How the National Library of Medicine can help health-system pharmacists

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DISCLAIMER

The views and opinions expressed in this presentation are those of the presenter and should not be attributed to the National Library of Medicine (NLM) and/or the National Institutes of Health (NIH)

Please feel free to stay in touch, including possible comments about anything you might want to publish related to NLM resources

Learning Objectives

• Understanding of the National Library of Medicine’s:
  • Resources of likely interest to health-system pharmacists and other healthcare professionals (be able to describe at least five)
  • New tools and approaches being used to make information more accessible (be able to describe at least two)
  • Easy ways to stay updated about NLM resources (be able to describe at least two)
Today’s handout

Web Resources for Pharmacy Professionals


Recent publication related to today’s presentation

U.S. National Library of Medicine (NLM)

NLM’s Mission: Collect, organize, preserve, and disseminate health-related information.

- World’s largest biomedical library
- Millions of items in collection
- Services: PubMed, MedlinePlus, and many others
- Research and Development
  - Biomedical informatics and communications
- Quite new focus: Disaster information
NLM’s challenges

Need to identify and compile authoritative, trustworthy information

Information needs to meet the needs of the users

Users need to have access when and where they need it

Users need easy access, e.g., during emergencies

Information evolves

Ways to deliver and access the information evolve

Information Technologies are Changing

2001 (only 14 years ago!)

“Global toxicology and risk analysis: Roles of the Internet and World Wide Web” journal article

Toxicology 160: 59-63.


“Finding the best ways to keep current with the literature and other information associated with the many aspects of toxicology and risk analysis is a challenge and opportunity, as are access to good sources of training and staying aware of the applicable regulations in various countries and regions.”
What almost everyone uses =
PubMed

PubMed
http://pubmed.gov
PubMed includes over 25 million citations from MEDLINE, life science journals, and online books.
Citations may include links to full-text articles from PubMed Central or publisher websites.
Not every science journal is in PubMed. Let publishers know.
PubReader
PubMed Commons
PubMed Commons Journal Clubs

What everyone might want to use =
MedlinePlus
MedlinePlus Includes Poisoning, Toxicology, and Environmental Health Information

What everyone might want to use =

NLM’s Specialized Information Services Division resources

http://sis.nlm.nih.gov/

The Specialized Information Services Division (SIS) of the NLM is responsible for information resources and services in:

- Toxicology
- Environmental health
- Chemical and drug information
- HIV/AIDS
- Specialized topics in minority & other special populations health
- Disaster information
Suggested starting points to http://sis.nlm.nih.gov/enviro.html


Examples

Lactation: Drug information for breastfeeding mothers and their nursing infants including maternal/infant drug levels and possible effects

Drug-induced liver injury: Evidence-based information on prescription and over-the-counter drugs, herbs, and dietary supplements.

Drug information including names, descriptions, labels, drug categories and links to additional resources

Dietary Supplements: Ingredients, health benefit claims and manufacturer information for dietary supplements with links to research

**TOXNET® (TOXicology Data NETwork):**

- A suite of databases covering toxicology, hazardous chemicals, environmental health and related areas.
- Linked to PubMed®

**TOXNET®**

toxnet.nlm.nih.gov

Databases on toxicology, hazardous chemicals, environmental health, and toxic releases.

**Two TOXNET databases of high likely interest to pharmacists:**

- **Hazardous Substances Data Bank (HSDB®)**
  - Comprehensive, peer-reviewed toxicology and environmental data for chemicals, including specific information on drugs and supplements

- **LactMed® (Drugs and Lactation Database)**
  - Database of drugs, dietary supplements, and other chemicals to which breastfeeding mothers may be exposed and the effects of those agents on nursing infants and lactation

**Hazardous Substances Data Bank (HSDB®)**

The focus is on toxicology.

It is enhanced with information on human exposure, industrial hygiene, emergency handling procedures, environmental fate, regulatory requirements, nanomaterials, and related areas.

All data are referenced and derived from a core set of books, government documents, technical reports and selected primary journal literature.

HSDB is peer-reviewed by the Scientific Review Panel (SRP), a committee of experts in the major subject areas within the data bank’s scope. HSDB is organized into almost 6,000 substance records.
LactMed® (Drugs and Lactation)

Database of drugs and other chemicals to which breastfeeding mothers may be exposed.

Information on the levels of such substances in breast milk and infant blood, and the possible adverse effects in the nursing infant.

Statements of the American Academy of Pediatrics concerning a drug's compatibility with breastfeeding are provided, as are suggested therapeutic alternatives to those drugs where appropriate.

All data are derived from the scientific literature and fully referenced.

TOXNET®
toxnet.nlm.nih.gov

Two other TOXNET databases of interest to pharmacists:

ChemIDplus®

ChemIDplus Lite
Online dictionary of chemical substances cited in NLM databases and other Internet resources

ChemIDplus Advanced
Advanced includes chemical structure, toxicity, and physical property searching

Comparative Toxicogenomics Database (CTD)

ChemIDplus®

ChemIDplus contains several hundred thousand chemical records, most of which include chemical structures.

ChemIDplus is searchable by Name, Synonym, CAS Registry Number, Molecular Formula, Classification Code, Locator Code, Structure, and/or Physical properties.

Enhanced structure display is available in ChemIDplus Advanced.
Added in 2011 and now being enhanced:
Comparative Toxicogenomics Database (CTD)

- Includes extensive curated information describing relationships between chemicals, genes, proteins, exposures, and human diseases.
- Primary goal to advance the understanding of the effects of chemicals on human health.
- Housed at North Carolina State University, with funding from NIH’s National Institute of Environmental Health Sciences and previously from NLM.

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The Comparative Toxicogenomics Database's 10th year anniversary: update 2015

Click [here](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4384013/) to access the full content of the CTD via TOXNET's version.
Haz-Map®
Primarily for health and safety professionals, but also for consumers seeking information about the health effects of exposure to chemicals and biologicals at work.
Links jobs and hazardous tasks with occupational diseases and their symptoms.

Mobile-optimized Web interface

Selected links to information on environmental health, toxicology, disasters, chemicals, drugs, & special populations
**DRUG INFORMATION DATABASES**

- Drug Information Portal – 2007
- LactMed – 2006
- LiverTox – 2012
- Pillbox – 2012

*Also: Dietary Supplement Label Database - 2013*
• DailyMed provides trustworthy information about marketed drugs in the United States.
• Is the official provider of FDA label information (package inserts).
• Provides a standard, comprehensive, up-to-date, look-up and download resource of medication content and labeling found in medication package inserts.
• NLM provides this as a public service and does not accept advertisements.
• The drug labeling information on this Web site is the most recent submitted to the FDA and currently in use; it may include, for example, strengthened warnings undergoing FDA review or minor editorial changes. These labels have been reformatted to make them easier to read.

Drug Information Portal

Drug Information Portal

Portal to current drug information from NLM and other Federal agencies. Resources cover the time drugs are in clinical trials, through their FDA approval process, and then on to the marketplace. Coverage includes drug names and their synonyms, drugs with official generic name status such as USAN (United States Adopted Name) or INN (International Nonproprietary Name).

druginfo.nlm.nih.gov
LactMed® (Drugs and Lactation) Database of drugs and other chemicals to which breastfeeding mothers may be exposed.

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LiverTox®

Comprehensive clinical and research information and a case registry on liver injury attributable to about 1,000 prescription and nonprescription drugs, herbals, and dietary supplements.

livertox.nih.gov
Pillbox is a repository of images of pharmaceutical solid oral dosage forms with metadata used for an intuitive identification system.

It combines high-resolution imaging with tablet/capsule physical appearance data that include color, imprint, scoring, shape, and size.

This identification system, which is in the public domain, is of considerable use to health care providers and institutions, emergency personnel, poison control centers, and the public.

Efforts have been in progress for the images to possibly become the FDA-structured product labeling standard for submission by pharmaceutical manufacturers.
Dietary Supplement Label Database

Collaborative project between the Office of Dietary Supplements (ODS) at NIH and NLM, containing full label contents from US marketed dietary supplements and providing search features important for researchers.

www.dsld.nlm.nih.gov
Additional Resources

ClinicalTrials.gov

Searchable database providing information about ongoing clinical research studies on drugs and treatments.

Clinical Trials Database
https://clinicaltrials.gov/
NLM Disaster and Emergency Response Tools

- Wireless Information System for Emergency Responders (WISER) --- released about twelve years ago
- Chemical Hazards Emergency Medical Management (CHEMM) --- released in mid-2011
- Radiation Emergency Medical Management (REMM) --- released about eight years ago

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WisER Platforms – Partial History

- Palm Pilot
- Pocket PC
- Laptop
- WebWisER
- Android
- BlackBerry
- iPhone

February 2011

- FDU 3.1, and with CHEMM

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Chemical Hazards Emergency Medical Management (CHEMM)

- A comprehensive, user-friendly resource that enables first responders, first receivers, other healthcare providers, & planners to plan for, respond to, recover from, & mitigate the effects of mass-casualty chemical incidents.
- Collaboration between NLM & ASPR + many medical, emergency response, toxicology, industrial hygiene experts.
- Available on the Internet; downloadable to PCs & Macs.
Role-based Navigation and Key Features

- Why integrate?
  - Users won’t remember multiple tools in emergencies/disasters
- Expands WISER’s Audience
  - 1st Responder
  - Hazmat Specialist
  - EMS
  - Hospital Provider
  - Preparedness Planner
  - Role-based content
- iOS and Android
- WISER for Windows and WebWISER

Incorporation of CHEMM into WISER apps

Customized Acute Care Substance Data

Mass casualty chemical incident information from CHEMM
CHEMM-IST
CHEMM Intelligent Syndrome Tool

- Question and answer driven
- Predicts a toxic syndrome/group as opposed to an individual chemical

A Web site for easy access to these tools

NLM's Specialized Information Services
Division resources
Where to get additional training about these resources

Some ways to stay informed

@NLM_SIS – Clinical and non-clinical toxicology, environmental health and disaster information updates

https://service.govdelivery.com/accounts/USNMTEH/subscriber/new
http://sis.nlm.nih.gov/listservnewsmedia.html#listserv

http://www.nlm.nih.gov/mobile/
Recap

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