web site that provides a starting point or gateway to other resources on the Internet or on the facility's intranet.

Concern about the quality and the reading level required to understand health care information available on the World Wide Web is widely acknowledged in the medical literature. Eysenbach et al²⁶ conducted a systematic review of studies assessing the quality of health information for consumers. They reported wide variation in results as well as a lack of consistency in the operational definitions of quality. The lack of rules for posting information online makes it challenging to evaluate the quality, credibility, and reliability of this information.²⁷⁻³⁰ In a related study, Berland et al²⁸ concluded that use of search engines to find health care information is inefficient, yields poor and inconsistent coverage of key information, and requires a high school reading level or greater to understand the material accessed. More recent reports support these findings.^{29,30}

Although nurses possess the requisite post-high school reading level and are able to comprehend health information published online, they need advanced computer search skills to

access it and a consistent method for evaluating its quality. There is a set of questions nurses can use when critically appraising health information web sites, including the following:

- Is the information from a recognized authority?
- Does the web site comply with voluntary standards?
- Who is the intended audience?

IS THE INFORMATION FROM A RECOGNIZED AUTHORITY?

Most of the national organizations that have become recognized authorities in the perioperative arena have web sites to serve health care providers. Unrestricted access is available on government sites such as the Centers for Disease Control and Prevention web site (<http://www.cdc.gov>) and nonprofit organizations' sites such as the Anesthesia Patient Safety Foundation web site (<http://www.apsf.org>). Both AORN (<http://www.aorn.org>) and the American Society of Perianesthesia Nurses (ASPAN) (<http://www.aspan.org>) make their journals available online to members and subscribers who have registered for the online services. These sites provide perioperative clinicians in the OR and postanesthesia care unit with the ability to search for pertinent clinical expertise to at the point of care.

Another recognized authority, Sigma Theta Tau International Honor Society of Nursing (<http://www.nursingsociety.org>) provides access from their web site to The Virginia Henderson International Nursing Library, Indianapolis, Indiana. This online library of nursing research gives clinicians free access to abstracts of published and unpublished works. A special feature of this web site is that it provides contact information for the primary investigators.

DOES THE WEB SITE COMPLY WITH VOLUNTARY STANDARDS?

A number of national and international organizations offer guidelines for web-based health information, but to date, none of these guidelines is binding.²⁷ Sites that voluntarily comply with quality standards from organizations such as Health on the Net Foundation, Geneva, Switzerland, and Intute, Manchester, England, display easily identified icons. The logos of these organizations usually are located at the bottom of the web site home page with text indicating that the site subscribes to the standards of or is approved by the organization. Other sites post the specific

quality guidelines they use to determine what web sites are linked to their database. Medline Plus, maintained by the US National Library of Medicine, is a good example of this. In its printed quality guidelines, MedlinePlus requires that any links listed on its web site direct users to web sites that demonstrate quality, authority, and accuracy of health content. The purpose of a linked web site must be educational and available at no charge before MedlinePlus will link to it.³¹

WHO IS THE INTENDED AUDIENCE? On credible health care web sites, the organization's purpose is clearly stated and easy to find. Often this can be found in an "About Us" link. The intent of the web site's owner can be further revealed in the suffix of the web address (ie, the Uniform Resource Locator [URL]). Following is a list of common URL suffixes and the associated type of web site:

- *.com* commercial enterprise,
- *.edu* educational institution,
- *.gov* government web site, and
- *.org* nonprofit organization.

It often is easy to obtain access to an association's clinical practice standards and guidelines, such as from the American Association of Nurse Anesthetists (AANA) at <http://www.aana.com> or the American Society of Anesthesiologists (ASA) at <http://www.asahq.org>. Sometimes information on an organization's web site is restricted to members only (eg, ECRI Institute [<http://www.ecri.org>]). For clinicians accessing any complex web site with deeply imbedded content, navigation using the "Site Map" often will facilitate locating the relevant clinical content.

Health care web sites are designed to provide information to either patients or health care clinicians. When the intended audience is the patient, information usually will have a positive slant and be less scientific in nature.²⁷ Some disease-oriented sites, such as the American Heart Association (AHA) at <http://www.americanheart.org> and the American Diabetes Association (ADA) at <http://www.diabetes.org>, have links to scientific information and practice guidelines for professionals. For example, the American Latex Allergy Association (<http://www.latexallergyresources.org>) provides a database of nonlatex consumer and health care products that is

well organized and easy to search.

It is necessary to be aware that the purpose of *.com* web sites is to entice buyers; however, the quality assurance, product alert, and safety information that medical device vendors post online can be quite helpful to perioperative clinicians. Commercial vendors sometimes post product manuals or troubleshooting guides online. This type of information can be very convenient to access during the intraoperative phase. The practice of posting this information varies from vendor to vendor, however, and manuals are not in a consistent location on all web sites. Sometimes manuals can be accessed from a link on the home page, but frequently they are imbedded in the site's education or resource areas. The fastest way to find them is by using the "Search This Web Site" search box that usually appears near the top of the home page.

QUESTIONS OF VALIDITY

Objective clinical judgments aim at validity,⁷ meaning the goal is to accomplish what is intended in an error-free manner. Web sites with valid information for use by health care professionals come from a balanced point of view and give complete and accurate information with logical, evidence-based recommendations. Much of the health information that is available on the Internet is biased toward English-speaking cultures. This imbalance favoring Western philosophical views works itself out through scientific inquiry; a clinician can ask several questions to identify the best possible clinical information available online, including:

- Is the author biased?
- Is the information complete and accurate?
- Are the recommendations valid?
- Will the information help the patient?

IS THE AUTHOR BIASED? Clinicians must be cautious when using *.com* web sites, unless these commercial sites are marketing current clinical content (eg, <http://www.eMedicine.com>, <http://www.medscape.com>) or are used only to access information about the safe use of a particular product. Other information on a *.com* web site often is biased toward the promotion of a vendor's products and services. Any references to particular research studies supporting use of a vendor's products should be examined carefully for

***The American Medical Association
recommends that content on health care
web sites be reviewed by experts who
are not involved in the creation of
the material being presented.***

bias. Such references must be placed in the context of a full body of evidence. This can only be accomplished by conducting a more thorough review of the available literature.

One useful resource, a tool called DISCERN, is a specific assessment questionnaire clinicians can use to assess the quality of written health information. This tool is available at <http://www.discern.org.uk>. The authors of the DISCERN questionnaire recommend using caution when a health information source focuses on one particular treatment or relies on single case examples to promote a particular point of view.^{32,33} This caution is applicable to health care providers who are seeking online expert opinions.

For example, a recent search on a popular web browser for “hysterectomy alternatives” brought up a web site posted by a woman who avoided having a hysterectomy. She believed the shrinking of her fibroid tumors had resulted from her taking an enzyme supplement that she has since begun to sell online. Whether the supplement did or did not shrink her fibroids, the information is presented in a biased manner using only her personal experience as an example. This type of information requires corroboration before it can be applied in a clinical setting.

The same search term on MedlinePlus brought up numerous surgical and nonsurgical alternatives to hysterectomy. Included was information about recent developments in understanding the pathophysiology of fibroid tumors and current trials of pharmaceutical treatments to shrink them.³⁴ When an author is presenting information objectively, he or she will use a variety of sources to validate the information. Looking for this

characteristic on web documents is similar to reviewing references at the end of any published journal article. For example, the electronically published article on OI referenced earlier in this article²⁵ contains a bibliography, as would any reputable print publication.

Another way to discern whether a web site is unbiased is to review the site’s linking policy. Both AHA and MedlinePlus are examples of sites that limit others from linking to their web pages in a way that implies endorsement of products or services.

IS THE INFORMATION COMPLETE AND ACCURATE? The American Medical Association recommends that web site content be reviewed by experts who are not involved in creation of the material being posted.³⁵ This can be accomplished using a peer review process or by review of an editorial board. An example is eMedicine.com, which has a five-step peer review process to ensure accuracy of the posted content.

To ensure complete coverage of all topics, eMedicine.com has a consistent outline of information in its publications. Articles about surgical procedures posted to the eMedicine.com clinical database consistently address

- background and history of the procedure;
- pathophysiology;
- indications;
- differences of race, gender, and age;
- relevant anatomy and contraindications;
- workup;
- medical and surgical treatments;
- complications;
- follow-up;
- future projections and controversies; and
- other miscellaneous information or pictures.

Any credible health care web page must be available continuously and must be updated regularly. Health care information evolves at an accelerated pace, so regular updates are required to keep published content current. The date of the most recent update of posted materials should be prominently displayed. In general, peer-reviewed print journals suggest that cited references be published within the past five years. The same general rule should be applied to online publications.

ARE THE RECOMMENDATIONS VALID? When applied to research designs, the term *validity* refers to the

degree to which an instrument measures what it is intended to measure.⁶ The validity of health information published on the Internet might be understood better by applying other definitions of the term. Valid recommendations are grounded in sound principles and current scientific evidence. They should be free from error and able to withstand logical criticism. Recommendations are valid when they are firmly founded in scientific fact and produce the desired results. Consistency with other published evidence supports validity and credibility.

For example, the use of complementary and alternative medicine is widespread. In the current health care environment, health care providers and consumers should be cautious of pseudoscientific claims made about these products. Pseudoscience refers to the use of methods or theories that presume to have a scientific basis without warrant.³⁶ It is imperative that clinicians become adept at differentiating between supplements and remedies that have been scientifically tested and those that are marketed and used based on unsubstantiated or fallacious assumptions.

In a quality review of 150 complementary and alternative medicine web sites, Walji et al³⁷ found that 97% of them omitted vital warnings, potential drug interactions, contraindications, or adverse reactions. The authors suggested that there is a direct correlation between alternative medicine web sites that use scientific references, have disclaimers of financial interest, and display copyright and editorial policy and the accuracy of the information that these web sites present.

Searchable web sites that assist with evaluating the safety of complementary and alternative therapies include the National Center for Complementary and Alternative Medicine (<http://nccam.nih.gov>) and the US Food and Drug Administration's Medwatch web site (<http://www.fda.gov/Medwatch>).

A useful pamphlet about herbal supplements and anesthesia is posted on the ASA web site at <http://www.asahq.org/patientEducation/herbPatient.pdf>.

WILL THE INFORMATION HELP THE PATIENT? Perhaps the most important question to ask when evaluating health information on the Internet is whether it will help the patient. Research utilization experts refer to this as "fit." When applying recommendations from Internet sources, one should consider whether it fits the patient's needs, preferences, and values.

There may be age, gender, or other disparities that render information not applicable to the perioperative setting for a particular patient or population. Likewise, it may be necessary to consult sites specific to pediatric patients or older adults. Some disease-specific web sites such as the ADA web site (<http://www.diabetes.org>) have specific information for and about children. The AARP web site (<http://www.aarp.org>), contains links relevant to older adult patients' needs.

Overall, the potential benefit of a treatment to the patient must be worth any potential harm, side effect, or cost. When a clinician uses web-based in-

formation to gather QI and expert opinion evidence, the associated costs to patients should be negligible. Almost all the educational resources listed in Table 2 are available free of charge. A few sites require registration (eg, Medscape) or membership (eg, AORN). A more detailed example of a web site evaluation is given in Table 3.

PORTABLE DIRECTORY OF EBP WEB SITES

The communication of new ideas and information takes place through many channels including mass media and face-to-face communication. According to Rogers' Diffusion of Innovations Theory, communication is most effective when beliefs, values, and expectations are shared by

Valid online health information is grounded in sound principles and current scientific evidence, free from errors, able to withstand logical criticism, and founded on scientific fact.

TABLE 2
Credible Evidence-Based Web Sites*

Category	Description
Nursing	American Association of Nurse Anesthetists. Provides practice guidelines. <i>http://www.aana.com</i>
Nursing	AORN. Membership information and access to Specialty Assembly portals and the <i>AORN Journal</i> online (password protected). <i>http://www.aorn.org</i>
Nursing	Medscape. Integrated information and educational tools. Simple, one-time, free registration. <i>http://www.medscape.com/nurseshome</i>
Nursing	Sigma Theta Tau Virginia Henderson Library. Access to study and conference abstracts. Primary investigators can be contacted. <i>http://www.nursinglibrary.org/portal/main.aspx</i>
Nursing	University of North Carolina at Chapel Hill Health Sciences Library. Information about evidence-based nursing. <i>http://www.hsl.unc.edu/services/tutorials/ebn/index.htm</i>
Medical	American Society of Anesthesiologists. Provides practice guidelines. <i>http://www.asahq.org/index.htm</i>
Medical	eMedicine. Free access to a broad clinical knowledge base for physicians and other health care professionals. Free registration. <i>http://www.emedicine.com</i>
Medical	National Library of Medicine, National Institutes of Health (NIH), other government agencies and health-related organizations. Includes hundreds of videotaped clips of surgical procedures. <i>http://medlineplus.gov</i>
Medical	Surgical Tutor. Educational material intended for British surgical interns/residents. <i>http://www.surgical-tutor.org.uk/default-home.htm</i>
Medical	University of Illinois at Chicago. Evidence-based medicine web site. Describes levels of evidence. <i>http://www.uic.edu/depts/lib/lhsp/resources/ebm.shtml</i>
Quality improvement (QI)	Anesthesia Patient Safety Foundation. Educational tools including videotaped clips of anesthesia complications/emergencies. <i>http://www.apsf.org</i>
QI	Centers for Disease Control and Prevention. Includes online access to the Guideline for Prevention of Surgical Site Infection. <i>http://www.cdc.gov</i>
QI	FDA MedWatch web site. Current safety alerts for medications, biologics, medical devices and dietary supplements. <i>http://www.fda.gov/Medwatch/safety/2007/safety07.htm</i>
QI	The Joint Commission. Patient safety initiatives and sentinel event reports and statistics. <i>http://www.jointcommission.org</i>
QI	The National Center for Complementary and Alternative Medicine. Maintained by the National Institutes of Health. <i>http://nccam.nih.gov</i>
Diseases	AARP. Database of resources relevant to older adult patients. <i>http://www.aarp.org/research/ageline/</i>
Diseases	American Cancer Society. Information about cancer treatment and resources. <i>http://www.cancer.org/docroot/home/index.asp</i>
Diseases	American Diabetes Association. Includes a section for professionals and free access to full text articles from selected journals. <i>http://www.diabetes.org/home.jsp</i>
Diseases	American Heart Association. Includes information on diseases, conditions, and treatments. <i>http://www.americanheart.org</i>
Diseases	American Latex Allergy Association. Comprehensive resource for patients and professionals. <i>http://www.latexallergyresources.org/links/products.cfm</i>

* Access verified October 30, 2007.

TABLE 3
A Comparison of Two Health Care-Related Web Sites

At a Clinical Practice Model Resource Center Consortium member hospital, an RN first assistant was co-authoring a guideline to describe the care of pediatric patients with diabetes during the perioperative period. During this process, a specific clinical question arose: Are glycemic targets for children with diabetes the same as those set for adults? To answer the question, the nurse conducted two different online searches for information. One was through the American Diabetes Association (ADA) web site. The other was an advanced search using a popular search engine.

The ADA web site (ie, a .org web site) provides access to full text articles from selected diabetes journals. To search the ADA database, the author used the “Site Map” to find a link to journals in the section for health professionals and scientists. A search of all ADA journals for “pediatrics AND surgery” located an ADA Statement on Care of Children and Adolescents with Type 1 Diabetes. The glycemic targets for various pediatric populations were included in the statement.

In comparison, an advanced search on a popular search engine using the search terms *pediatric, surgery*, and the phrase *glycemic control* returned the name of a commercial web site (ie, a .com web site). The information on this commercial web site lacked the level of scientific quality and completeness needed. It was biased toward commercial product endorsement and did not give specific glycemic targets.

Comparison of the two web sites using consistent criteria showed that higher quality and clinically relevant evidence was obtained from the ADA web site. The nurse recognized that the sites were published for different purposes. The answer to the nurse’s clinical question was found with the help of the ADA web site rather than the web site she found using the more commonly used search engine.

Question	ADA web site	Commercial web site
Is the information from a recognized authority?	Yes. The ADA is an authoritative source of clinical practice standards and guidelines for the care of diabetic patients.	No. This site is maintained by a product vendor.
Does the web site comply with voluntary standards?	No.	No.
Is the author unbiased and credentialed?	Yes. The ADA provides research funding and information. It also publishes research. All authors of standards, guidelines, and consensus statements are credentialed.	No. Although this web site lists a body of scientific evidence supporting tight glycemic control, it is biased toward promotion of the company’s products.
Who is the audience?	Patients and professionals.	Patients and professionals with purchasing power.
Is the information complete and accurate?	Yes. There are links to full text journal articles with glycemic targets, relevant pathophysiology, and comparisons between various age groups.	No. Although the web site advocates tight glycemic control, it does not provide glycemic target values or age-specific detail. The only links given are for product descriptions and ordering information.
Is the web site current and regularly updated?	Yes. The web site is regularly updated and provides access to a searchable database of 5 diabetes journals.	Yes. The web site is regularly updated; however, most scientific references are older than 5 years.
Are the recommendations valid?	Yes. Detailed glycemic targets were based on a balanced review of research evidence less than 5 years old.	Possibly. General recommendations for tight glycemic control were based on research more than 5 years old.
Will the information help the patient?	Yes. The specific glycemic targets for pediatric patients with diabetes are provided.	No. The web site does not provide specific pediatric glycemic targets.

both the sender and receiver of information.⁶ Consistent with Rogers' theory, both novice and expert perioperative nurses are strategically positioned to be opinion leaders to bring EBP techniques into the unique social system of perioperative practice.

When asked what agencies helped them most with EBP, nurses most frequently identified schools of nursing and professional organizations.¹¹ Organizations like AORN, ASPAN, and AANA have become essential resources for the dissemination of research evidence through perioperative standards, recommended practices, and clinical guidelines. Nurses who efficiently use these organizational resources for EBP and coach their colleagues to seek evidence-based answers to clinical questions are active participants in the creation of the desired future for health care.

Concern is mounting among health care IT professionals, however, about the effects of electronic Internet information storage on the efficiency of network system performance (Linda R. Harrison, RN, BSN, MBA, e-mail communication, February 26, 2007). Indiscriminate storage of Internet information on computer workstations can slow the use of networked software. This is particularly true of images (eg, radiological picture archiving). This problem is prompting some large health systems to place limitations on Internet storage (eg, blocking bookmarked favorites at computer workstations). In addition, limitation of Internet access may be considered when large groups of people do not use online resources efficiently.

Fortunately for members of AORN, there is a convenient, web-based alternative to desktop Internet data storage. A list of preferred evidence-based web sites can be entered into an AORN member's specialty assembly (SA) portal as "My Links" (Figure 2). A clinician can access this directory of links from any hospital work-

station, even when local Internet storage is blocked. This list of links is available from home or another workplace. This is helpful when a clinician works at several health care facilities. Use of the AORN SA portal has the potential to make online searches easy for a nurse, regardless of his or her skill level in searching the Internet.

USING AN AORN SA WEB PORTAL

The process of using an AORN SA portal consists of the following steps:

- become an AORN member,
- register online to be a member of an SA,
- evaluate evidence-based Internet web sites,
- enter the list of web sites in the "My Links" section of the SA portal,
- access this list from any computer desktop equipped with Internet access,
- conduct regular maintenance to update these links,
- mentor colleagues one-on-one to use EBP techniques, and
- maintain AORN membership.

The process begins with registration on the AORN web site. Perioperative nurses can navigate online to <http://www.aorn.org> and join, renew, or register for online AORN member services. It is important to write down and save both the user name and password. These will be



Figure 2 • The AORN Specialty Assembly web portal showing "My Links."

needed each time a member returns to the AORN web site.

A member can access the SA web portal by using the “Community” drop-down box on the AORN home page (Figure 3). Entering a list of trusted web addresses into “My Links” on the web portal page is intuitive for nurses with basic computer skills. Nurses with limited computer skills may want to ask a colleague for help or use the list of web sites from this article to start.

After a clinician sets up a “My Links” directory online, he or she can begin one-on-one mentoring of colleagues by demonstrating how this directory is used to efficiently answer clinical questions in daily practice. When questions arise that can be answered by consulting an online reference, a nurse can show others how to create and use a “My Links” directory. By demonstrating the usefulness of this resource, a nurse will encourage others to integrate EBP into their personal practice patterns.

To illustrate, consider a perioperative nurse who has been out of the workforce and recently returned to practice in an ambulatory surgery setting after attending an RN refresher course. One day, she is responsible for a patient who is scheduled for an open breast biopsy. The patient has had an implanted cardiac defibrillator for two years. The RN remembers putting a magnet over implanted pacemakers to prevent interference from electrosurgery, but she has

never cared for a patient with an implanted cardiac defibrillator. Both the surgeon and anesthesiologist are unavailable for consultation.

The patient’s medical record shows that the patient has an automatic, dual-chamber, implantable cardioverter defibrillator with cardiac resynchronization therapy, fluid monitoring, and telemetry. The nurse wonders whether use of a pacemaker magnet is appropriate. She approaches the control desk to ask the charge nurse for assistance.

The charge nurse, however, is on break. Covering the desk is an RN who entered nursing practice less than a year ago. The newer nurse invites her colleague to watch as she goes online to the web site of the company that manufactured the implant. She demonstrates how to navigate through her AORN SA web portal to the web site of the manufacturer. Using the site map, she is able to locate the user manual for the defibrillator. She accesses the specific manual for the patient’s implant, which provides clear instruction on how to program it to asynchronous mode and disable the defibrillator’s function with a magnet. The manual also advises use of bipolar cautery during the procedure. Together the two nurses are able to plan the patient’s perioperative nursing care.

Later in the day, the first nurse asks her colleague to demonstrate again how she found the manual so quickly. Both nurses are members of AORN, and over the next few days, they set up a “My Links” directory for the first nurse. During the following months, both nurses advocate the use of the SA portal to their friends and colleagues.

SUMMARY

Nurse scientists recognize that in addition to research, evidence from QI organizations and expert opinion are important resources to guide clinical nursing practice.^{6,10,38} Such evidence is readily available online.

Today, it is more common to have Internet access available in the OR. Unfortunately, many practicing nurses have not been schooled in evidence-based



Figure 3 • Accessing the Specialty Assembly Web Portals from the AORN Home page.

methods for conducting online searches.^{3,4} In addition, many nurses do not use the IT infrastructure when it is provided.^{5,18} Because of the demographics of the current nurse workforce, many practicing nurses are less likely to know how to seek information online.²² Tutorials given by opinion leaders in the perioperative setting may be an effective method for increasing nurses' basic computer competencies and use of EBP.²⁰⁻²¹

When evaluating the credibility of Internet web sites for evidence-based nursing practices, nurses should ask many questions, including the following three key questions:

- Who is the intended audience?
- Is the information complete, accurate and scientifically valid?
- Will the information help the patient?^{27,32,33,35,37}

Health information posted online for patients can be relatively unscientific and written with a specific slant. At worst, it may be biased with a commercial motive or based on pseudo-scientific claims. It is important that health information obtained from the Internet represent a balanced, unbiased point of view and give all the information needed to implement logical, evidence-based recommendations.

The growing concern about efficient use of Internet resources on networked computer information systems by many health care providers can be overcome by using an AORN SA web portal. Perioperative nurses who are members of AORN can use an SA web portal to create a personal list of credible web sites that is accessible from any OR in any hospital with Internet access. Finally, intergenerational collaboration may prove to be the best method for promoting the use of this EBP technique. — **AORN** —

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