CHAPTER 15

DRUG INFORMATION AND LITERATURE EVALUATION

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Abstract

Drug information analysis requires systematic approaches to resource utilization and literature evaluation for clinical decision support. Information resource selection follows hierarchical assessment of evidence quality, currency, and clinical applicability. Literature search strategies utilize structured methods incorporating controlled vocabulary terms and systematic review of multiple databases. Study design evaluation incorporates assessment tools for specific research methodologies with emphasis on internal validity and generalizability. Statistical analysis interpretation focuses on clinical significance determination through effect size estimation and confidence interval evaluation. Application to practice requires integration of evidence quality assessment with patient-specific factors and practical implementation considerations. Systematic approaches incorporate regular updates of drug information resources, critical evaluation of new evidence, and modification of clinical protocols based on emerging data.

Keywords: *Literature evaluation, Information resources, Research methodology, Statistical interpretation, Evidence application*

Learning Objectives

After completion of the chapter, the learners should be able to:

- Utilize appropriate drug information resources for clinical questions
- Conduct systematic literature searches using medical databases
- Evaluate study designs for strengths and limitations
- Interpret statistical analyses in clinical research
- Apply literature evaluation findings to clinical practice
- Synthesize evidence from multiple sources to inform clinical decisions.

INFORMATION RESOURCES

Drug information resources form a hierarchical structure of evidence and accessibility, each serving distinct purposes in clinical practice and research. Understanding the characteristics, strengths, and limitations of these resources is essential for effective drug information retrieval and evaluation.

Primary Literature

Primary literature represents original research published in peer-reviewed journals, serving as the foundation of scientific evidence. These publications include clinical trials, observational studies, case reports, and original research articles. Key medical and pharmacy journals provide the most current research findings, though the volume and complexity of primary literature necessitate careful evaluation skills.

Professional journals vary in their focus and impact

factor, with major publications such as the New England Journal of Medicine, The Lancet, and JAMA providing high-impact clinical research. Specialty pharmacy journals offer more focused content relevant to pharmaceutical care and medication management.

Table 15.1: Hierarchy of Drug Information Resources

Primary Resources	Secondary Resources	Tertiary Resources
Original research articles	Systematic reviews	Drug handbooks
Clinical trials reports	Meta-analyses	Clinical practice guidelines
Case reports	Evidence-based summaries	Drug monographs
Conference proceedings	Pharmacoeconomic analyses	Drug formularies
Patent literature	Clinical trial registries	Treatment algorithms
Raw drug data	Abbreviated new drug applications	Standard treatment protocols
Post-marketing surveillance data	Drug safety alerts	Drug information databases

Secondary Literature

Secondary literature consists of publications that analyze, summarize, or review primary literature. Systematic reviews and meta-analyses represent the highest level of secondary literature, providing comprehensive synthesis of available evidence on specific topics. These publications often appear in specialized journals or databases such as the Cochrane Library, offering critical evaluation of multiple primary studies.

Review articles, clinical guidelines, and consensus statements also fall into this category. These resources provide valuable summaries of current evidence and

expert recommendations, though their quality can vary significantly. Evidence-based guidelines from professional organizations offer standardized approaches to therapeutic management, incorporating both evidence review and expert consensus.

Figure 15.1 Hierarchy of evidence

Tertiary Literature

Tertiary resources provide compiled and summarized drug information in readily accessible formats. Standard drug references such as AHFS Drug Information, Facts & Comparisons, and Micromedex serve as comprehensive sources for drug monographs, dosing information, and therapeutic recommendations. These resources undergo regular updates but may lag behind primary literature in incorporating new evidence.

Specialized handbooks and compendia provide focused information for specific practice areas or therapeutic categories. Resources like the Pediatric Dosing Handbook or Geriatric Dosage Handbook offer population-specific guidance. Understanding the update frequency and editorial processes of these resources helps in appropriate application of their information.

Digital Databases and Platforms

Electronic resources have revolutionized drug information access through comprehensive databases and

search platforms. PubMed/MEDLINE serves as the primary portal for biomedical literature searches, offering extensive indexing and search capabilities. Specialized databases like International Pharmaceutical Abstracts focus on pharmacy-specific literature.

Clinical decision support systems integrate multiple resources into searchable platforms, often including drug interaction checkers, dosing calculators, and clinical monitoring guidelines. Commercial platforms like Clinical Pharmacology, Lexicomp, and UpToDate provide point-of-care access to comprehensive drug information with regular updates.

Drug Information Centers and Services

Institutional and regional drug information centers provide specialized services for complex drug information queries. These centers employ trained professionals who can access and evaluate multiple resources to address specific clinical questions. They often maintain proprietary databases of previous questions and responses, building institutional knowledge bases.

Professional organizations and regulatory agencies maintain drug information resources focused on specific aspects of medication use. The FDA's website and databases provide regulatory information and safety updates, while professional society websites offer practice guidelines and specialty-specific resources.

Resource Evaluation and Selection

Selecting appropriate information resources requires consideration of several factors:

- Currency of information
- Depth and breadth of coverage
- Editorial quality and review processes
- Accessibility and ease of use

- Cost-effectiveness
- Integration with workflow
- Update frequency and mechanisms

The ability to critically evaluate and appropriately select information resources represents a core competency for pharmacy practice.

Literature Search Strategies

Developing Search Questions (PICO Format)

The foundation of effective literature searching begins with properly formulated clinical questions. The PICO format provides a structured approach to developing searchable clinical questions by breaking them down into four key components: Patient/Problem, Intervention, Comparison, and Outcome. This systematic approach helps clarify the search focus and identify relevant search terms.

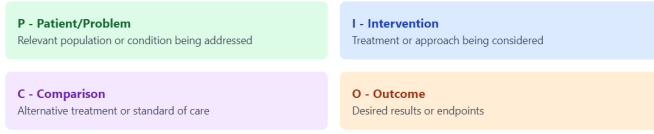

Figure 15.2 PICO format for clinical questions

Converting clinical scenarios into well-structured questions requires careful consideration of each PICO element. The Patient/Problem component defines the relevant population or condition, while the Intervention specifies the treatment, diagnostic test, or exposure of interest. The Comparison element identifies alternative approaches or control groups, and the Outcome component clarifies the endpoints or results of interest. Additional elements such as time frame or study type may be incorporated when relevant.

Database Selection

Selecting appropriate databases requires understanding their scope, coverage, and unique features. MEDLINE/PubMed serves as the primary biomedical literature database, offering extensive coverage of clinical research and basic sciences. The Cochrane Library specializes in systematic reviews and meta-analyses, providing high-level evidence synthesis. EMBASE offers broader international coverage and stronger focus on drug-related literature.

Specialized databases serve specific information needs. International Pharmaceutical Abstracts focuses on pharmacy-specific literature, while PsycINFO covers psychological and behavioral research. Clinical trial registries such as ClinicalTrials.gov provide access to ongoing and completed trial information. Understanding database overlap and unique coverage helps optimize search strategies.

Search Methodology

Systematic search methodology ensures comprehensive literature retrieval while maintaining efficiency. The process begins with preliminary searches to identify key terms and relevant citations. This initial step helps refine search strategies and identify additional search terms through examination of subject headings and keywords used in relevant articles.

Medical Subject Headings (MeSH) in MEDLINE and similar controlled vocabularies in other databases provide standardized terminology for searching. Effective searching combines these controlled terms with appropriate keywords to capture both indexed and non-indexed articles. Understanding database-specific indexing practices improves search precision and recall.

Search Terms and Boolean Operators

Constructing effective search strategies requires careful selection and combination of search terms. Boolean operators (AND, OR, NOT) allow logical combinations of search concepts. The OR operator combines similar concepts or synonyms to broaden searches, while AND narrows results by requiring multiple concepts. The NOT operator excludes unwanted terms but should be used cautiously to avoid inadvertently eliminating relevant citations.

Advanced search techniques incorporate truncation, wildcard characters, and proximity operators. Truncation allows searching for word variations using root terms, while proximity operators specify required word relationships. Phrase searching and exact match options help control for context and improve precision when needed.

Filtering and Refining Results

Search refinement involves applying appropriate limits and filters to manage result sets. Common filters include publication date ranges, study types, languages, and age groups. Understanding database-specific filtering options helps target relevant literature while excluding irrelevant results. However, filters should be applied judiciously to avoid missing important citations.

Iterative refinement often becomes necessary as initial searches are reviewed. This process involves adjusting search terms, combining or splitting concept groups, and modifying filters based on preliminary results. Citation pearl growing, where known relevant articles are analyzed to identify additional search terms or related articles, can enhance search comprehensiveness.

Documentation of Search Process

Thorough documentation of search strategies ensures reproducibility and allows for future updates or modifications. Essential documentation elements include:

- Database names and interfaces used
- Search dates and time periods covered
- Complete search strategies including all terms and combinations
- Applied filters and limits
- Number of results at each stage
- Any special features or techniques employed

Search documentation supports quality assurance and enables others to validate or update searches. In systematic reviews and meta-analyses, detailed search documentation becomes a critical component of the methodology section. Regular review and updating of documented searches help maintain current awareness of new evidence

Study Design Evaluation

Types of Research Studies

Research studies in healthcare literature encompass a broad spectrum of methodological approaches, each designed to address specific types of research questions. Experimental studies, particularly randomized controlled trials (RCTs), provide the most rigorous evaluation of interventions through systematic manipulation of variables and random assignment of subjects. These studies offer strong causal inference capabilities but may have limited generalizability.

Observational studies, including cohort, case-control, and cross-sectional designs, examine relationships between variables without experimental manipulation. Cohort studies follow groups over time to assess outcomes, while case-control studies retrospectively