

## COMMUNITY PHARMACY

### Obtaining and Providing Health Information in the Community Pharmacy Setting

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Community pharmacists are a valuable information resource for patients and other healthcare providers. The advent of new information technology, most notably the Internet, coupled with the rapid availability of new healthcare information, has fueled this demand. Pharmacy students must receive training that enables them to meet this need. Community advanced pharmacy practice experiences (APPEs) provide an excellent opportunity for students to develop and master drug information skills in a real-world setting. Preceptors must ensure that students are familiar with drug information resources and can efficiently identify the most useful resource for a given topic. Students must also be trained to assess the quality of resources and use this information to effectively respond to drug or health information inquiries. This article will discuss key aspects of providing drug information in the community pharmacy setting and can serve as a guide and resource for APPE preceptors.

**Keywords:** community pharmacy, drug information, advanced pharmacy practice experience

#### INTRODUCTION

In today's information-driven society, pharmacists are constantly bombarded with new data. With thousands of prescription medications, nonprescription medications, and dietary supplements available in the United States, and with over 600,000 new biomedical journal articles published in 2004 alone, it would be impossible for a busy community pharmacist to stay up to date on every aspect of patient care. To weed through this abundance of information, pharmacists need good drug and health information retrieval skills to find the answers they need when they need them. To encourage students and, therefore, pharmacists to develop and maintain effective information retrieval skills, the American Association of Colleges of Pharmacy Center for the Advancement of Pharmaceutical Education Advisory Panel on Education Outcomes states that upon completing a doctor of pharmacy (PharmD) program, graduates must be able to "retrieve, analyze, and interpret the professional, lay, and scientific literature to provide drug information to patients, their families, and other involved health care providers."<sup>1</sup> In other words, pharmacists and students must "be able to obtain, manage, evaluate and disseminate information in a format that is relevant to the requestor."<sup>2</sup>

Providing quality drug and health information is not about knowing the answer to every question. It is about being confident in one's ability to know where to look for the best information. A quick search of the Internet on any given topic will often result in links to thousands of web sites, which can easily overwhelm the information seeker. Having access to a variety of quality resources and knowing how and when to use them will result in a confident researcher who can find useful information. The best sources of information are those that provide highly relevant and valid information but do not require a lot of effort to use.<sup>3</sup> This article is designed to aid community pharmacy preceptors in their pursuit of quality information by providing reviews of specific drug and health information resources, instruction on how to assess the quality of resources, advice on how to document information requests, and tips on using available resources to stay up to date in the profession. This knowledge should, in turn, assist preceptors in providing students with opportunities to practice and refine their own drug and health information retrieval skills which were acquired during the didactic portion of the PharmD curriculum.

#### INFORMATION RESOURCES

Many different types of drug and health information requests are made in the community practice setting. Some of the more common types of inquiries encountered in this setting include adverse effects, dosage and administration, drug interactions, pharmacotherapy, and disease state information relating to prescription drugs, nonprescription drugs, and dietary supplements.<sup>4</sup> Selecting the

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best resource is a critical step in the process of answering any drug information question. Information resources are broken down into 3 different categories of literature: primary, secondary, and tertiary and each of these categories serve a specific purpose in the information retrieval process. Primary literature is considered the base or foundation for the rest of the literature, secondary literature connects the information seeker to the primary literature and tertiary literature serves as the core body of knowledge developed by synthesizing the information gained from the primary literature.<sup>5</sup> Table 1 provides brief definitions, examples, advantages, limitations, and tips on when to use each type of literature.<sup>5,6</sup>

Tertiary resources, available in both print and electronic formats, are a good place to start when researching common questions encountered in a community pharmacy. Table 2 describes selected common general drug information resources and provides basic information about what each resource contains and how they are arranged.<sup>7-16</sup> Most drug monographs contain similar information, some in a brief format, as in the *Drug Information Handbook* (Lexi-Comp, Inc., Hudson, OH), and some in a comprehensive format, such as *AHFS Drug Information* (American Society of Health-System Pharmacists, Bethesda, MD). The decision of which resource to use is often based upon availability, personal preference, and the level of detail needed to provide a complete answer. As the scope and focus of these resources can vary, when possible, it is a good idea to consult multiple resources to validate an answer. If the information found in the tertiary resources is not sufficient, the next option would be to consult the primary literature for more specific and current information. Journal articles reporting the results of clinical trials, which are accessible by searching secondary

literature resources, make up the bulk of primary literature used to answer drug information questions.

Table 3 provides a list of selected secondary literature research databases used to find drug and health information journal articles.<sup>17-19</sup> *PubMed* is probably the database most often used in community practice because it is freely available to anyone with Internet access. *PubMed* provides access to the citations and abstracts of thousands of biomedical journals and, in some cases, journal publishers provide links to the full text of their journals at no cost to the user. Links to tutorials on searching *PubMed* effectively are available from the site's main page.<sup>19</sup> The other secondary research databases listed are fee-based, limiting broad access to most community pharmacies. Community pharmacists who would like to explore these databases more fully could contact their local school or college of pharmacy to see if these databases are available in their libraries.

Personal digital assistants (PDAs) are an increasingly popular tool for retrieving drug and health information. As indicated by Table 2, many print resources are available in a PDA format. There are also numerous free resources downloadable from the Internet. An article in the 2005 *Annals of Pharmacotherapy* by Keplar provides a good overview of PDA applications for drug and health information.<sup>20</sup> The Practice Management Section of the *Red Book* (Thomson PDR, Montvale, NJ) also provides a listing and contact information for drug information PDA software that can be used by pharmacists who are interested in assessing which applications might meet their information needs.<sup>15</sup>

In addition to the many fee-based print and electronic drug information resources, there are also many freely available web sites that provide high quality drug and

Table 1. Sources of Drug Information by Literature Type<sup>5-6</sup>

Category	Definition	Examples	Advantage	Limitation	When to Use
Primary Literature	Publication of original research that has not been interpreted or changed by others	Scientific journal articles which report results of case studies, research or clinical trials	Current and original information	Knowledge of scientific methods and statistics is needed to properly interpret the information	When looking for most up to date information
Secondary Literature	Resources which provide access to the primary literature	Indexing and abstracting databases such as <i>PubMed</i>	Provide efficient access to primary literature	Users need to be adept at searching electronic databases	When you need to find primary literature
Tertiary Literature	Collection of data and concepts drawn from primary literature	Reference books, drug monograph collections, review articles	Convenient and easy to use Information is usually well established	Information may be dated due to gap between when resource is written and published	When you need to find background information or a quick answer

Table 2. Tertiary Drug Information Resources<sup>7-16</sup>

Resource Name	Available Format(s)	Key Feature(s)
AHFS Drug Information	Print	Drug monographs of single drug entities in the United States arranged by drug classification
	Online	Includes bibliography of cited references
	PDA	Extensive indexing
Clinical Pharmacology Online	Online	Online database of drug information monographs
	PDA	Product identification tool
		Drug interaction checker
		Ability to screen multiple drugs for adverse reactions
Drug Facts and Comparisons	Print	Drug monographs of single drug entities in United States arranged by 14 categories of therapeutic use
	Online	
	CD-ROM	
	PDA	
Drug Information Handbook	Print	Quick reference to commonly used drugs in concise format
	Online	Arranged alphabetically by generic drug name
	PDA	Includes brief information about some combination drugs
Martindale's: The Complete Drug Reference	Print	Includes propriety preparations from 27 countries including the United States
	Online	Most commonly used to identify foreign equivalents
MICROMEDEX Healthcare Series	Online	Multiple databases including drug monographs, disease summaries, toxicology, drug interactions, and patient education
	PDA	References to primary literature
Mosby's Drug Consult	Print	Prescription drug monographs are the complete manufacturer's package insert (including black box warning)
	Online	Arranged alphabetically by generic name
	PDA	Includes pricing information and product identification guide
Physicians' Desk Reference	Print	Monographs include an exact copy of the product's FDA approved or other manufacturer supplied labeling
	Online/PDA	Arranged alphabetically by manufacturer
Red Book	Print	Most commonly used for drug pricing
	CD-ROM	Products arranged by brand name with cross-references to generic name
		Include a clinical reference guide, a herbal medicine guide, a practice management guide (includes information on PDA database products), and drug reimbursement information by state
USP DI Volume 1: Drug Information for the Health Care Provider	Print	Contains drug information monographs arranged alphabetically by generic name
	Online	Index provides easy access to list of off-label uses
	CD-ROM	

CD-ROM = compact disc-read only memory; PDA = personal digital assistant

health information. Table 4 describes a number of these sites, many of which are produced by the United States Government.<sup>21-27</sup> Only *Medscape* requires users to follow a simple registration process that allows the database to be customized to the user's needs. All of the other listed sites are freely available with no registration needed. Additional links to drug and health information can be found

by searching the Internet using search engines such as Google, keeping in mind the Internet evaluation guidelines discussed in this article.

While it is beyond the scope of this article to provide an exhaustive list of information resources for community APPE preceptors, Tables 5 and 6 attempt to provide a basic listing of print and electronic, fee-based and free, resources

Table 3. Secondary Literature Research Databases<sup>17-19</sup>

<b>Resource</b>	<b>Contents</b>	<b>Topic(s) Covered</b>
International Pharmaceutical Abstracts (IPA)	Citations and abstracts from over 750 pharmaceutical, medical, and health-related journals published since 1970 No full text	Pharmacy education Pharmacy administration Biopharmaceutics Pharmacokinetics New drug delivery systems Pharmacist liability Legal, political & ethical issues
Iowa Drug Information Service (IDIS)	Selected citations, abstracts and full-text articles from approximately 200 peer-reviewed medical and pharmaceutical journals	Articles published within select journals directly related to drug therapy and disease state information
PubMed	Over 15 million citations & abstracts from over 4,000 biomedical journals from the 1950's to the present Limited links to freely available full text articles	Medicine Nursing Dentistry Pharmacy Veterinary medicine Health care system Preclinical sciences

found to be useful by the authors in answering questions about self-care and dietary supplements.<sup>8,12,28-40</sup> The tables provide information about both primary and tertiary resources and include comments on key features of each resource.

### **Assessing the Quality of Information Resources**

The widespread availability of electronic-based healthcare information resources has provided nearly unlimited access to the latest information, both for healthcare professionals and the general public. This has led to both opportunities and challenges for preceptor pharmacists, who must provide care to a generation of well-informed patients and train the next generation of pharmacists. Patients and students alike can benefit from the ability to quickly obtain medical and medication information from the Internet, CD-ROM, or PDA-based resources. However, the transition from printed text to digital resources has in some cases led to a blurring of the line between information and misinformation, particularly when it comes to Web-based sources. Both patients and students must be educated to critically evaluate the information they obtain and apply the same set of quality standards regardless of the information source. Four basic criteria have been established for evaluating the quality of medical/health information. They include authorship, attribution, disclosure, and currency, and are applicable regardless of the information source.<sup>41</sup> The first criterion, authorship, may be considered the most important as it refers to identifying the source of the information and de-

termining whether the source (ie, the author) is credible and qualified. Assessing attribution involves evaluating the reference sources cited by the authors. High-quality information resources should clearly cite all references used and/or contain a comprehensive bibliography. The third criterion, disclosure, involves identifying potential conflicts of interest or bias that may exist with a given author or publishing body. Funding sources for all authors and/or publishing bodies of medical/drug information must be clearly stated and should be considered when evaluating the quality of a resource. In addition, author affiliations, particularly those involving corporations or other interest groups, must be transparent to the information user (student or patient). The final criterion, currency, may be the most important depending on the type of information being sought. Because of the rapid availability of new medical/healthcare information, resources must be updated on a continuous basis. This has driven the demand for electronic-based resources that can be easily updated. Any of these 4 criteria may be used to identify a potential weakness in a resource or reference; however, all 4 must be considered as a whole when assessing the overall quality of an information resource. Depending on the type of resource and information being sought, some aspects may be more important than others.

### **Primary Information Resources**

Primary sources of drug or medical information form the basis of evidence-based healthcare practice. The

Table 4. Drug and Health Information Web sites<sup>21-27</sup>

Resource Name	Web Address	Key Feature(s)
Centerwatch Clinical Trials Listing Service	www.centerwatch.gov	<ul style="list-style-type: none"> <li>• Free section of site includes database of drugs currently in clinical trial</li> <li>• Explains clinical trial process</li> <li>• Includes sections on results of recent clinical trials and newly approved drugs</li> </ul>
Drugs@FDA	www.accessdata.fda.gov/scripts/cder/drugsatfda/	<ul style="list-style-type: none"> <li>• Catalog of FDA-approved drugs</li> <li>• Includes drug approval letters, labels and review packages for approved and tentatively approved prescription, nonprescription and discontinued drugs</li> </ul>
Electronic Orange Book	www.fda.gov/cder/ob/default.htm	<ul style="list-style-type: none"> <li>• Searchable database of approved drug products with therapeutic equivalence evaluations</li> </ul>
Free Medical Journals	www.freemedicaljournals.com/	<ul style="list-style-type: none"> <li>• Links to over 1,200 free full text medical journals arranged by specialty</li> </ul>
Medi-Lexicon	www.pharma-lexicon.com/	<ul style="list-style-type: none"> <li>• Dictionary of over 165,000 medical, pharmaceutical, biomedical &amp; healthcare acronyms and abbreviations</li> </ul>
Medscape	www.medscape.com/px/urlinfo	<ul style="list-style-type: none"> <li>• Free registration</li> <li>• Contents include full text medical journal articles, surveys in disease management, access to MedPulse®, an email newsletter that highlights your chosen specialty</li> </ul>
National Guideline Clearinghouse	www.guideline.gov/	<ul style="list-style-type: none"> <li>• Clearinghouse of evidence-based clinical practice guidelines</li> <li>• PDA downloads of guideline summaries</li> </ul>

FDA = Food and Drug Administration; PDA = personal digital assistant

practice of evidence-based medicine is defined as the explicit application of the best currently available evidence in making decisions about the care of individual patients.<sup>42</sup> Pharmacy students are taught to practice using an evidence-based approach, and often turn to primary sources (ie, published clinical trials, case reports) of information to answer a question or come up with a recommendation. In the case of primary literature, all 4 areas of assessment discussed above are typically easily identifiable. The author's names and credentials, reference sources, date of publication, and funding source or affiliations should be clearly listed within the study manuscript. Additional skills are necessary to critically evaluate primary literature and to understand how to interpret and apply this information to individual patient care. While it is beyond the scope of this article to provide a comprehensive review of literature evaluation skills, a number of potentially useful review articles and monographs on the topic are available.<sup>43-46</sup> An overview of key concepts will be briefly discussed. In order to illustrate some of the important components of evaluating primary literature, it is helpful to consider a common scenario that may occur during an APPE. A 28-year-old female patient comes to the pharmacy counter with a question about the oral con-

traceptive she has been taking for 5 years. She heard on the Cable News Network (CNN) that a recent study showed that estrogen and progestin hormones increase the risk of heart disease and breast cancer, and asks if she should stop taking the medication. Not satisfied with the initial "talk to your doctor" response, the patient asks that her question be further researched, and gives the student her name and phone number for a follow-up response. After searching *PubMed*, the student finds the study and formulates a response to be discussed with the preceptor before calling the patient. Prior to responding to the patient, some key aspects about the study must be assessed. First, the type of study and the journal of publication must be considered. Table 7 lists the types of study designs commonly used in primary healthcare literature.<sup>47</sup> In the example above, the student determines that the study in question, known as the Women's Health Initiative Study (WHI), was a randomized, controlled, clinical trial published in the *Journal of the American Medical Association*, a well-known, peer-reviewed medical journal.<sup>48</sup> Studies published in non-peer reviewed journals may be well-designed and valid, but the lack of peer-review leaves the scientific validity of the study in question. Conversely, publication in a reputable

*American Journal of Pharmaceutical Education 2006; 70 (3) Article 57.*

Table 5. Selected Self-Care Resources<sup>28-36</sup>

<b>Resource Name</b>	<b>Available Format(s)</b>	<b>Key Feature(s)</b>
Handbook of Nonprescription Drugs	Print	Arranged by medical conditions, each chapter discusses proper patient assessment/triage and available self-care options Includes treatment algorithms and patient counseling information
<i>Journal of the American Pharmacists Association</i>	Print Online	Each issue includes an “OTC Product” section that reviews an innovative product on the market (ie, new device, new dosage form, new strength, recent prescription-to-nonprescription product switch) An annual review article summarizes key products to enter the market throughout the previous year Frequent articles on self-care issues in the “Research”, “Experience” or “Tools for Advancing Pharmacy Practice” sections
Medscape DrugInfo	Online	Information for patients and health care professionals
National Council on Patient Information and Education (NCPIE)	Online	For consumers, provides nonprescription medicines use tips, important questions to ask health care professionals and links for further information For health care professionals, provides a Be MedWise brochure, tool kit and results of NCPIE surveys
Nonprescription Drug Therapy: Guiding Patient Self-Care	Print Electronic* CD-ROM†	Information organized by medical condition Easy-to-use format describes condition being treated, diagnosis/assessment strategies, treatment options and patient information Assists in determining whether nonprescription medicines, non-drug therapy or physician referral is appropriate for the patient
Nonprescription Product Therapeutics	Print	Information organized by medical condition Easy-to-use format describes condition being treated, diagnosis/assessment strategies, treatment options and patient information Assists in determining whether nonprescription medicines, non-drug therapy or physician referral is appropriate for the patient Includes decision-making algorithms, case studies and patient counseling tips Includes “A Pharmacist’s Journal”, which are real-life experiences from the “front lines” in community pharmacy
OTC Advisor: Pharmacy-Based Self-Care Services Certificate Training Program	Online	Modules available electronically and in a print-ready format with associated CE credit After successful completion of online modules, pharmacists may elect to complete live portion of program to receive certificate
Physicians Desk Reference for Non-Prescription Drugs	Print	Ability to locate products based on category or active ingredient Limited color pictures available for product identification
Pocket Guide for Nonprescription Product Therapeutics	Print	Handy, lightweight, portable version of Nonprescription Product Therapeutics Features include counseling tips that highlight information patients need to know, patient assessment algorithms to guide therapy decisions Color pictures available for distinguishing conditions

CD-ROM = compact disc-read only memory; CE = continuing education; OTC = over-the-counter; Rx = prescription

\*part of *Facts and Comparisons 4.0 Online*

†part of eFacts

Table 6. Selected Dietary Supplement Resources\*<sup>8,12,35,37-40</sup>

Resource	Available Format(s)	Key Features
<i>American Botanical Council Expanded Commission E Monographs</i>	Print Online	Monographs contain a good review of efficacy studies and pharmacology Information regarding adverse effects and drug interaction somewhat limited
<i>Clinical Pharmacology</i>	Online CD-ROM PDA	Comprehensive, evidence-based monographs Supporting evidence for adverse effects and drug interactions is well-described Printable patient education monographs available
<i>Facts and Comparisons: Review of Natural Products</i>	Print Online CD-ROM	Well referenced monographs with good information on efficacy Safety and drug interaction sections somewhat limited Evidence-based monographs covering all types of dietary supplements
<i>Micromedex: AltMedDex</i>	Online	Rating system for efficacy and for significance of drug/herbal interactions Good descriptions of potential adverse effects Updated regularly
<i>Natural Medicines Comprehensive Database</i>	Print Online CD-ROM PDA	Comprehensive but concise monographs of dietary supplements Rating system for efficacy and safety of each dietary supplement Online version offers drug interaction checking feature Updated regularly (online version)
<i>Natural Standard</i>	Print Online	Evidence-based, comprehensive monographs Detailed reviews of clinical trial data Provides a “grade” for the supporting evidence supporting of each agent
<i>Physician Desk Reference for Herbal Medicines</i>	Print	Monographs are well-referenced Extensive list of agents reviewed, including Chinese herbs

\*Includes general drug information references containing content on dietary supplements CD-ROM = compact disc-read only memory; PDA = personal digital assistant

medical journal does not guarantee that a study is without flaws. Next, the major study components must be evaluated to determine any important limitations and to interpret whether the information applies to the patient asking the question. Table 8 provides a detailed list of questions to consider when assessing a research report.<sup>49</sup> In practice, it may not be necessary to perform such a detailed assessment of a study; however, students should be able to do so when asked. Figure 1 depicts a simplified stepwise approach to evaluating a given study and its relevance to practice.<sup>49</sup> In the example question, the study meets all of the criteria of a well-designed and clinically useful study; however, it is not entirely relevant to the specific patient asking the question. The WHI study consisted of peri- and postmenopausal women using a different form of hormone therapy. The patient asking the question is also much younger than the study population, thereby making the results not necessarily applicable to her situation. Students in an APPE should be encouraged to practice evidence-based pharmacy when appropriate, and must be able to evaluate primary literature in order to do so.

### Secondary Information Resources

Secondary literature resources consist of indexing and abstracting services or databases designed to enable users to search the medical literature and obtain bibliographic listings and/or abstracted information. Examples of such resources were discussed earlier in the article. Quality assurance is typically less of a concern with this type of resource. Secondary literature resources such as *PubMed* act as a gateway to a broad scope of primary literature and other types of journal articles. Indexing features also provide condensed listings of journal articles in a focused area. One disadvantage of these resources is that using broad search terms can often result in a large number of citations that must be sifted through. Different databases also use varying search techniques or rules. Students should be encouraged to use these indexing services to search for information to help answer drug information questions that arise during an APPE. Such activities allow students to become familiar with the various databases, and provide the opportunity to improve searching skills, while becoming more efficient at retrieving information.

Table 7. Types of Study Designs<sup>47</sup>

<b>Study Design</b>	<b>Key Feature(s)</b>
Case Reports or Case Series	Published observations of a single (case report) or small number (case series) of patients Used to report rare/unique situations occurring in practice Interpretation and application must be done cautiously
Epidemiologic Studies	Include case-control and cohort studies; done either retrospectively or prospectively Designed to identify associations between exposure to certain factors and development of diseases Results must be considered in the context of possible confounding variables
Meta-Analysis	Designed to combine and statistically analyze data from multiple studies in order to generate summarized conclusions
Outcomes-Based Research	Designed to assess and compare the outcomes such as costs or quality of life of a treatment or therapy Often involves developing hypothetical models to predict outcomes
Prospective Clinical Trials	Gold standard of clinical research Designed to determine cause and effect relationships Ideally should be randomized, blinded and placebo-controlled
Survey Research	Designed to study relationships between social and psychological variable through the use of questionnaires Survey instruments used should be validated prior to use

### **Tertiary Information Resources**

Tertiary resources such as textbooks, review articles, drug information resources, and Internet web sites are among the most common types of references used in practice as they offer comprehensive information that is easily accessible. In most cases, these resources offer reliable information that is based, at least in part, on a review of the subject matter's primary literature. Additionally, many textbooks and most review articles undergo a peer-review process prior to publication to ensure that the content is accurate and complete. This does not mean that such resources are free of limitations in the areas of assessment previously discussed. Textbooks can be published without peer review and authored by individuals who are less than well-qualified to write on the subject matter. Information may appear accurate and credible but, if poorly referenced, may not be reliable. Perhaps the greatest limitation of printed textbooks is that information is not current, and often lags behind by 1 to 2 years due to publishing delays. The introduction of electronic-based resources, either in the form of CD-ROMs or Internet-based information, has helped with this issue. Generally speaking, pharmacists and students can feel confident that the drug and disease information found in well-known and commonly used textbooks and electronic databases is accurate and reliable. However, pharmacists, and particularly students, have begun to rely on random Internet web sites as sources for information, a practice which could introduce quality assurance issues.

### **Internet-Based Health Information**

The Internet has become one of the most commonly used sources of medical and health information by the general public in the United States.<sup>50</sup> Unfortunately, many potential problems exist when it comes to assuring the quality of information found online. Most problematic is that authorship is entirely unregulated. In other words, any individual with a computer can create a web site and post information. The process of peer review, or any other mandatory process of quality assurance, does not necessarily apply. The Internet is also a vehicle for commerce. This has led to potential problems regarding biased information designed to promote the sale of a product. Commercial web sites can often be identified by the ".com" at the end of their domain name. Government, academic, or organization web site domain names end with ".gov," ".edu," and ".org," respectively. In general, web sites ending with these domains contain information that is more reliable and potentially free of commercial bias. Finally, the vast amount of content available can make it difficult for patients (and students) to even find the exact information sought. Studies evaluating the quality of health information on the Internet have yielded concerning results. A systematic review by Eysenach et al found that 70% of studies examining the quality of health information online concluded that problems exist in terms of inaccurate, incomplete, or biased information. These studies assessed a variety of search topics including medication and disease information topics.<sup>51</sup> Pharmacists and pharmacy students are increasingly faced with questions from



Table 8. Evaluation Questions for Assessing Clinical Research Reports<sup>49</sup>

<b>Study Component</b>	<b>Questions to Consider</b>
Overall Assessment	<p>Was the article published in a reputable, peer-reviewed journal?</p> <p>Were the investigators qualified to conduct the study?</p> <p>Did the authors contribute substantially to the research effort?</p> <p>Did the research site have appropriate resources and patients for the study?</p> <p>Was study funding obtained from an unbiased source?</p>
Title/Abstract	<p>Was the title of the article unbiased?</p> <p>Did the abstract provide a clear overview of the purpose, methods, results and conclusions of the study?</p>
Introduction	<p>Did the authors provide sufficient background information to demonstrate the study was important and ethical?</p> <p>Were the study objectives clearly explained?</p> <p>Were planned sub-group or covariate analyses indicated?</p> <p>Were the research and null hypotheses stated?</p> <p>Was the study approved by an institutional review board (IRB)?</p> <p>Was the study ethical?</p>
Methods	<p>Was an appropriate study design used?</p> <p>Did the inclusion and exclusion criteria represent an appropriate patient population for the study?</p> <p>Was the sample size large enough to detect a statistically significant difference between treatment groups?</p> <p>Was the study sample representative of the patient populations to which the study results were intended to be generalized?</p> <p>Was the study controlled? Were the controls appropriate?</p> <p>Were the outcome variables relevant, clearly defined, objective and clinically and biologically significant?</p> <p>Was methodology used to measure outcome variables described in detail? Were outcome variables measured at appropriate time intervals?</p> <p>Was the study randomized using an appropriate method? After randomization, were demographics for the treatment and control groups similar?</p> <p>Were subjects, investigators, outcomes assessors, and data entry personnel blinded? Were these individuals unable to determine whether treatment or control was administered before the blind was broken?</p> <p>Were data collected appropriately?</p> <p>Was patient compliance with the study medication measured?</p> <p>Were patient and investigator compliance with the study protocol monitored?</p> <p>Were appropriate statistical tests used?</p>
Results	<p>Were dates for study initiation and completion provided? Is the study current and relevant?</p> <p>Were the numbers of patients screened, enrolled, administered study treatment, completing, and withdrawing from the study reported?</p> <p>Were reasons for withdrawal reported?</p> <p>Were demographics for treatment and control subjects similar at baseline?</p> <p>Were data presented in a clear and understandable format? Were data for both efficacy and safety clearly reported?</p> <p>Was an intent-to-treat analysis conducted?</p> <p>Were exact p-values and confidence intervals reported?</p> <p>Was the study power calculated?</p> <p>Could a Type I or Type II error have occurred?</p> <p>Were the study results valid?</p> <p>Can study results be generalized to patients in clinical practice?</p> <p>Were the results both statistically and clinically significant?</p>

*(Continued on next page)*

Table 8. (Continued) Evaluation Questions for Assessing Clinical Research Reports<sup>49</sup>

Study Component	Questions to Consider
Conclusions/Discussion	Did the authors compare their study results to those of a systematic review or all previously published data? Were the study conclusions consistent with the results and did they relate to the study conclusions? Did the study results support the conclusions?
References	Is the current literature well represented?

Source: Mosdell KW. Literature evaluation I: controlled clinical trials. In: Malone PM, Mosdell KW, Kier KL, Stanovich JE, eds. *Drug Information: A Guide for Pharmacists*. 2nd ed. New York, NY: McGraw-Hill; 2001: 607-9 [Appendix]. Reprinted with permission from The McGraw-Hill Companies

Internet-savvy patients. In addition, most students are now trained to rely on electronic information resources, including the Internet, as a tool in daily practice. It is therefore critical that students should have the ability to recognize the pitfalls and potential limitations of Internet-based information, and know how to identify high-quality web sites.

During the mid-1990s and early 2000s, the problems associated with health information on the Internet became increasingly apparent. This led to the development of a number of voluntary quality assurance “services” designed to assist users in identifying web sites containing reliable health information. One of the most popular is provided by the Health on the Net (HON) Foundation, a non-profit organization founded in 1995 whose mission is to guide Web users to sound, reliable information.<sup>52</sup> The group developed a set of 8 principles known as the HON Code, which are designed to serve as quality assurance criteria for web sites containing medical or health information. The principles are consistent with the 4 main areas of assessment previously discussed, and can be found on the HON Foundation Web site. Healthcare web sites that wish to become “approved” by the HON Foundation are required to complete an application consisting of questions about their web site content and whether or not they meet the HON Code principles. Web sites that are granted approval can display the HON Code symbol on their main homepage. The presence of this symbol indicates the web site adheres to the HON Code principles. The HON Foundation web site also includes a search engine that enables users to search for information from HON-approved web sites. A similar process has been developed by an organization called Health Internet Ethics (HI-Ethics).<sup>53</sup> Like the HON Foundation, a set of quality assurance standards were developed by HI-Ethics to govern the content of information found on health-related web sites. These criteria, which also focus on the areas of authorship, attribution, disclosure, and currency, must be met for a web site to become approved and display the Hi-Ethics symbol. Other institutions and organizations, including the American Medical Association, have developed similar criteria to guide

the development of quality information web sites. When searching for information online, students should seek out sites that have obtained one of these “seals of approval.” Since the process is voluntary, not all quality web sites have participated in these services. Regardless of the web site, students must be trained to carefully evaluate information obtained online, and consider the 4 areas of assessment and any potential deficiencies in these areas when using information from this source.

## RESPONDING TO INFORMATION REQUESTS

Community pharmacists have long served as the medication experts of the health care team and, due to their knowledge and accessibility, are frequently consulted by the public and other professionals to answer health-related questions. Therefore, community APPEs can serve as a training ground for student pharmacists in the responsible provision of drug information to the public. Consumers are becoming more involved in their own health care and are obtaining health information from the Internet, direct-to-consumer advertising, or friends; often, when they approach the community pharmacist, they are seeking to validate information they have previously obtained or to explore health topics they have yet to fully research. Additionally, other health care providers often access community pharmacists for answers to questions involving diseases or medications. Community pharmacists and students develop a standardized process for responding to health information requests. This process begins with receiving the question and is completed when the request is appropriately documented and communicated to the requestor. The use of a documentation form can standardize the process and can assist both preceptors and students in tracking the development of their drug information skills.

A 7-step, systematic process has been articulated for responding to health information requests.<sup>54</sup> The first step is to receive the question and collect demographics from the requestor. The approach to answering the question, the resources utilized, and the response given to the requestor will depend on who is asking the question. Students and

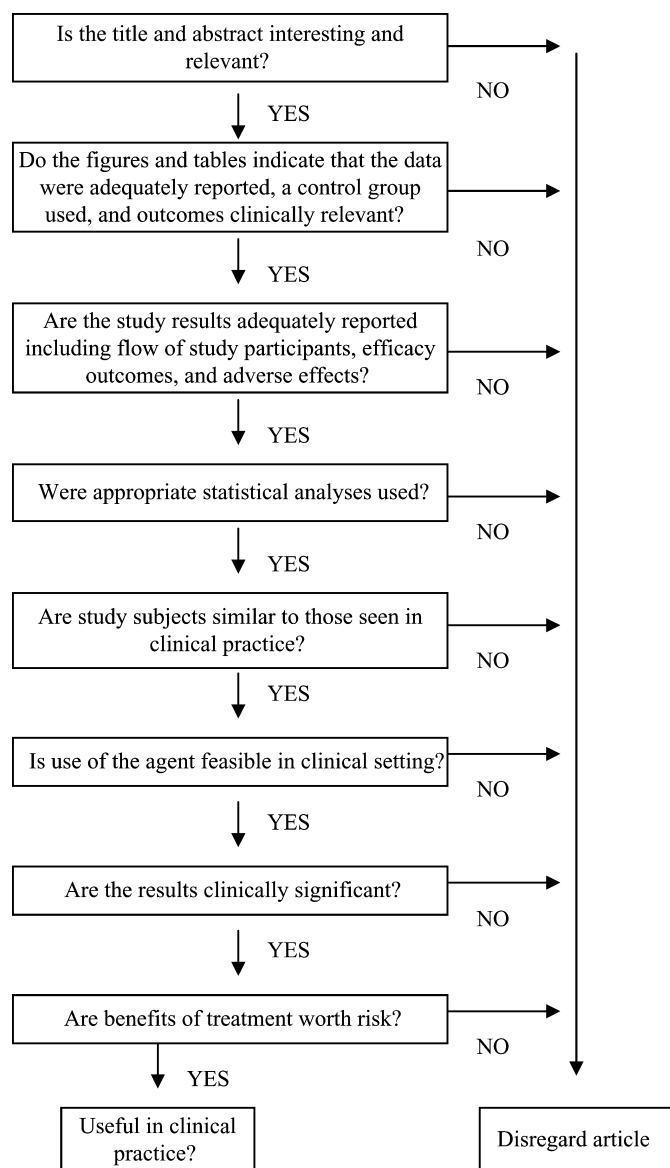


Figure 1. Step-wise approach to evaluating the literature. Source: Mosdell KW. Literature evaluation I: controlled clinical trials. In: Malone PM, Mosdell KW, Kier KL, Stanovich JE, eds. *Drug Information: A Guide for Pharmacists*. 2nd ed. New York, NY: McGraw-Hill; 2001:162 [Figure 1]. Reprinted with permission from The McGraw-Hill Companies.

pharmacists should determine the requestor’s name, contact information, position, training, and knowledge on the subject matter. Also, the student or pharmacist should determine the mechanism (ie, verbal, written, e-mail) and approximate timeframe for communicating the answer back to the requestor.

The second step of the standardized process is to obtain background information. The skill of obtaining background information efficiently yet comprehensively requires practice. In this step, the student or pharmacist tries to obtain a more complete picture of the situation.

Questions that may be asked include resources that the requestor has already consulted (and, possibly, what information was uncovered) and whether the request relates to a specific person (and, if so, the person’s current medical conditions and medications). If sufficient background information is collected, the requestor can avoid going back to the requestor for further questions or clarifications. Open-ended questions may be preferred for collecting this information.

During the process of obtaining background information, determination of the ultimate question should be confirmed. The student or pharmacist should confirm the true question being asked prior to proceeding with categorization of the question and development of the search strategy. Appropriate categorization of the question assists with selection of resources to be searched. Students and pharmacists need to consider which resources are available at the practice site, are most likely to contain the information needed, and can be accessed in the timeframe requested. The utility of all resources accessed should be noted on the documentation form. A simple scale (-/~/+ or 0/1/2) can help to track the usefulness of the resources for that particular category of question.

The process of data evaluation, analysis, and synthesis is often the most difficult for students and pharmacists. Several references are available to describe the techniques for literature evaluation and application.<sup>43-47,49</sup> Once the literature has been searched and an answer obtained, a succinct but informative response must be formulated. When the answer is delivered to the requestor, the student or pharmacist must verify that the response given was complete and satisfactory to the requestor.

Documentation is an essential final step in the health information request process. It has often been said, “If you did not document it, it did not happen.” Documentation can reduce liability and confirms the actions of the student pharmacist or pharmacist. Sample forms for documenting drug or health information requests are available.<sup>54,55</sup>

Often in responding to a health information request, materials summarizing the question asked and answer found are created by the student and/or pharmacist and given to the requestor. At other times, common health information questions are the foundation for an APPE educational activity, like a presentation for the community, a patient newsletter, or patient education materials. If someone else’s information is used to create something (eg, a handout, a presentation, a newsletter, or a pamphlet), credit must be given to the authors. This information should be presented as a quote, a summary, or a paraphrase and the resource from which it was taken must then be cited using an established citation format.

There are many citations styles available and the formats generally include the author, title, publisher, and date of publication. Biomedical journals often require authors to use the Vancouver Style when referencing the work of others and examples can be found at the site of the International Committee of Medical Journal Editors.<sup>56</sup> Citing information serves a number of purposes: it gives credit where credit is due, complies with established copyright laws, adds credibility to works by showing from where the information for the conclusions came, and provides readers with an avenue for exploring a topic further.<sup>57</sup> Learning how to properly cite references is often emphasized in the didactic portion of pharmacy curricula and real-life application in the experiential setting can reinforce the importance of following established guidelines.

### **KEEPING UP TO DATE**

Pharmacy is a dynamic profession that is growing and changing every minute. Community pharmacists who are committed to providing advanced patient care services and APPEs must stay current with the latest in practice innovations and clinical guidelines. Strategies for staying current should be tailored to an individual's needs and preferences but can include membership and active participation in professional organizations, pursuit of advanced training, building a guideline and resource library, and use of pertinent electronic web sites, magazines, and journals.

### **Professional Organizations**

One of the first ways to stay up-to-date is by being a member of professional organizations that are focused on clinical practice in community pharmacy or ambulatory care settings. Professional organizations are on the cutting edge of practice and research. The American Association of Clinical Pharmacy, American Pharmacists Association (APhA), APhA Foundation, American Society of Consultant Pharmacists, National Association of Chain Drug Stores, and National Community Pharmacists Association are just a few of the pharmacy associations that community practitioners could find useful. Key membership benefits and/or features of these pharmacy associations are presented in Table 9.<sup>58-63</sup> In addition to becoming an active member, practitioners can stay current by attending their meetings. Since this may not be practical for all community pharmacists, pharmacists can read through abstracts, podium presentations, or poster presentations presented during the meeting. Often, these items are published in the professional organizations' main publications following the meeting.

### **Advanced Training**

Pursuing advanced training and credentialing is another way for a pharmacist to keep up with innovative practice and update his or her current set of skills. Certificate training programs are available on a wide range of topics from organizations like APhA, the National Institute for Pharmacist Care Outcomes, and state pharmacy associations.<sup>59,64</sup> Certificate training programs typically require a self-study component to be completed prior to participation in a live training program. Completion of the program confers a specific set of knowledge and skills in a defined area of pharmacy practice. A pharmacist can also choose to pursue certification. Certifications may be for general pharmacy practice, like the Board Certified Pharmacotherapy Specialist (or BCPS) designation, or for disease-specific knowledge.<sup>65</sup> Pharmacists with practices focusing on diabetes may be interested in pursuing certifications such as the Board Certified Advanced Diabetes Management (or BC-ADM) or Certified Diabetes Educator (or CDE) or Certified Disease Manager (or CDM) credential.<sup>66-68</sup> Another disease-specific certification is the Certified Asthma Educator (or AE-C).<sup>69</sup> The Certified Geriatric Pharmacist (or CGP) certification may be appealing to pharmacists with practices focusing on seniors.<sup>70</sup> Certifications typically require detailed study and preparation and completion of a rigorous, nationally recognized, formally evaluated test. When a pharmacist successfully passes the examination, a designation is provided (eg, Board Certified Pharmacotherapy Specialist or Certified Diabetes Educator).

### **Clinical Practice Guidelines**

Maintaining a current library of existing clinical practice guidelines enables community pharmacists to stay abreast of the latest pharmacotherapy. The National Heart, Lung and Blood Institute maintains the clinical practice guidelines for asthma, dyslipidemia, hypertension, and obesity.<sup>71</sup> These guidelines can be located underneath the "Information for Health Professionals" section of their web site. In January each year, the American Diabetes Association publishes new clinical practice guidelines.<sup>72</sup> The National Diabetes Education Program web site also has a number of resources that pharmacists can use for their patients with diabetes.<sup>73</sup> Many pharmacies and pharmacists are incorporating immunization services into their practices. Even if your state does not authorize pharmacists to administer immunizations, pharmacists and students should serve as immunization advocates or host others to provide immunizations in the pharmacy. The Centers for Disease Control and Prevention National Immunization Program web site is a goldmine of immunization-related information.<sup>74</sup> Underneath the "Resources"

Table 9. Membership Benefits/Features of Select Professional Organizations<sup>58-63</sup>

Professional Organization	Key Membership Benefit(s)/Feature(s)
American College of Clinical Pharmacy (ACCP)	The Ambulatory Care Practice and Research Network (PRN) generates lots of discussion on key practice issues on their listserv (membership in a PRN is only available to ACCP members) If one enjoys using email to stay current, the PRN listserv could be one way to stay up-to-date
American Pharmacists Association (APhA)	Long history of involvement in community pharmacy Practicing pharmacists are members of the Academy of Pharmacy Practice and Management (APPM) Every APPM member selects one section as their primary section; community pharmacists are often part of the Clinical/Pharmacotherapeutic Practice Section or Community and Ambulatory Practice Section (Pharmacists become a primary member of one section but can receive communications from one or more of the other sections)
APhA Foundation	Affiliated with APhA Provides innovative programs and projects that assist pharmacists in reengineering their practices Project Improving Persistence and Compliance with Therapy (ImPACT), the Incentive Grants for Practitioner Innovation in Pharmaceutical Care, the Advanced Practice Institute and the National Clinical Issues Forum would be of benefit to community practitioners
American Society of Consultant Pharmacists (ASCP)	Provides leadership, education, advocacy, and resources to advance the practice of senior care pharmacy Sponsors www.SeniorCarePharmacist.com, which provides information for seniors and caregivers and offers a directory of senior care pharmacists who consult directly to consumers
National Association of Chain Drug Stores (NACDS)	Represents chain pharmacy practice and is involved in a number of pharmacy and health-related issues and promotes the value and role of community pharmacy in the health care system Web site includes information about some of their supported patient education and wellness programs like immunizations, poison prevention and asthma awareness Publishes an annual National Health and Community Events Resource Guide that lists the national health campaigns that are targeted during each month of the year (helpful in planning for community pharmacy-based health and wellness events)
National Community Pharmacists Association (NCPA)	Represents pharmacist owners, managers and employees of independent community pharmacies

section of their web sites is an online ordering form, where health care providers can order immunization-related materials free of charge. Many community pharmacists assist patients with quitting the use of tobacco products and many pharmacies offer nonprescription nicotine replacement products or prescription tobacco cessation aids. The United States Department of Health and Human Services Treating Tobacco Use and Dependence guidelines can be a useful component of every community pharmacist's clinical practice guideline library.<sup>75</sup> A number of print-ready clinician and consumer resources can be found on their web site and clinicians do have the option of ordering print materials.

### Pharmacy Publications

There are a number of pharmacy-related magazines that frequently write about practice innovations. *Drug Topics*, *Pharmacy Times*, *Pharmacy Today*, and *US Pharmacist* are just a few of the most commonly accessed publications.<sup>76-79</sup> Online access of some of these magazines may be limited to subscribers, but many community

pharmacies directly receive these publications. There are many journals available whose content may be of interest to community pharmacists engaged in advanced practice activities. *American Journal of Pharmaceutical Education*, *Annals of Pharmacotherapy*, *Journal of the American Medical Association*, *Journal of the American Pharmacists Association*, *New England Journal of Medicine*, and *Pharmacotherapy* are a few of the journals that practitioners may find relevant to their practice.<sup>80-85</sup> Many journals are available free of charge but some require a subscription. If a journal requires a subscription to access its complete resources, check with the school or college of pharmacy library for access options. Many journals today offer a free electronic table of contents (eTOC) service. With an eTOC service, pharmacists can sign up to receive e-mail message alerts that notify them when new issues of the journal are published. Some journals also offer a free tracking service, where pharmacists can be e-mailed when articles of interest are published or are cited by new articles being published. Community pharmacists should consider taking advantage

of these types of opportunities, particularly because there is no charge associated with their use and the information is delivered directly to an e-mail inbox.

### Other Resources

Other resources that may assist community pharmacists with keeping up with innovative practice and clinical guidelines are *Pharmacist's Letter* and pharmacist.com. *Pharmacist's Letter* requires a subscription, but many pharmacists find their concise reviews and detail documents helpful.<sup>86</sup> Pharmacist.com is a joint project of APhA and the National Association of Boards of Pharmacy and includes a variety of drug information resources and continuing education programs.<sup>87</sup> The pharmacist.com front page includes a "Top Stories" section and "In the Spotlight" section that is a quick look at new changes in practice and resources of interest to clinical community practitioners. The pharmacist.com Focus, delivered directly to an e-mail inbox, provides a brief synopsis of key practice issues and links to longer articles on the pharmacist.com web site.

The pursuit of new knowledge should be a never-ending process and the development and maintenance of the skills required to find useful (ie, correct, applicable, and easily attainable) information is a critical component of that pursuit. The didactic PharmD curriculum provides a foundation of knowledge and skills that are practiced and applied during APPEs. Community pharmacists and student pharmacists should be encouraged to continuously develop drug and health information retrieval skills to ensure their patients and the health care providers they work with are receiving current and accurate information.

### ACKNOWLEDGMENT

Portions of this article were adapted from a presentation given by the author as part of the APEX Program, and are published here with permission from the University of Florida.

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