

Drug Information Retrieval & Storage

+ Introduction:

Availability of authentic drug information is the key to promote rational use of drugs, a well accepted concept in clinical practice in the developed world. Drug information is an essential element in achieving health goals and information is an aid to decision making. The objectives of drug information center is to collect information, to evaluate and compare drugs, to provide an education and teaching aid for health care personnel, to assist clinicians in the selection of safe and effective medication and to enable pharmacists and pharmacy students to develop their abilities in providing information on drugs and medicines.

Large hospitals develop and staff a new division of the department of pharmacy which is commonly referred to as 'Drug Information Center'. This new concept in hospital pharmacy operation is usually located in a separate section of pharmacy, containing large number of reference texts, journals, reprints and brochures. They are also equipped with electronic data processing equipments and staff. Now computers have possible networking of regional drug information centers made located in different hospitals. Networking on regional, national, sub continentals, intercontinental levels had placed Drug Information Services at a global level.

Drug information is both a body of data and information about medications and a set of skills and tools that provide pharmacy professionals with the ability to find, access, understand, interpret, apply and communicate information and acquire knowledge. The

body of facts and information pertaining to medications is generally referred to as "the drug literature". The literature of pharmacy and pharmaceuticals encompasses all aspects of drugs, beginning with isolation or synthesis, including physical analysis, bioactivity, toxicology, clinical research, market research, and economic and social considerations. The drug literature, reflecting all the individuals who create it and use it, such as chemists, biomedical scientists, all the various health care professionals, attorneys, and patients, is vast and complex. Different kinds of publications are available in the library like journals, abstracting and indexing publications, books, compendia, monographs, patents proceedings, reviews, FDA-approved labeling (package inserts), house organs, newsletters, promotional literature, government documents, and analysis by consulting services.

Drug information skills coupled with the processes and technology offered by informatics are part of the solution to mastering information overload and maintaining the knowledge system that improves patient care outcomes.

✚ Drug Information Retrieval Systems:

As a drug moves along the path from discovery to the market and into worldwide use, data and information about the agent are created and accumulate. When this information is published, its value and usefulness to scientific, professional, and patient communities becomes known. Publication of research results at each step of the path is essential. The path of drug development and marketing offers a structure that is useful to scientists and practitioners concerned with compounds of potential therapeutic value.

The resources themselves are classified as: primary (original research), secondary (indexing and abstracting services), and tertiary (textbooks and evaluated information). Individual resources are now generally available in more than one physical format; for example, a journal may be available as a paper publication or as an electronic publication (either individually or as part of a publisher's electronic journal collection or content collection). Primary, secondary, and tertiary resources are available for each step in the path of drug development, but reporting time increases from each step to the next.

1. Preclinical Drug information:

At this point a compound is recognized and then considered for potential pharmaceutical or therapeutic usefulness; researchers will be both consumers of and contributors to the data information-knowledge cycle that characterizes science. Initially, in the synthesis and purification phase of drug development, information about the compound's chemistry and

physical properties may be both sought and created. Whether or not the compound has been of interest to other researchers may be determined by searching public records of grant and contract awards and also by searching resources that cover preliminary and early research results. The patent status of the compound may need to be established.

- a) **Physical and chemical data:** AIDS DRUGS, Beilstein, CAS Registry, Chemcyclopedia, ChemFinder, Chemical Abstracts, ChemID plus, Chemindex plus and The Merck Index.
- b) **Patents:** U. S. Patent and Trademark Office Web Patent Databases offer free WWW access, <http://www.uspto.gov/main/patents.htm>, to a bibliographic patent database that uses the most current patent classification system. The Delphion Intellectual Property Network (IPN) is a research tool for patent information.

2. Phase IV Studies and Post Marketing Drug Information

During the Phase IV Studies and Post Marketing Drug Information stages a thorough literature search is required to find material relevant to the clinical use of the drug. This will require not only searching the basic bibliographic databases such as Biological Abstracts, EMBASE, IDIS, IPA, MEDLINE, and Science Citation Index, but also searching the patent literature, using Patent and Trademark Office Web Patent Databases.

The following bibliographic databases provide access to the full span of life-science periodical literature, including all stages of a

compound's development from early brief reports to comprehensive assessments after years of clinical use.

- ❖ BIOSIS
- ❖ EMBASE
- ❖ International Pharmaceutical Abstracts
- ❖ MEDLINE
- ❖ Pubmed Central
- ❖ Science Citation Index

S. No.	Resources/sites for Drug Information and related information	Information provided
1	www.ashp.org/s_ashp/sec_drug_shortages.asp	American Society of Health-System Pharmacy – Shortages: Drug Shortage Resource Center with updates/ management of shortages
2	www.cdc.gov	Centers for Disease Control: Public health guidelines, vaccine and travel information, and CDC publications
3	www.fda.gov	Food and Drug Administration: Drug and Biologics information (approvals, shortages, Orange Book, news, etc.). Be sure to click CBER for biologics and CDER for drug information.
4	www.home.mdconsult.com	Full-text books and journals, drug information, news, CME, and patient leaflets. Requires fee and password
5	www.guidelines.gov	National Guidelines Clearinghouse : Public resource for evidence-based clinical practice guidelines established by the governments Agency for Healthcare Research and Quality.
6	www.health.nih.gov	National Institutes of Health: Information on disease states, research, and federal health programs from the NIH
7	www.ncbi.nlm.nih.gov/entrez	National Library of Medicine: PubMed - a searchable listing of abstracts of medical literature
8	www-medlib.med.utah.edu	Spencer S. Eccles Health Sciences Library: Library catalog, full-text journals, searchable databases, etc.
9	www.uhsc.utah.edu/pharmacy/druginf	The University of Utah Hospital & Clinics Drug Information Service: Information about our service, publications, and drug shortage updates. Many links are for internal use only.

General Drug Information		
10	www.medlineplus.gov	Site links to patient drug category and health monographs, medical dictionaries, health professional directories and other resources such as organizations and health libraries.
11	www.health.nih.gov	National Institutes of Health: Information on disease states, research, and federal health programs from the NIH
12	www.Csmwm.org	Specialize in Depression Help , Drug Reaction , Depression Drugs , Allergy Medicines , Drug Safety and an array of other products and services
Investigational Drugs		
13	www.clinicaltrials.gov	National Institutes of Health–Clinical Trials: Directory of clinical trials in progress. Can search by disease state or specific agent.
14	www.phrma.org/newmedicines/	Information on drugs in the pipeline. Can search by disease state and therapeutic categories. Good summary articles on topics related to drug development.
15	www.cancer.gov/clinicaltrials	National Cancer Institute: Specific for clinical trials to treat cancer
16	www.patientadvocate.org/	Patient Advocate Foundation : Patient resource i.e. it means to participate in clinical trials and use investigational drugs.
17	www.bioscorprio.com	Lists of investigational drugs in pipeline by disease state. Major limitation is must pay for additional information.
18	www.centerwatch.com	Provides trial data and email-notification services to patients interested in participating in clinical trials. Professional investigation drug information can be found after subscribing to the service for a substantial fee.

Drug Literature:

The concept of drug information service or drug information center is an attempt to document drugs by abstracting information about them. The information about drugs is collected from various sources which are available. In 1972 Walton et al modeled the drug literature as a pyramid with the primary literature forming the base of the pyramid, the secondary literature interfacing and serving as a bridge from the primary literature to reference works (tertiary literature).

1. **Primary Literature:**

Primary literature contains the first written accounts of original research. In terms of size, the primary literature is probably larger than either the secondary or tertiary literature. It is the original information presented by the author without any evaluation by the second party, for example, articles published in journals, dissertations, conferences, etc.

2. **Secondary Literature:**

In this original information is modified, condensed, commented upon by other persons like review articles, abstracts, text books, etc. These include - Indexing and Abstracting services, Evaluated Secondary Resources and Internet search engines.

3. **Tertiary Literature:**

In this information is gathered from primary and secondary sources and arranged in such a manner to give coupled

information. The tertiary literature is a distillation and evaluation of data and information first presented in such primary literature sources as research reports, meeting presentations, and journal articles. But just as characteristic, the tertiary is the most accessible, easiest to use, and perhaps the most used of all information resources. Information searches generally start with a perusal of books, reviews, and handbooks. These include - Aggregated and linked references such as MICROMEDEX Systems and StatRef.

✚ Advantages of Computerized Literature Retrieval:

- ✓ Save time, space, money
 - ✓ Save effort, person-hours and greater efficiency.
 - ✓ Online Computerized services offer Term Searching of Fields, Controlled vocabulary and Indexes.
 - ✓ Online Computerized services offer Search Commands for Creating search sets, Boolean operation, Word searching and Search limiting.
 - ✓ Online Computerized databases offer Computerized greater Precision.
 - ✓ Qualitatively different kinds of searches are possible.
 - ✓ Easier to assess quality of information found More cues: authorship, institutional affiliation, reputation, references, ...
 - ✓ Processing of search results: Sort, rank, report, export, integration with Intranet/portal, ...
 - ✓ Highly Focused information that is actionable
 - ✓ They offer evidence for their claims.
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- ✓ Provides great reading with a wealth of knowledge.
 - ✓ Broadened perspective.
 - ✓ Most articles contained in journals include graphs, tables, images & photographs, videos, etc., which help illustrate the information being portrayed.
 - ✓ Unlike in the print copies days when you could only access information physically in libraries, academic journals online come with the option of free downloads which allow you to save material to your PC or Smartphone.
 - ✓ Online journals are like encyclopedias, offering information in large quantities to scholars. There's a wide variety of databases to source information from, but it's so much easier to access this information online because all you need is a computer and internet.
 - ✓ Academic journals include real life case studies which are excellent sources of in-depth information and knowledge.
 - ✓ Academic journals online come with several research options, which helps widen your scope. They allow you to explore both quantitative and qualitative research, for optimum results. With both, you can analyze statistical data, opinions, verbal data, etc.
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Use of Computerized Retrieval

Today computers provide us with powerful tools for drug information handling - for collection, organisation, classification, retrieval and distribution. Computers have been used since the late 1960s for the storage of large databases such as library catalogues and bibliographic references. Development of optical storage media such as CD-ROM has given us the possibility of storing large quantities of text, graphics, pictures, and sound at a low cost. These new optical memories can function as distributed stores for encyclopedias, databases, books etc. This has stimulated the development of local information systems.

These three aspects of computerized information retrieval:

- Library catalogues.
- Online databases.
- Databases on CD-ROM.

Types of databases

There are a number of types of databases:

1. **Library catalogues** - catalogues covering the holdings (books, reports, journals conference proceedings, etc.) of one or more library.
 2. **Bibliographic databases** containing bibliographic references, with or without abstracts.
 3. **Reference databases**, for example, current research projects, handbooks, encyclopedias, product suppliers, etc.
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4. **Factual databases or data banks** containing information, often in numerical form, which can be used directly, e.g. chemical structures, tables, terminology.
5. **Full-text databases** which contain the complete version of the text of given publications.

Computerised library catalogues

Computerised library catalogues were first introduced during the late 1960s. The online catalogue, known as the Online Public Access Catalogue, or OPAC, has gradually become more user friendly with the use of menus and simple commands. Access for users is now often in the form of a Web (World Wide Web) interface.

The computerised library catalogues allow you to:

- Check to see if a certain book or journal is available at the library or
- See which books are available on a specific subject
- See whether or not a book is currently available or out on loan.

Access to databases

Information from the primary sources has been collected together and organised under subject headings and authors in reference databases. These can be accessed in a number of ways:

- Searching online from a database mounted on a host computer from a commercial information retrieval service (IRS). This requires a password.
 - By means of a searchable compact disk CD-ROM database.
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- From a database with WWW interface mounted either locally or available from a remote server.

Online information retrieval from databases is the acquisition of information from a distant computer via a terminal or PC, involving an interactive dialogue between enquirer and computer. The computer handles a number of databases stored in electronic form, consisting of references to journal articles, conference papers, reports, books etc, which the Information Retrieval Service (IRS) or 'host' makes available to interested parties, such as university libraries, on a commercial basis.

CD-ROMs and WWW interfaces have been designed for end-users. They are relatively user-friendly and the search software is (more-or-less) self explanatory. Today, CD-ROMs often are mounted on a server so in reality the user will not be able to notice any differences between using online databases or a CD-ROM.
