

# The (U.S.) National Library of Medicine: Collecting, Organizing, and Disseminating Information in Toxicology, Exposure Science, and Risk Assessment

Pertti (Bert) Hakkinen, Ph.D.  
Acting Head, Office of Clinical Toxicology

OpenTox USA InterAction Meeting  
October 30, 2013



U.S. National Library of Medicine



# Personal Background

Disclaimer

# Learning Objectives

- Understanding of the National Library of Medicine's toxicology and environmental health databases, and other NLM resources.
- Where to look for various types of information.
- Opportunities to interact with us.

# 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**

### Databases

PubMed/MEDLINE  
MeSH  
UMLS  
ClinicalTrials.gov  
MedlinePlus  
TOXNET  
Images from the History of Medicine  
LocatorPlus  
All NLM Databases & APIs



**ToxMystery**  
Interactive site that helps children learn about household chemicals.

REPLAY 

WHAT'S WRONG IN THIS ROOM, a ToxMystery activity. Enter the house by clicking on the front door.

**NATIVE VOICES**  
**HSRIC**  
**GHR**  
**ToxMystery**

### Find, Read, Learn

Search biomedical literature  
Find medical terminologies  
Search NLM collections  
Read about diseases  
Learn about drugs  
Explore history  
Find a clinical trial  
Use a medical dictionary  
Find free full-text articles

### Explore NLM

About NLM  
Health Information  
Library Catalog & Services  
History of Medicine  
Online Exhibitions & Digital Projects  
Information for Publishers  
Visit the Library

### Research at NLM

Human Genome Resources  
Biomedical Research & Informatics  
Environmental Health & Toxicology  
Health Services Research & Public Health  
Health Information Technology

### NLM for You

Grants & Funding  
Meaningful Use Tools  
Training & Outreach  
Network of Medical Libraries  
Regional Activities  
Careers @ NLM  
Mobile Gallery

### News & Events

- The NLM Medical Text Indexer Providing Baseline for International BioASQ Challenge (08/06/13)
- NLM Announces Release of Pill Images (07/23/13)
- Grande Dame of Indexing at the National Library of Medicine, Thelma Charen, Dies (07/17/13)
- NLM to Participate with Partners in "An Epidemiology of Information: New Methods for Interpreting Disease and Data" (07/11/13)



Technical Bulletin



Connect with NLM



Multimedia Exhibition



Podcasts



NLM Tools & Widgets

[Copyright](#), [Privacy](#), [Accessibility](#), [Site Map](#), [Viewers and Players](#)  
U.S. National Library of Medicine, 8600 Rockville Pike, Bethesda, MD 20894   
[National Institutes of Health](#), [Health & Human Services](#)  
[Freedom of Information Act](#), [Contact Us](#)

**First published:** 10 October 1993  
**Last updated:** 06 August 2013  
**Permanence level:**  
Permanent: Dynamic Content

# PubMed

<http://pubmed.gov>

PubMed includes over 23 million citations from MEDLINE, life science journals, and online books.

Citations may include links to full-text articles from PubMed Central or publisher web sites.

Not every science journal is in PubMed. Let publisher/us know.

[My NCBI](#) – store searches; automatic updates

**NLM's efforts include**  
collecting, organizing, preserving,  
and disseminating information  
on  
toxicology, exposure science,  
risk assessment, and risk management

**Plus:** Offer tools and training

# Information Technologies are Changing

2001

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

Toxicology 160: 59-63.

<http://www.ncbi.nlm.nih.gov/pubmed/11246124>

“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.”



# WISER (For Emergency Responders) Platforms – History



Palm Pilot



Pocket PC



Laptop

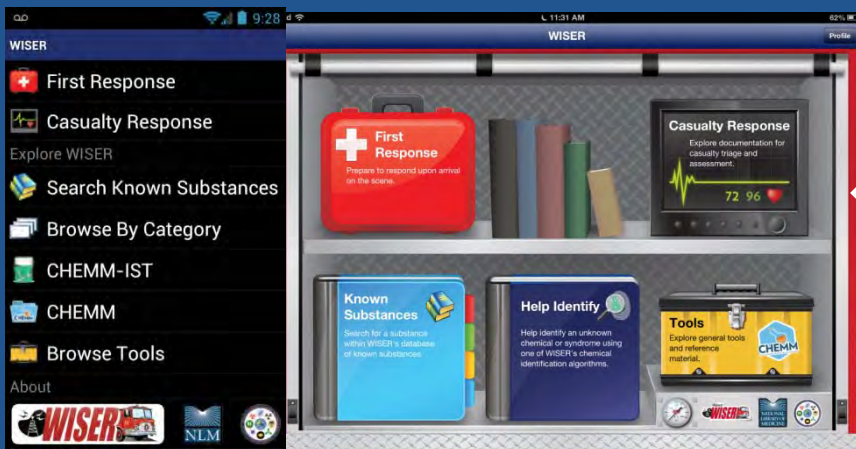


WebWISER



March and May 2013

August 2011



iOS 3.1, and with CHEMM



Android



BlackBerry



iPhone

## 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

<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
- Chemistry
- HIV/AIDS
- Specialized topics in minority & other special populations health
- Disaster information

The screenshot shows the homepage of the Specialized Information Services (SIS) website. At the top, it features the U.S. Department of Health & Human Services logo and the URL www.hhs.gov. The main header is green with the text "Specialized Information Services" and the National Library of Medicine logo. Below the header is a navigation menu with links for "SIS HOME", "ABOUT US", "A-Z INDEX", "SIS NEWS", and "CONTACT US". The main content area includes a search bar with the word "search" in a large font, a "CHEMM" logo, and a section for "Chemical Hazards Emergency Medical Management" with a description and a progress indicator. Below this is a section titled "TOXICOLOGY, ENVIRONMENTAL HEALTH, CHEMISTRY, HIV/AIDS, DISASTER HEALTH, AND TOPICS RELEVANT TO SPECIFIC POPULATIONS" with six featured topics, each with an image and a brief description: "Environmental Health & Toxicology", "Chemical and Drug Information", "HIV/AIDS", "Outreach Activities & Resources", "Disaster Information Management Research Center", and "Directory of Health Organizations". At the bottom, there is a "Connect with Us" section with icons for Facebook, Twitter, Mobile, RSS, and Share.

Suggested starting points to <http://sis.nlm.nih.gov/enviro.html>

The screenshot shows the homepage of the Environmental Health & Toxicology (EHT) website. At the top, it features the U.S. Department of Health & Human Services logo and the National Library of Medicine logo. The main navigation bar includes links for SIS Home, About Us, Site Map & Search, SIS News, and Contact Us. A central banner displays a blue container with hazard symbols and the text "EXTREME DANGER • DANGEROUS TO LIFE AND HEALTH". Below the banner is the heading "Information About Poisoning".

On the left side, a vertical menu titled "Find Information About..." lists several categories, with red arrows pointing to "Especially For", "Search TOXNET® Databases", "Other Professional Resources", "Resources for the Public", and "Enviro-Health Links".

In the bottom left, there is a "Search Our Web Site" box with a search input field and a "Search" button. Below it is an "A to Z Index of Resources" grid and an "About TEHIP" section with links to "Toxicology & Environmental Health Information Program", "Which Resource Should I Use?", and "Contact Us: Provide Feedback".

The central "For Information About..." section contains three items: "Pillbox Beta" (with a red arrow pointing to it), "Household Products Database", and "Toxics Releases".

On the right side, there are several informational boxes: "Search TOXNET" (with a search input field and a red arrow pointing to it), "In the Spotlight" (listing "Chemical Hazards Emergency Medical Management (CHEMM)", "LactMed App", "TOXNET Mobile Access", "Which Resource Should I Use?", and "Environmental Health Student Portal"), "Stay Connected" (with links for "Join the Listserv", "Subscribe to RSS", "Follow us on Twitter", and "Bookmark and share"), and "News & Events" (with links for "SIS News" and "Calendar of Events").

At the bottom center, there is a logo for the 175th National Library of Medicine.

# New Especially for Toxicologists Page – November 2012

- Guide to NLM resources on environmental health, toxicology, and chemical information for toxicologists.
- <http://sis.nlm.nih.gov/enviro/especiallytoxicologists.html>

U.S. Department of Health & Human Services [www.hhs.gov](http://www.hhs.gov)

**Environmental Health & Toxicology**  
SPECIALIZED INFORMATION SERVICES

National Library of Medicine  
National Institutes of Health **NLM**

[SIS Home](#) | [About Us](#) | [Site Map & Search](#) | [SIS News](#) | [Contact Us](#)

[SIS Home](#) > [Environmental Health and Toxicology](#)

Text size: [S](#) [M](#) [L](#) [XL](#)  
[Bookmark and share](#)

## Especially for Toxicologists

### Starting Points

- ▶ **TOXNET**  
Databases on hazardous chemicals, environmental health, and toxic releases
  - **ChemIDplus - Chemical Identification Plus**  
Dictionary of chemical names, synonyms, and structures. Links to related NLM databases and other resources
    - **ChemIDplus Advanced**  
Structure searching for a subset of the substances in ChemIDplus
  - **CTD - Comparative Toxicogenomics Database**  
Data describing the relationship between chemicals, genes and human diseases
  - **DART - Developmental and Reproductive Toxicology Database**  
References to teratology, developmental and reproductive toxicology literature
  - **GENE-TOX - Genetic Toxicology Data Bank**  
Peer-reviewed genetic toxicology test data
  - **Haz-Map**  
Links jobs and hazardous tasks with occupational diseases. For professionals and consumers.
  - **Household Products Database**  
Safety and health information for products used in and around the home
  - **HSDB - Hazardous Substances Data Bank**

**Search TOXNET for:**

- All TOXNET Databases
- TOXLINE
- HSDB
- Haz-Map
- ChemIDplus
- Household Products Database
- LactMed

**Search**

Which Resource Should I Use?  
[Database Descriptions](#)  
[TOXNET FAQs](#)  
[PubMed toxicology search](#)

http://sis.nlm.nih.gov/enviro/decisionguide.html

The screenshot shows the top navigation bar with the U.S. Department of Health & Human Services logo and the URL www.hhs.gov. The main header features the 'Environmental Health & Toxicology' logo with the tagline 'SPECIALIZED INFORMATION SERVICES' and the National Library of Medicine logo. A secondary navigation bar includes links for 'SIS Home', 'About Us', 'Site Map & Search', 'SIS News', and 'Contact Us'. The page content includes a breadcrumb trail 'SIS Home > Environment Health and Toxicology', a text size selector (S, M, L, XL), and a 'Bookmark and share' link. The main heading is 'Which Resource Should I Use?'. The introductory text states: 'The National Library of Medicine's Environmental Health and Toxicology Portal provides a starting point for finding reliable information on toxicology, hazardous chemicals, environmental health, and toxic releases. This guide can help you select the right resource for your needs. Visit the database [table](#) for expanded descriptions and sample records for some of these resources.' Below this is a section titled 'Guide to choosing the right environmental health and toxicology resource' which contains a table with two columns: 'If you're looking for:' and 'Go to:'. The table lists various search criteria and their corresponding database resources.

SIS Home > Environment Health and Toxicology

Text size: [S](#) [M](#) [L](#) [XL](#)

[+ Bookmark and share](#)

### Which Resource Should I Use?

The National Library of Medicine's Environmental Health and Toxicology Portal provides a starting point for finding reliable information on toxicology, hazardous chemicals, environmental health, and toxic releases. This guide can help you select the right resource for your needs. Visit the database [table](#) for expanded descriptions and sample records for some of these resources.

#### Guide to choosing the right environmental health and toxicology resource

If you're looking for:	Go to:
Journal references to toxicology literature including birth defects information	<a href="#">TOXLINE</a> or <a href="#">DART</a>
Summaries of peer-reviewed human health effects and emergency medical treatment for chemicals	<a href="#">HSDB</a>
Animal Toxicity Studies	<a href="#">HSDB</a>
Environmental Fate, Exposure, Standards and Regulations	<a href="#">HSDB</a>
Chemical/Physical properties and safety/handling/disposal of chemicals	<a href="#">HSDB</a>
Manufacturing, formulation and use of chemicals	<a href="#">HSDB</a>
Chemical names and synonyms	<a href="#">ChemIDplus Lite</a> or <a href="#">HSDB</a>

http://sis.nlm.nih.gov/enviro/databasedescriptions.html

The screenshot shows the top navigation bar with the U.S. Department of Health & Human Services logo and the URL www.hhs.gov. The main header features the 'Environmental Health & Toxicology' logo with the tagline 'SPECIALIZED INFORMATION SERVICES' and the National Library of Medicine logo. A secondary navigation bar includes links for 'SIS Home', 'About Us', 'Site Map & Search', 'SIS News', and 'Contact Us'. Below the navigation, the breadcrumb 'SIS Home > Environment Health and Toxicology' is visible, along with text size options (S, M, L, XL) and a 'Bookmark and share' button. The main heading is 'Environmental Health, Toxicology and Chemical Database Descriptions'. A paragraph explains that the portal provides a starting point for finding reliable information on toxicology, hazardous chemicals, environmental health, and toxic releases, and includes a link to a guide for selecting the right resource. The central focus is a table titled 'Summaries of the Environmental Health and Toxicology Databases'.

Database	Fact Sheet	Description	Sample Records
<a href="#">Alternatives to Animal Testing - ALTBIB</a>	<a href="#">ALTBIB</a>	Searchable bibliography on alternatives to the use of live vertebrates in biomedical research and testing	<a href="#">Corrositex</a>
<a href="#">Chemical Carcinogenesis Research Information System</a>	<a href="#">CCRIS</a>	Chemical records with carcinogenicity, mutagenicity, tumor promotion, and tumor inhibition test results	<a href="#">Phenol</a>
<a href="#">Carcinogenic Potency Database</a>	<a href="#">CPDB</a>	Results of chronic, long-term animal cancer tests on chemicals	<a href="#">Benzene</a>
		Designed for simple searching on name or	

# Selected links to information on environmental health, toxicology, disasters, chemicals, drugs, & special populations

## Pathways for Public Health Information

Selected links to information on environmental health and toxicology, disasters, chemicals, drugs, and special populations

See our [Selection Criteria](#) to learn how we choose the materials for these guides

Enviro-Health Links	Disaster Health Links	Targeted Populations
<ul style="list-style-type: none"> <li>▸ Arsenic and Human Health</li> <li>▸ Climate Change and Health</li> <li>▸ Developing and Using Medicines for Children</li> <li>▸ Dietary Supplements</li> <li>▸ Education, Careers and Outreach in Toxicology and Environmental Health</li> <li>▸ Environmental Justice Internet Guide</li> <li>▸ Epigenomics</li> <li>▸ Hexavalent Chromium and Other Chromium Compounds</li> <li>▸ Imported (Chinese) Drywall</li> <li>▸ Indoor Air</li> <li>▸ Keeping the Artist Safe: Hazards of Arts and Crafts Materials</li> <li>▸ Laboratory Safety</li> <li>▸ Lead and Human Health</li> <li>▸ Mercury and Human Health</li> <li>▸ Nanotechnology</li> <li>▸ Outdoor Air</li> <li>▸ Pesticide Exposure including Pesticides used for Bed Bugs</li> <li>▸ Tobacco, Smoking, and Health</li> <li>▸ Toxicology Web Links</li> <li>▸ Toxicogenomics</li> <li>▸ Water Pollution</li> <li>▸ West Nile Virus: Pesticides Used for Mosquito Control</li> </ul>	<ul style="list-style-type: none"> <li>▸ Animals in Disasters</li> <li>▸ Biological Warfare</li> <li>▸ Chemical Emergencies                             <ul style="list-style-type: none"> <li>• Chemical Warfare</li> <li>• Crude Oil Spills and Health</li> <li>• TVA Kingston Fossil Plant Coal Ash Spill</li> </ul> </li> <li>▸ Community Preparedness</li> <li>▸ Coping with Disasters, Violence and Traumatic Events</li> <li>▸ Disaster Apps and Mobile Optimized Web Pages</li> <li>▸ Disaster Recovery</li> <li>▸ Disaster-Related Competencies for Healthcare Providers</li> <li>▸ Fires and Wildfires</li> <li>▸ Floods</li> <li>▸ Geological                             <ul style="list-style-type: none"> <li>• Earthqua</li> <li>• Japan Ea</li> <li>• Haiti Eart</li> <li>• Chile Earthquake</li> </ul> </li> <li>▸ H1N1 Flu (Swine Flu)</li> <li>▸ Health Effects from the Collapse of the World Trade Center</li> <li>▸ Personal Preparedness</li> <li>▸ Public Health Preparedness for Mass Gatherings</li> <li>▸ Sources of Emergency and Disaster Health Information from the U.S. Government</li> <li>▸ Special Populations: Emergency and Disaster Preparedness</li> <li>▸ Tornadoes</li> <li>▸ Weather and Storms                             <ul style="list-style-type: none"> <li>• Climate Change and Health</li> <li>• Droughts</li> <li>• Extreme Heat</li> <li>• Floods</li> <li>• Hurricanes</li> <li>• Hurricane Sandy</li> <li>• Hurricanes Katrina, Rita, Wilma: Impact on Environmental Health</li> <li>• Tornadoes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▸ American Indian Health</li> <li>▸ Arctic Health</li> <li>▸ Asian American Health Web Site</li> <li>▸ Children's Environmental Health Information Resources</li> <li>▸ Multi-Cultural Resources for Health Information</li> <li>▸ Refugee Health Information Network (RHIN®)</li> <li>▸ Women's Health Resources</li> </ul>

<http://sis.nlm.nih.gov/pathway.html>



# Toxicology Web Links “Enviro-Health Links” Page (most recent update on October 17, 2013)

The screenshot shows the top navigation bar of the Environmental Health & Toxicology website. It includes the U.S. Department of Health & Human Services logo and the website URL www.hhs.gov. The main header features the text 'Environmental Health & Toxicology' with 'SPECIALIZED INFORMATION SERVICES' underneath, and the National Library of Medicine logo. A secondary navigation bar contains links for 'SIS Home', 'About Us', 'Site Map & Search', 'SIS News', and 'Contact Us'. The main content area shows the breadcrumb 'SIS Home > Environmental Health & Toxicology' and the page title 'Enviro-Health Links - Toxicology Web Links'. On the right side, there are text size options (S, M, L, XL) and a 'Bookmark and share' button. The main content lists several categories: 'U.S. Government', 'International Resources', 'Associations and Societies', and 'Additional Resources'. Under 'U.S. Government', there are two main bullet points: one for the Agency for Toxic Substances and Disease Registry (ATDSR) with sub-links for Minimal Risk Levels, Public Health Assessments, ToxFAQs™, Toxic Substances Portal, Toxicological Profiles, and Case Studies in Environmental Medicine; and another for the Centers for Disease Control and Prevention (CDC) with sub-links for Mining: Safety and Health Research, Morbidity and Mortality Weekly Report, National Center for Environmental Health, and National Center for Health Statistics.

U.S. Department of Health & Human Services [www.hhs.gov](http://www.hhs.gov)

Environmental Health & Toxicology  
SPECIALIZED INFORMATION SERVICES

National Library of Medicine  
National Institutes of Health

[SIS Home](#) | [About Us](#) | [Site Map & Search](#) | [SIS News](#) | [Contact Us](#)

SIS Home > Environmental Health & Toxicology

**Enviro-Health Links - Toxicology Web Links**

Text size: [S](#) [M](#) [L](#) [XL](#)  
 [Bookmark and share](#)

**U.S. Government**  
**International Resources**  
**Associations and Societies**  
**Additional Resources**

**US Government**

- Agency for Toxic Substances and Disease Registry (ATDSR)
  - Minimal Risk Levels
  - Public Health Assessments
  - ToxFAQs™
  - Toxic Substances Portal
  - Toxicological Profiles
  - Case Studies in Environmental Medicine
- Centers for Disease Control and Prevention (CDC)
  - Mining: Safety and Health Research
  - Morbidity and Mortality Weekly Report
  - National Center for Environmental Health
  - National Center for Health Statistics

## TOXNET® (TOXicology Data NETwork) is:

- A cluster of databases covering toxicology, hazardous chemicals, environmental health and related areas.
- Accessible free of charge at <http://toxnet.nlm.nih.gov>
- Linked to PubMed®

The screenshot shows the TOXNET website interface. At the top left is the United States National Library of Medicine (NLM) logo. The main header features the TOXNET logo and the text 'Toxicology Data Network'. A navigation bar includes links for 'TOXNET Mobile Access', 'SIS Home', 'About Us', 'Site Map & Search', and 'Contact Us'. Below the navigation bar, there are breadcrumb links for 'Env. Health & Toxicology' and 'TOXNET'. The main content area is titled 'TOXNET - Databases on toxicology, hazardous chemicals, environmental health, and toxic releases.' and is divided into three columns. The left column, 'Select Database', lists various databases such as ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, and TOXMAP. The middle column, 'Search All Databases', contains a search box with the prompt 'Enter term(s) to search all databases.' and a 'Search' button. Below the search box are 'TOXNET Search Options' including 'Search all databases: Enter term(s) in box above', 'Search a specific database: Click database at left', and 'Database description: Click on the [?]' icon. The right column, 'Env. Health & Toxicology', features a 'Portal to environmental health and toxicology resources' with a 'VISIT SITE' button. Below this is a 'Support Pages' section with links to 'Help', 'TOXNET FAQ', 'TOXNET Update Status', 'Fact Sheet', 'Database Description', 'Training Manual & Schedule', and 'News'. At the bottom left, there is an 'Additional Resource' section with links to 'CPDB' and 'CTD'.

## Toxicology Data Network (TOXNET): Examples

- **Hazardous Substances Data Bank** – comprehensive toxicological information on almost 6,000 substances (human and animal toxicity, safety and handling, environmental fate, and more). Scientifically peer-reviewed.
- **TOXLINE** - Extensive array of references to literature on biochemical, pharmacological, physiological, and toxicological effects of drugs and other chemicals.
- **ChemIDplus** - Numerous chemical synonyms, structures, regulatory list information, and links to other databases containing information about the chemicals.
- **Haz-Map** – occupational health database; links jobs and job tasks to symptoms and hazardous substances.
- **Latest (2011): Comparative Toxicogenomics Database**

## ITER (International Toxicity Estimates for Risk)

Data in support of human health risk assessments. It is compiled by [Toxicology Excellence for Risk Assessment \(TERA\)](#) and contains over 680 chemical records.

Comparison of international risk assessment information in a side-by-side format and explains differences in risk values and cancer classifications derived by different organizations.

Focuses on hazard identification and dose-response assessment, is extracted from each agency's assessment, and contains links to the source documentation.

**Table of Contents**

- Full Record
- Substance Identification/Summary Table
- Substance Name
- CAS Registry Number
- Risk Values - Summary Table
- Data - Noncancer Oral
  - Noncancer Oral Risk Values Table
  - Noncancer Oral Symptoms
  - Noncancer Oral Specifics
- Data - Cancer Oral
  - Cancer Oral Risk Values Table
  - Cancer Oral Symptoms
  - Cancer Oral Specifics
- Data - Noncancer Inhalation
  - Noncancer Inhalation Risk Values Table
  - Noncancer Inhalation Symptoms
  - Noncancer Inhalation Specifics
- Data - Cancer Inhalation
  - Cancer Inhalation Risk Values Table

**BENZENE**  
CASRN: 71-43-2

For other data, click on the Table of Contents:

**Substance Identification/Summary Table:**

Substance Name: BENZENE  
CAS Registry Number: 71-43-2

**Risk Values - Summary Table:**

Risk Value Type \ Organization	ATSDR	Health Canada	IARC	IPRV	ITER PR	NSE Int'l	RIVM	U.S. EPA
Noncancer Oral	✓	✓	✓	---	---	---	✓	✓
Cancer Oral	✓	✓	---	---	---	---	✓	✓
Noncancer Inhalation	✓	✓	---	---	---	---	✓	✓
Cancer Inhalation	✓	✓	✓	---	---	---	✓	✓

✓ = Chemical evaluated and ITER data online.



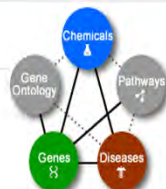


### Connect. Compare.

CTD illuminates how environmental chemicals affect human health. [More...](#)

### Discover.

1. What human diseases are associated with a [gene/protein](#)? (Example)
2. What human diseases are associated with a [chemical](#)? (Example)
3. What genes/proteins interact with a [chemical](#)? (Example)
4. What chemicals interact with a [gene/protein](#)? (Example)
5. What references report a [chemical-gene/protein interaction](#)? (Example)
6. What cellular functions (GO terms) are affected by a [chemical](#)? (Example)



#### Keyword Search

All data

Name, ID, author...

Search Advanced searches

CTD contains **5,183,383** toxicogenomic relationships.

#### Recently Updated Chemicals

1,3-butylene glycol Arsenic arsenic trioxide arsenite bis(tri-n-butyltin)oxide  
 bortezomib Cacodylic Acid Cadmium Chloride dimethylarsinous acid  
 Formaldehyde Genistein monomethylarsonous acid orlistat sodium arsenate  
 sodium arsenite zoledronic acid

#### Recently Updated Diseases

#### Recently Updated Genes

#### News

- July 11, 2011  
[New data available!](#)
- July 5, 2011  
New Bioinformatics Primer: [Understanding environment-disease connections: An introduction to the Comparative Toxicogenomics Database \(CTD\)](#)
- April 14, 2011  
Enriched pathway relationships for chemicals are now available.
- March 3, 2011  
Download the [2011 CTD Resource Guide](#).
- March 3, 2011  
ChemComps now feature Cytoscape Web visualizations of gen
- December 28, 2010  
Network scoring added for inferred gene-disease relationship
- [All changes](#)

#### Get email news:

Email address

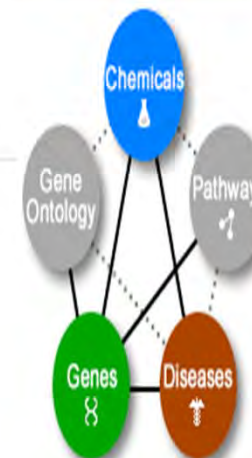
#### Our Latest Publication

- Davis AP, et al.  
The Comparative Toxicogenomics Database: update 2011.  
Nucleic Acids Res. 2011 Jan;39(Database issue):D1067-72. [E](#)

CTD illuminates how environmental chemicals affect human health. [More...](#)


### Discover.

1. What human diseases are associated with a [gene/protein](#)? (Example)
2. What human diseases are associated with a [chemical](#)? (Example)
3. What genes/proteins interact with a [chemical](#)? (Example)
4. What chemicals interact with a [gene/protein](#)? (Example)
5. What references report a [chemical-gene/protein interaction](#)? (Example)
6. What cellular functions (GO terms) are affected by a [chemical](#)? (Example)



# Mobile-optimized Web interface

YOUR SOURCE FOR THE LATEST SEARCHING INFORMATION



**NLM TECHNICAL BULLETIN**  
U.S. NATIONAL LIBRARY OF MEDICINE | NATIONAL INSTITUTES OF HEALTH

[Current Issue](#) | [Archive](#) | [Indexes](#) | [About](#) | [St](#)

---

## Mobile TOXNET Access











Mobile TOXNET Access. NLM Tech Bull. 2012 Jan-Feb;(384):b10

**2012 February 15** [posted]

Now you can access the NLM TOXNET with any mobile device.

<http://toxnet.nlm.nih.gov/pda/>

## TOXNET

 HSDB	>
 TOXLINE	>
 CCRIS	>
 DART	>
 GENE-TOX	>
 IRIS	>
 ITER	>
 LactMed	>
 TRI	>
 DIRLINE	>

# Additional Resources

## Things to Think About Today



# In 2012: An updated enhanced version of the ALTBI<sup>B</sup> Web portal

- Provides better and broader access to information on *in silico*, *in vitro*, and improved (refined) animal testing methods
- Also, information on the testing strategies incorporating these methods and other approaches.
- <http://toxnet.nlm.nih.gov/altbib.html>



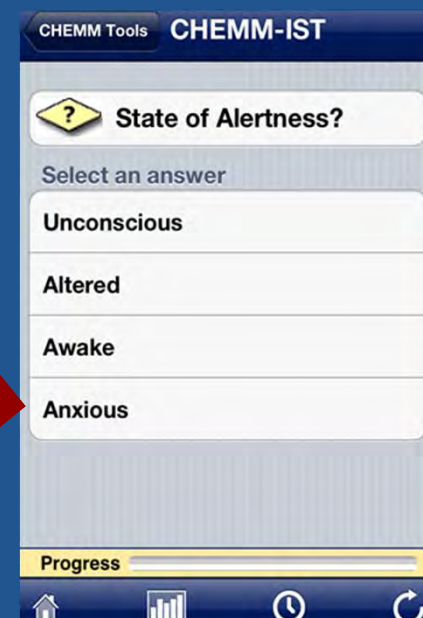
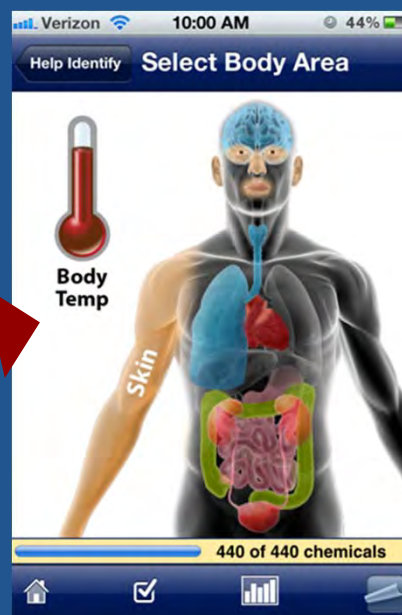
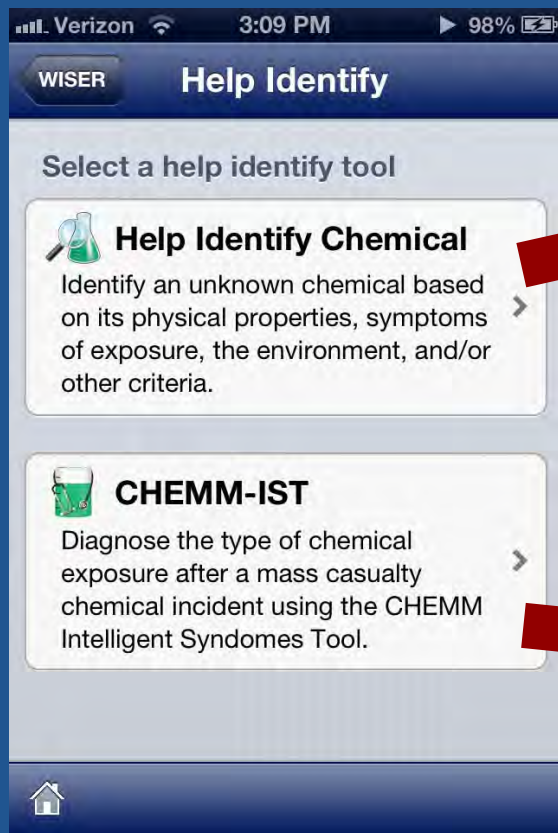
The screenshot shows the ALTBI<sup>B</sup> Web portal interface. On the left, there is a blue box with the NLM logo and the text "United States National Library of Medicine". To the right of this is a green banner with the text "ALTBI<sup>B</sup> Alternatives to Animal Testing" and a small image of a black and white mouse. Below the banner is a navigation bar with links for "SIS Home", "About Us", "Site Map & Search", and "Contact Us". Below the navigation bar is a breadcrumb trail: "Env. Health & Toxicology > ALTBI<sup>B</sup>". Below the breadcrumb trail is the text "Resources for Alternatives to the Use of Live Vertebrates in Biomedical Research and Testing". At the bottom, there are two green buttons: "Search Animal Alternatives Literature" and "Animal Alternatives News".

## New, Customized User Profiles

WISER now includes new hospital provider and preparedness profiles. All profiles now include a customized WISER home page, bringing relevant content to your fingertips.



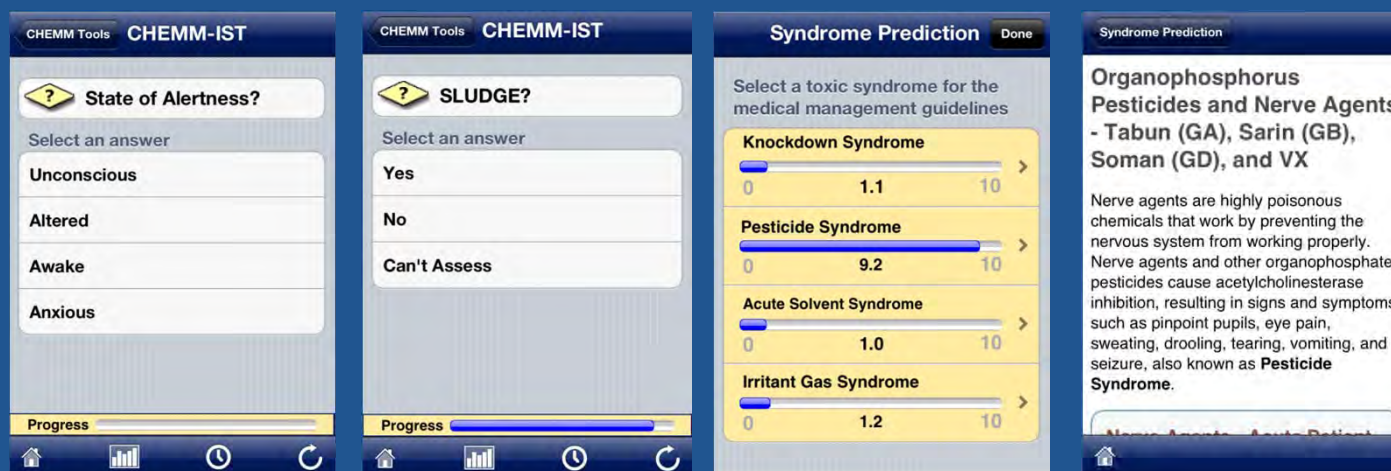
# New Help Identify Tool - CHEMM-IST



# CHEMM-IST

## CHEMM Intelligent Syndrome Tool

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



Do we collaborate? Yes!

A Recent Example



# Recap

- Understanding of the National Library of Medicine's toxicology and environmental health databases, and other NLM resources.
- Where to look for various types of information.
- Opportunities to interact with us.

**Pertti (Bert) J. Hakkinen, Ph.D.**

Acting Head, Office of Clinical Toxicology  
Specialized Information Services  
National Library of Medicine  
National Institutes of Health  
Bethesda, MD 20892 USA

[pertti.hakkinen@nih.gov](mailto:pertti.hakkinen@nih.gov)