

TOXNET and Beyond:

Using the National Library of Medicine's
Environmental Health and Toxicology Portal





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Environmental Health and Toxicology Portal

Disclaimer

Every effort has been made to ensure that the screen graphics and the exercises in this document are up to date and accurate. However, due to the frequency of Web updates, they may have changed.



The Oak Ridge Institute for Science and Education (ORISE) is a U.S. Department of Energy institute focusing on scientific initiatives to research health risks from occupational hazards, assess environmental cleanup, respond to radiation medical emergencies, support national security and emergency preparedness, and educate the next generation of scientists. ORISE is managed by Oak Ridge Associated Universities.

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Preface

Our lives are filled with chemical exposures. How do we discover more about these chemicals for ourselves and our organization? The National Library of Medicine's Environmental Health and Toxicology Portal provides access to numerous databases that can help you explore environmental chemicals and risks. *TOXNET and Beyond: Using the National Library of Medicine's Environmental Health and Toxicology Portal* conveys the fundamentals of searching the NLM TOXNET system of databases in chemistry, toxicology, environmental health, and related fields. In addition to TOXNET, the course will highlight various resources available through the Environmental Health and Toxicology Portal.

The National Library of Medicine's Environmental Health and Toxicology Information Program was created in 1967 to serve as the federal government's centralized resource for toxicology and environmental health information. Throughout history, the effects and importance of poisons and exposure to toxic substances has been recognized. A history of congressional legislation and events contributed to the creation of the initial Toxicology and Environmental Health Information Program, TEHIP. Eventually, the program grew into what is now the NLM Environmental Health and Toxicology Program which is offered through an online portal.

Historical Timeline

- ▶ Poisons recognized throughout time
- ▶ Socrates – hemlock
- ▶ Cleopatra – asp
- ▶ Paracelsus (1493–1541), Father of Toxicology – “The dose makes the poison”
- ▶ Lucretia Borgia – 15th & 16th Centuries
- ▶ Harvey W. Wiley's Poison Squad (1903)
- ▶ The Jungle (1906) Upton Sinclair – lack of hygiene in the meat-packing industry
- ▶ Food and Drugs Act (1906) – prohibited adulterated or misbranded items
- ▶ Federal Food, Drug and Cosmetic Act (1938) – enhanced safety requirements for drugs
- ▶ Drug Amendments (1962) – effectiveness required for drugs
- ▶ Silent Spring (1962) Rachel Carson – sparked public awareness about hazards of synthetic chemicals
- ▶ President's Science Advisory Committee (1966) – “Report on the Handling of Toxicological Information”
- ▶ TEHIP Created (1967)
- ▶ Situated within NLM's Division of Specialized Information Services (SIS)

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Environmental Health & Toxicology Portal Decision Tree

(a pull-out reference card) *final page*

Introduction



Course Overview

Purpose

The purpose of this training is to familiarize participants with reliable online environmental health and toxicology information, from the National Library of Medicine and other reliable sources. Skills and knowledge acquired in this training class will enable participants to access, utilize, and refer others to environmental health and toxicology information.

Objectives

After completing this course, participants will be able to:

- ▶ Identify quality, accurate, and authoritative online resources pertaining to environmental health, toxicology, and related medical information.
- ▶ Demonstrate the ability to perform strategic search techniques to find relevant online information.
- ▶ Apply the skills and knowledge obtained in this class to their organization's health information needs.

NLM Online Resources Covered in this Class

The following resources will be covered with time for hands-on practice:

- ▶ **ChemIDplus**—access to structure and nomenclature authority databases for the identification of chemical substances cited in NLM databases
- ▶ **Hazardous Substances Data Bank (HSDB)**—comprehensive, peer-reviewed toxicological data for more than 5,000 chemicals
- ▶ **Toxicology Literature Online (TOXLINE)**—a bibliographic toxicology database covering more than 3 million bibliographic citations
- ▶ **Chemical Carcinogenesis Research Information System (CCRIS)**—scientifically evaluated and fully referenced data on more than 8,000 chemicals
- ▶ **Developmental and Reproductive Toxicology Database (DART)**—a bibliographic database containing more than 200,000 references to literature published since 1965
- ▶ **GENE-TOX**—genetic toxicology test data on more than 3,000 chemicals resulting from expert peer review of the open scientific literature
- ▶ **Integrated Risk Information System (IRIS)**—carcinogenic and non-carcinogenic information on more than 500 chemicals
- ▶ **International Toxicity Estimates for Risk (ITER)**—side-by-side comparisons of international risk assessment information on more than 650 chemicals with links to source documentation

- ▶ **LactMed**—a database of drugs and other chemicals to which breastfeeding mothers may be exposed
- ▶ **Toxics Release Inventory (TRI)**—information on annual environmental releases of more than 600 toxic chemicals by U.S. facilities from the U.S. Environmental Protection Agency (EPA)
- ▶ **TOXMAP**—a Geographic Information System that uses maps of the United States to help users visually explore TRI data
- ▶ **Haz-Map**—an occupational toxicology database that links job tasks to occupational diseases and their symptoms
- ▶ **Household Products Database**—human health effects information on more than 10,000 brand-name consumer products

Information on the following resources is included in the “More to Explore” section of this manual.

- ▶ **Drug Information Portal**—current drug information for more than 17,000 drugs with links to additional online resources with potential drug information
- ▶ **Dietary Supplements Labels Database**—information from the labels of more than 5,000 brands of dietary supplements in the marketplace
- ▶ **Tox Town**—an interactive guide to commonly encountered toxic substances and environmental health risks
- ▶ **Radiation Emergency Medical Management**—guidance on clinical diagnosis and treatment during mass casualty radiological/nuclear events, primarily for physicians but usable to those without formal radiation medicine expertise
- ▶ **Wireless Information System for Emergency Responders (WISER)**—provides a wide range of information on hazardous substances, including substance identification support, physical characteristics, human health information, and containment and suppression advice
- ▶ **Enviro-Health Links**—selected links to Internet resources on toxicology and environmental health issues of special interest

These additional resources will be demonstrated:

- ▶ **Disaster Information Management Research Center (DIMRC)**—health information resources and informatics research related to disasters of natural, accidental, or deliberate design
- ▶ **Carcinogenic Potency Database (CPDB)**—analyses of the results of 6,540 chronic, long-term animal cancer tests, conducted in support of cancer risk assessments for humans, on 1547 chemicals
- ▶ **Comparative Toxicogenomics Database (CTD)**—extensive curated scientific data describing relationships between chemicals, genes and human diseases.

Environmental Health & Toxicology Portal

The NLM **Environmental Health and Toxicology Portal** provides a starting point for seeking reliable information on toxicology, hazardous chemicals, environmental health, and toxic releases.

Find Information by Topic & Intended Audience

- Find Information About...
- Especially For
- Search TOXNET@ Databases
- Other Professional Resources
- Resources for the Public
- Enviro-Health Links
- Guides & Tutorials
- Quick Tours

Reference Tools & Additional Resources

- Search Our Web Site (e.g. climate change)
- A to Z Index of Resources
- About TEHIP
 - Toxicology & Environmental Health Information Program
 - TEHIP Quick Tour
 - Contact Us: Provide Feedback

Search all TOXNET Databases

Search TOXNET

TOXNET - Collection of databases on hazardous chemicals, toxic releases, and environmental health

(e.g. mercury, asbestos)

In the Spotlight

- Hexavalent Chromium and Other Chromium Compounds
- Dietary Supplements Labels Database
- LactMed
- ALTBIB
- Environmental Health Student Portal

Stay Connected

- Join the Listserv
- Subscribe to RSS
- Follow us on Twitter
- Bookmark and share

News & Events

- SIS News
- Calendar of Events

sis.nlm.nih.gov/enviro.html

Browse the easily navigable site by topic or audience. Explore related resources using the **A to Z Index of Resources**. The **Other Professional Resources** include database descriptions, fact sheets, a list of NLM databases and electronic resources. You can also search all TOXNET databases from this page.

Additional Resources

For further information, we recommend these additional resources:

- ▶ Getting the Most from SIS's Environmental Health and Toxicology Resources sis.nlm.nih.gov/getthemostfromsis.html
- ▶ NLM's Environmental Health and Toxicology Resources Quick Tour sis.nlm.nih.gov/enviro/captivate/tehipoverview.htm
- ▶ Publications and Reference Materials sis.nlm.nih.gov/enviro/enviropubs.html

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TOXNET



TOXNET Overview

NLMs **TOXNET** (Toxicology Data Network) is a free, Web-based system of databases on toxicology, environmental health, hazardous chemicals, toxic releases, chemical nomenclatures, and specialty areas such as occupational health and consumer products.

The screenshot shows the TOXNET website interface. At the top left is the NLM logo and 'United States National Library of Medicine'. The main header is 'TOXNET Toxicology Data Network'. Below the header is a navigation bar with links: 'TOXNET PDA Access', 'SIS Home', 'About Us', 'Site Map & Search', and 'Contact Us'. A secondary navigation bar includes 'Env. Health & Toxicology' and 'TOXNET'. The main content area is titled 'TOXNET - Databases on toxicology, hazardous chemicals, environmental health, and toxic releases.' It is divided into three main sections: 'Select Database', 'Search All Databases', and 'Env. Health & Toxicology'. The 'Select Database' section lists various databases with an information icon (i) to the right of each name. The 'Search All Databases' section has a search box and buttons for 'Search', 'Clear', and 'Help'. The 'Env. Health & Toxicology' section features a 'Portal to environmental health and toxicology resources' with a 'VISIT SITE' button and a 'Support Pages' section with links to Help, TOXNET FAQ, TOXNET Update Status, Fact Sheet, Database Description, Training Manual & Schedule, and News. Annotations with arrows point to these sections: 'Select a TOXNET Database to Search' points to the 'Select Database' list; 'Search all Databases' points to the search box; 'Link to EH/Tox Portal' points to the 'Env. Health & Toxicology' section; and 'Support Pages' points to the 'Support Pages' list.

toxnet.nlm.nih.gov

Types of information in the TOXNET databases include:

- ▶ Specific chemicals, mixtures, and products
- ▶ Unknown chemicals
- ▶ Special toxic effects of chemicals in humans and/or animals

Click the information icon (i) to the right of each database in the Select Database column for a description of the database, a link to the fact sheet, and a sample record.

The TOXNET Databases

The TOXNET databases can be grouped in the following categories:

- ▶ Chemical Information—ChemIDplus
- ▶ Toxicology Data (one record per chemical)—HSDB, IRIS, CCRIS, GENE-TOX, ITER, and LactMed—can also search any combination of these files with the **Multi-Database** feature
- ▶ Toxicology Literature (bibliographic references)—TOXLINE and DART
- ▶ Toxic Releases—TRI and TOXMAP
- ▶ Specialty Databases—Haz-Map, Household Products Database

TOXNET Basic Searching

From the TOXNET home page, you can search all TOXNET databases simultaneously. Your results will be displayed as links to the databases in which your search term(s) were found—and the number of records in each—under the headings: **References from the Biomedical Literature** (TOXLINE and DART) and **Chemical, Toxicological, and Environmental Health** (all others).

The screenshot shows the TOXNET search interface. At the top, it says "TOXNET - Databases on toxicology, hazardous chemicals, environmental health, and toxic releases." Below this is a "Select Database" list on the left and a "Search All Databases" form on the right. The search form has a text input field containing "ammonia" and a "Search" button. Below the search form, there are two sections of results:

References from Biomedical Literature

TOXLINE	Toxicology Literature Online	16563
DART	Developmental Toxicology Literature	285

Chemical, Toxicological, and Environmental Health Data

ChemIDplus	Chemical Identification/Dictionary	1
HSDB	Hazardous Substances Data Bank	925
CCRIS	Chemical Carcinogenesis Information	1
CPDB	Carcinogenic Potency Database	0

Entering search term(s)—You may enter any combination of words, chemical names, and numbers, including Chemical Abstracts Service (CAS) registry numbers. Common “stop words” such as “a,” “an,” “and,” “for,” “the,” and “it” will not be searched. When searching for terms other than chemicals, the system automatically searches for singular and plural forms of the term(s) entered.

Synonym searching—By default the system will search for the exact name, synonyms, and CAS number as derived from ChemIDplus. Select “No” to search only for the exact chemical term or CAS Registry Number entered. In LactMed, the CAS number refers to the parent compound (i.e., not the salt form).

The close-up shows a search form with a text input field containing "(e.g. antifreeze kidney failure, chromium compounds, 7718-54-9)". Below the input field are "Search", "Clear", and "Help" buttons. Underneath, there is a section titled "For chemicals, add synonyms and CAS numbers to search:" with radio buttons for "Yes" (selected) and "No". At the bottom of this section are "Limits" and "Browse the Index" buttons.

Truncation—The asterisk (*) is the right-handed truncation symbol for any number of characters.

Phrase searching—Search phrases with quotation marks.

Boolean searching—Use the logical operators “AND,” “OR,” and “NOT” to limit a search of two or more terms to specific criteria. In searches with combinations of these operators, “AND” takes precedence, followed by “NOT” and then “OR.” This default precedence may be overridden with the use of parentheses, which may also be nested (i.e., parentheses within parentheses). Examples:

- ▶ Pulmonary **AND** edema—retrieves all records with the two words appearing together
- ▶ Liver **OR** kidney—retrieves all records containing either of these words (or both of them)

- ▶ Carcinoma **NOT** squamous—retrieves records from which one or more terms have been excluded

Browse the Index—This feature provides a scannable index of all terms beginning with the search term you entered and the number of records for each term. In the Toxicology Data databases, selectable items indexed are **All Words**, **CAS Registry Number**, and **Chemical Name**. In the Toxicology Literature databases, selectable items indexed are **All Words**, **MeSH Headings/Keywords**, **Authors**, and **CAS Registry Number**.

Search Results buttons—Buttons on the left of the search results screen allow you to:



- ▶ **Save Checked Items**—save items in a set for displaying, sorting, and downloading
- ▶ **Sort**—sort the entire search results or items saved in a set
- ▶ **Download**—download the entire search results or items save in a set in brief, full, abstract, or tagged format
- ▶ **Modify Search**—make changes to the most recent search
- ▶ **Basic Search**—conduct a new search in the same database
- ▶ **Browse Index**—browse all words, CAS Registry Number, chemical name, and in bibliographic databases MeSH headings/keywords and authors
- ▶ Go to the **Help** file for that database
- ▶ Go to **TOXNET Home**

Navigation buttons—Buttons at the top of the record screen allow you to:



- ▶ Go to the **Next Item** in the search results
- ▶ Go back to the **Search Results** screen
- ▶ Perform a new **Basic Search** in the same database
- ▶ View **Details** of the search
- ▶ Display links to **Other Files** (NLM databases) containing information on the substance
- ▶ **Modify [your] Search**
- ▶ **Download** the record or portions of the record
- ▶ Perform a new search in the same database with **Limits** applied
- ▶ **Browse [the] Index**
- ▶ Go to the **Help** file for that database
- ▶ Go to **TOXNET Home**

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ChemIDplus



ChemIDplus

ChemIDplus is a free, Web-based search system that provides access to structure and nomenclature authority files used for the identification of chemical substances cited in NLM databases. It contains more than 370,000 chemical records, of which more than 290,000 include chemical structures. The ChemIDplus database has two different applications: **ChemIDplus Lite** (for basic searching) and **ChemIDplus Advanced** (for more experienced users).

ChemIDplus Lite

Link to ChemIDplus Advanced

toxnet.nlm.nih.gov

Content

Information in the ChemIDplus database includes:

- ▶ Systematic, generic, and trade names
- ▶ Synonyms
- ▶ CAS registry numbers
- ▶ Molecular formulas
- ▶ Classification codes
- ▶ Chemical structures (ChemIDplus Advanced)

ChemIDplus also provides links to many biomedical resources at NLM and on the Internet for chemicals of interest.

Searching ChemIDplus

Search ChemIDplus by name, synonym, Chemical Abstracts Service (CAS) registry number, molecular formula, classification code, locator code, structure, toxicity, and/or physical properties within two distinct applications:

- ▶ **ChemIDplus Lite** (ChemIDplus home page) is designed for simple searching on name or registry number to retrieve basic information about a chemical and provide locator links to other resources and does not require special software applets or plug-ins. The Lite version displays structures, but does not allow drawing or searching on structures.
- ▶ **ChemIDplus Advanced** (see below) is designed for more advanced searching on any combination of name, registry number, molecular formula, classification code, locator code, toxicity, physical property, structure, or molecular weight. In addition, ChemIDplus Advanced allows users to draw their own structures and perform similarity and substructure searches. For more tips on how to search using the ChemIDplus Advanced search features, access the [Help](#) section.

The screenshot shows the ChemIDplus Advanced search interface. The header includes the NLM logo and navigation links. The search area contains several sections:

- Substance Identification:** Includes a search box for Name/Synonym and a dropdown for Equals. An annotation points to this box with the text "Enter basic search term".
- Toxicity:** Includes dropdowns for Test, Species, Route, and Effect, and a range selector for mg/kg or ppm. An annotation points to this section with the text "Qualify a toxicity search".
- Physical Properties:** Includes a dropdown for Melting Point, a range selector, and a dropdown for Measurement Type. An annotation points to this section with the text "Select and qualify a physical property".
- Locator Codes:** Includes dropdowns for (any), AND, and (any). An annotation points to this section with the text "Qualify a search with specific 'locator' resources".
- Structure:** Includes a drawing area and a dropdown for View. An annotation points to this area with the text "Click in box to draw structures".
- Structure Search Options:** Includes radio buttons for Substructure Search, Similarity Search (set to 80%), Exact (parent only), Flex (parent, salts, mixture) NEW, and Flexplus (parent, all variations) NEW. An annotation points to this section with the text "Select type of structure search".
- Display structures using:** Includes radio buttons for Marvin and Chime, and a Change button. An annotation points to this section with the text "Search by molecular weight or range".
- Molecular Weight:** Includes a range selector. An annotation points to this section with the text "Search by molecular weight or range".

Search Results

If you searched ChemIDplus Lite, the system displays the record with basic information for the chemical, including links to additional information. If multiple records were retrieved, a list of names would be shown. Following is the ChemIDplus Lite record for *diazepam*. Use buttons on the left to retrieve categories of basic information such as Names & Synonyms, Formulas, Classification Codes, Registry Numbers, and Notes. The Toxicity and Physical Properties buttons display data in tables. Toxicity data contain links to the PubMed citation, if available. In the center of the page, lists of “locators” provide links to other resources in three categories:

- ▶ **File Locators**—point to a set of NLM associated databases
- ▶ **Internet Locators**—point to a set of resources with biomedical data of interest for the chemical
- ▶ **SuperList Locators**—point to a set of regulatory and scientific lists that contain information about the chemical

Record for Diazepam (ChemIDplus Lite)

Diazepam [USAN:INN:BAN:JAN] RN: 439-14-5		Search Navigation
<p>Basic Information</p> <p>Full Record</p> <p>Names & Synonyms</p> <p>Formulas</p> <p>Classification Codes</p> <p>Registry Numbers</p> <p>Notes</p> <p>Toxicity</p> <p>Physical Properties</p>	<p>For more information about this substance, you may select from the the links below.</p> <p>File Locator</p> <p>CCRIS ClinicalTrials.gov DART DailMed DrugPortal EINECS EMIC GENETOX HSDB LactMed MeSH MeSH Heading MedlinePlusAll MedlinePlusDrug Pillbox PubChem PubMed PubMed AIDS PubMed Cancer PubMed Toxicology RTECS TOXLINE</p> <p>Internet Locator</p> <p>CAMEO CPDB CTD ChEBI DrugDigest Drugs@FDA EPA Envirofacts EPA PPIIS EPA SRS NIAID ChemDB NIST WebBook NJ-HSFS NTP DBS SRC DATALOG USA.gov</p> <p>Superlist Locator</p> <p>CA65 DEA DSL IARC MA TSCAINV</p>	<p>Main Query Page</p> <p>Advanced ChemIDplus Search</p>

Other names used for chemical → Names & Synonyms

Links to PubMed articles → PubMed, PubMed AIDS, PubMed Cancer, PubMed Toxicology

File Locator(s) → File Locator

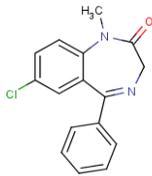
Internet Locator(s) → Internet Locator

Superlist Locator(s) → Superlist Locator

The advanced record shows the same locator lists and basic information as the ChemIDplus Lite record with the addition of structures including structure navigation buttons.

Record for Diazepam (ChemIDplus Advanced)

NAME: Diazepam [USAN:INN:BAN:JAN]
RN: 439-14-5



MW: 284.7447
[Enlarge Structure](#)

Basic Information

- Full Record
- Structure**
- Names & Synonyms
- Formulas
- Classification Codes
- Registry Numbers
- Notes
- Toxicity
- Physical Properties

For more information about this substance, you may select from the the links below.

File Locator

<ul style="list-style-type: none"> CCRIS ClinicalTrials.gov DART DrugPortal EINECS EMIC GENETOX HSDB LactMed MeSH MeSH Heading MedlinePlusAll MedlinePlusDrug Pillbox PubChem PubMed PubMed AIDS PubMed Cancer PubMed Toxicology RTECS TOXLINE 	<ul style="list-style-type: none"> NCI Chem Carcino Res Info Sys NIH ClinicalTrials.gov Developmental and Reprod.Tox. NLM/FDA Drug Labelling NLM Drug Information Portal EU Inv of Exist. Comm. Chem Sub Env. Mutagen Info. Center EPA GENetic TOXicology Hazardous Substances Data Bank Drugs and Lactation Database Medical Subject Headings File Medical Subject Headings Search Consumer Health Info Consumer Drug Information Drug Identification and Image Display PubChem Biomedical Citations From PubMed AIDS Citations from PubMed Cancer Citations from PubMed Toxicology Citations From PubMed Reg. of Toxic Eff. of Chem. Sub. NLM TOXLINE on TOXNET
<p>Internet Locator</p> <ul style="list-style-type: none"> CAMEO CPDB CTD ChEBI DrugDigest Drugs@FDA EPA Envirofacts EPA PPIIS EPA SRS NIAID ChemDB NIST WebBook NJ-HSES 	<ul style="list-style-type: none"> NOAA CAMEO Chemicals Carcinogenic Potency Database Comparative Toxicogenomics Database Chem Entities of Biological Interest Drug Digest FDA Drug Database EPA Master Chemical Integrator EPA Pest. Prod. Info. System EPA Substance Registry System NIAID Chemical Database NIST Chemistry WebBook New Jersey Haz. Sub. Fact Sheets

Search Navigation

- Start New Query
- Modify Query
- Show Query
- Search History
- Structure Similarity Search
- Structure Self/Parent Search
- Transfer Structure
- Basic ChemIDplus Search

Click to display structure and access InChI and SMILES notations

Click to enlarge and manipulate structure. View 3-D structure.

Structure navigation buttons

View data tables

Additional Resources

For further information, we recommend these additional resources:

- ▶ ChemIDplus Fact Sheet
nlm.nih.gov/pubs/factsheets/chemidplusfs.html
- ▶ ChemID FAQ
sis.nlm.nih.gov/toxnet_faq.html#chem

ChemIDplus Search Exercises

Scenario 1 – Chemical Identification

Linda works for a government agency that monitors ingredients in cigarettes. Linda and her team receive ingredient submissions from cigarette manufacturers. The team is tasked with verifying chemical ingredient names and registry numbers. Linda receives an ingredient submission which lists *acetoin* with CAS registry number 513-86-0. The previous submission listed *acetyl methyl carbinol* with the same registry number.

Search ChemIDplus Lite to verify the information: Locate the record for *acetoin*. Since 513-86-0 is the registry number for the *acetoin* record, verify whether, or not, *acetyl methyl carbinol* is a synonym for *acetoin*. Is there a regulatory source for this synonym?

Suggested Solution:

- Type **acetoin** in the search box
- Click the **Search** button
- Click the **Names & Synonyms** button on the left
- Scroll down to **Superlist Name**
-  Remember that the Superlist heading indicates government regulatory information (U.S. and International)
- Click the **i** button next to “Acetyl methyl carbinol” to view the source
- Close the **Data Source Information** window
- Close the **Names & Synonyms** window

Scenario 2 – Research Data

Dr. Stein is conducting research and has a need to examine the toxic effects of chemicals produced in high volumes in mice. Dr. Stein would like to focus on extremely toxic chemicals, but exclude pesticides from his initial short list for his team.

Search ChemIDplus Advanced to form a list of chemicals and view some of the effects listed in literature: Enter toxicity criteria for extremely toxic chemicals. Qualify the type of chemical by using Locator Codes. View the effects in the toxicity table. Return to the Search Results page to continue with Scenario 3.

Suggested Solution:

- Click the **Advanced ChemIDplus Search** button
- Select LD50 from the “Test” drop-down menu under the **Toxicity** input area. Next, qualify the value as less than in the drop-down menu to the right
- Type a value of **50** (mg/kg or ppm) in the search box under “Test”

- Select mouse from the “Species:” drop-down menu
- Select oral from the “Route:” drop-down menu
- Select EPA HPVIS from the first drop-down menu under the **Locator Codes** search box
-  The EPA HPVIS locator is the resource for High Production Volume Chemical Information System from the Environmental Protection Agency (EPA).
- Select AND NOT from the second drop-down menu under **Locator Codes**
-  The AND NOT qualifier excludes pesticides from the search results. The shaded rows indicate an exact match on the search query. The red text indicates a partial match. Notice links to PubMed in the Source column.
- Select EPA PPIS from the last drop-down menu under **Locator Codes**
-  The EPA PPIS is the EPA’s Pesticide Product Information System. The system identifies registered pesticides for use in the United States (current and former).
- Click the **Search** button
- Click the first record in the search results
- Click the **Toxicity** button on the left side of the page
- View the **Effect** column and close the **Toxicity** pop-up window
- Click **Search Results Page** on the right side of the page to continue with Scenario 3

Scenario 3 – Structure Similarity

Dr. Stein takes a look at his search results. He notices *chloromethylbenzene* in the results list. Dr. Stein would like to identify chemicals structurally similar to this compound.

Use the ChemIDplus Advanced search results from Scenario 2 to identify similar structures: From the previous search results, locate the chloromethylbenzene record and transfer the structure to the main query page. On the main query page, choose a level of similarity in the structure search box. The Similarity Search should be pre-selected as the default.

Suggested Solution:

- Click the  button on the right side of the Benzene, chloromethyl- structure
-  Benzene, chloromethyl- is a synonym for *chloromethylbenzene*.
- Select 70% from the drop-down menu
- Click the **Search** button
-  Notice the similar halogenated structures.
- Return to ChemIDplus Lite to prepare for the next search

Additional Exercises

 Go to toxnet.nlm.nih.gov

 Click  in the **Select Database** column

Exercise 1: Locate the record for *trifluralin*. Is *trifluralin* on the U.S. EPA Clean Air List (CAA1)?

Suggested solution:

- Type **trifluralin** in the search box
- Click the **Search** button
- Click CAA1 under **SuperList Locator**
- Review the information in the pop-up window and close the window
- Click the **Main Query Page** button at the right to prepare for a new search

Exercise 2: Check the **File Locator** field in the *selenium* record to see what other NLM databases contain information on *selenium*. View the listing of *selenium* synonyms.

Suggested solution:

- Type **selenium** in the search box
- Click the **Search** button
- Review the other NLM databases (under **File Locator**), that contain information on the chemical
- Click the **Names & Synonyms** button on the left of the page
- Review the list in the pop-up window and close the window
- Click the **Main Query Page** button at the right to prepare for a new search

Exercise 3: Find the lowest toxic dose tested (TDLo) for *phenobarbital* in infants.

Suggested solution:

- Type **phenobarbital** in the search box
- Click the **Search** button
- Click Phenobarbital [USAN:INN:JAN]
- Click the **Toxicity** button on the left of the page
- Review the chart and close the window
- Click the **Main Query Page** button at the right to prepare for a new search

Exercise 4: Locate the record for *formaldehyde* and link to the Internet Locator ATSDR ToxFAQs. Then link to the NIOSH Pocket Guide. Use the Classification Code button to find the Overall Carcinogenic Evaluation classification and the source for the rating.

Suggested solution:

- Type **formaldehyde** in the search box
- Click the **Search** button
- Click [ATSDR ToxFAQs](#) under **Internet Locator**
- Review the **ToxFAQs for Formaldehyde** in the ATSDR window and close the window
- Click [NIOSH Pocket Guide](#) under **Internet Locator**
- Review the information and close the CDC window
- Click the **Classification Codes** button on the left of the page
- Review the **Superlist Classification Code** list to find “Overall Carcinogenic Evaluation: Group 1”
- Click the information icon (i) next to “Overall Carcinogenic Evaluation: Group 1” to find the data source – IARC (International Agency for Research on Cancer)
- Close the **Data Source Information** window, then the **Classification Codes** window and return to the **Formaldehyde [USAN]** record
- Click the **Main Query Page** button at the top right to prepare for a new search

Exercise 5: Find the *xylene* record in ChemIDplus and use its structure to do substructure and 70% similarity searches, respectively. How many structures are in each category?

Suggested solution:

- Click the **Advanced ChemIDplus Search** button
- Type **xylene** in the Substance Identification search box
- Click the **Search** button and review the information retrieved
- Click the **Transfer Structure** button at the right
- Click the Similarity Search option in the Structure Search Options box and change the percentage to 70 in the pull-down menu
- Click the **Search** button and review the information retrieved
- Click the **TOXNET Home** button at the left of the page to prepare for the next session

Hazardous Substances Data Bank (HSDB)



HSDB

HSDB (Hazardous Substances Data Bank) is a comprehensive toxicology data file on NLMs TOXNET system. It contains data on more than 5,000 chemicals, organized into individual records—the average record is approximately 25 printed pages. Content is peer-reviewed by the Scientific Review Panel, a committee of experts in the major subject areas within the data bank's scope. HSDB is enhanced with information on human exposure, industrial hygiene, emergency handling procedures, environmental fate, regulatory requirements, and related areas.

The screenshot shows the TOXNET website interface. At the top, there is a header for the United States National Library of Medicine and TOXNET Toxicology Data Network. Below the header, there is a navigation menu with links like 'TOXNET PDA Access', 'SIS Home', 'About Us', 'Site Map & Search', and 'Contact Us'. The main content area features a 'Hazardous Substances Data Bank (HSDB)' section with a description: 'Comprehensive, peer-reviewed toxicology data for about 5,000 chemicals.' Below this, there are three main columns: 'Select Database' (listing various databases like ChemIDplus, HSDB, TOXLINE, etc.), 'Search HSDB' (containing a search box, 'Search', 'Clear', and 'Help' buttons, and a 'Limits' button), and 'Env. Health & Toxicology' (containing a 'Portal to environmental health and toxicology resources' and 'Support Pages' section). Annotations with arrows point to the 'Limits' button and the 'Browse the Index' button.

toxnet.nlm.nih.gov

Searching HSDB

Search HSDB by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number, and/or subject terms (basic searching). By default, the system searches for synonyms and CAS numbers of chemicals.

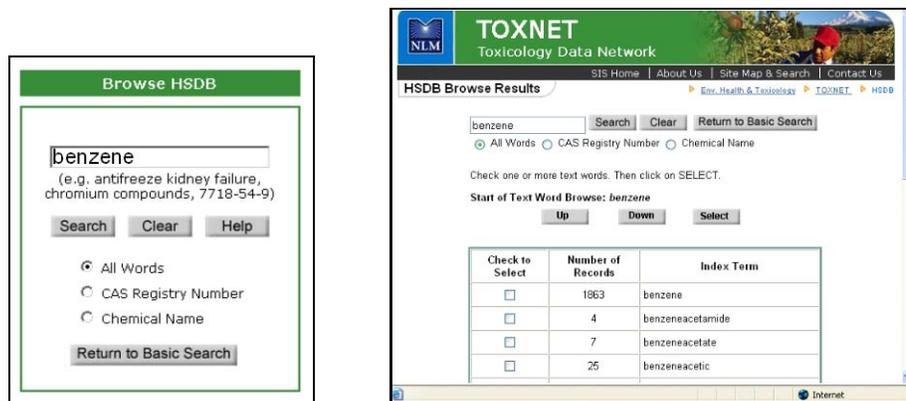
Use truncation (*), Boolean operators (AND, OR, NOT), phrase searching, nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ All the words, any of the words, or as a phrase
- ▶ In specific fields or categories of fields (see “HSDB Limits Search Fields” in this section)

The screenshot shows a detailed view of the HSDB search interface. It includes a search box with 'Search', 'Clear', and 'Help' buttons. Below the search box, there are options to 'Add chemical synonyms and CAS numbers to search:' with radio buttons for 'Yes' (selected) and 'No'. There are also options for 'Search:' with radio buttons for 'exact words', 'singular & plural forms' (selected), and 'word variants'. For 'Search records with:', there are radio buttons for 'the phrase', 'all words' (selected), and 'any words'. At the bottom, there is a 'Search in fields:' section with a note '(If no box is checked, all fields will be searched.)' and a 'Contract all categories' button.

Click the **Browse the Index** button on the home page to search a list of index terms related to the search term entered and the number of records containing that term. Select the record(s) you want to view by clicking the appropriate box in the “Check to Select” column and clicking the **Select** button. Scan the index above or below the original display by clicking the **Up** or **Down** button.



Search Results

Your initial retrieval is displayed as a list of substance names in blue and their CAS Registry Numbers. Substances are listed in **relevancy ranked order**. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

When searching for a chemical, the initial matching chemical record (the “primary record”) may be followed by additional chemical records that contain the chemical name or search term you entered.

Primary Record

Other Chemical Records

Search Results Screen

Click on a substance name on the search results screen to retrieve the record for that substance. The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), modify your search (**Modify Search**), **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical data is shown in the right frame. Your search term(s) appear in red.

The screenshot shows the TOXNET Record Screen for Benzene. At the top, there is a navigation bar with buttons for 'Next Item', 'Search Results', 'Basic Search', 'Details', 'Other Files', and 'Modify Search'. Below this is a 'Table of Contents' section on the left with a list of categories like 'FULL RECORD', 'Human Health Effects', 'Toxicity Summary', 'Evidence for Carcinogenicity', 'Human Toxicity Excerpts', 'Skin, Eye and Respiratory Irritations', 'Drug Warnings', 'Medical Surveillance', 'Populations at Special Risk', 'Probable Routes of Human Exposure', 'Body Burden', 'Average Daily Intake', 'Minimum Fatal Dose Level', 'Emergency Medical Treatment', 'Antidote and Emergency Treatment', and 'Animal Toxicity Studies'. The main content area on the right displays 'BENZENE' with its CASRN (71-43-2) and a 'Human Health Effects' section containing a 'Toxicity Summary'. Red circles highlight the navigation bar (1), the Table of Contents (2), and the main content area (3).

Record Screen

If you click the primary record, the system displays the **Human Health Effects**. If you click a different chemical record, or if your search was for a term other than a chemical, the system will display the sections of the record best matching your query terms (**Best Sections**), those where the chemical search term appears with greatest frequency.

Additional Resources

For further information, we recommend these additional resources:

- ▶ HSDB Skill Kit
nlm.nih.gov/pubs/techbull/ma07/ma07_hfdb_skill_kit.html
- ▶ HSDB Animated Tutorial
sis.nlm.nih.gov/enviro/captivate/basicsearchinghsdb_skin.swf

HSDB Limits Search Fields

The **Limits** feature allows you to specify a particular field or category of fields to search. By default, the system will search all fields in all categories. To see all fields within a specific category, click the “+” beside that category.

Search Fields in 16 Categories

Search in fields:
(If no box is checked, all fields will be searched.)

Contract all categories
 Expand all categories

- Substance Identification
- Human Health Effects
- Emergency Medical Treatment
- Animal Toxicity Studies
- Metabolism/Pharmacokinetics
- Pharmacology
- Environmental Fate & Exposure
- Environmental Standards & Regulations
- Chemical/Physical Properties
- Chemical Safety & Handling
- Occupational Exposure Standards
- Manufacturing/Use Information
- Laboratory Methods
- Special References
- Synonyms and Identifiers
- Administrative Information

Contract/Expand All Categories

Expanded Categories (All Fields)

Substance Identification

- Chemical Names
- CAS Registry Number

Human Health Effects

- Toxicity Summary
- Evidence for Carcinogenicity
- Human Toxicity Excerpts
- Human Toxicity Values
- Skin, Eye and Respiratory Irritations
- Drug Warnings
- Medical Surveillance]
- Populations at Special Risk
- Probably Routes of Human Exposure
- Body Burden
- Average Daily Intake
- Minimum Fatal Dose Level

Emergency Medical Treatment

- Emergency Medical Treatment
- Antidote and Emergency Treatment

Animal Toxicity Studies

- Toxicity Summary
- Evidence for Carcinogenicity
- Non-Human Toxicity Excerpts
- Ecotoxicity Excerpts
- National Toxicology Program Studies
- Non-Human Toxicity Values
- Ecotoxicity Values
- Ongoing Test Status
- TSCA Test Submissions

Metabolism/Pharmacokinetics

- Metabolism/Metabolites
- Mechanism of Action

 Interactions **Pharmacology** Therapeutic Uses
 Drug Warnings
 Interactions
 Drug Idiosyncrasies
 Drug Tolerance
 Minimum Fatal Dose Level
 Maximum Drug Dose
 Bionecessity **Environmental Fate & Exposure** Environmental Fate/Exposure Summary
 Probably Routes of Human Exposure
 Body Burden
 Average Daily Intake
 Natural Pollution Sources
 Artificial Pollution Sources
 Environmental Fate
 Environmental Biodegradation
 Environmental Abiotic Degradation
 Environmental Bioconcentration
 Soil Adsorption/Mobility
 Volatilization from Water/Soil
 Environmental Water Concentrations
 Effluent Concentrations
 Sediment/Soil Concentrations
 Atmospheric Concentrations
 Food Survey Values
 Plant Concentrations
 Fish/Seafood Concentrations
 Animal Concentrations
 Milk Concentrations
 Other Environmental Concentrations **Environmental Standards & Regulations** FIFRA Requirements
 Acceptable Daily Intakes
 TSCA Requirements
 CERCLA Reportable Quantities RCRA Requirements
 Atmospheric Standards
 Clean Water Act Requirements
 Federal Drinking Water Standards
 Federal Drinking Water Guidelines
 State Drinking Water Standards
 State Drinking Water Guidelines
 Soil Standards
 FDA Requirements
 Allowable Tolerances **Chemical/Physical Properties** Molecular Formula
 Molecular Weight
 Color/Form
 Odor
 Taste
 Boiling Point
 Melting Point
 Corrosivity
 Critical Temperature & Pressure
 Density/Specific Gravity
 Dissociation Constants
 Heat of Combustion
 Heat of Vaporization
 Octanol/Water Partition Coefficient
 pH
 Solubilities
 Spectral Properties
 Surface Tension
 Vapor Density
 Vapor Pressure
 Relative Evaporation Rate
 Viscosity
 Other Chemical/Physical Properties **Chemical Safety & Handling** Hazards Summary
 DOT Emergency Guidelines
 Odor Threshold
 Skin, Eye and Respiratory Irritations

-  Fire Potential
-  NFPA Hazard Classification
-  Flammable Limits
-  Flash Point
-  Autoignition Temperature
-  Fire Fighting Procedures
-  Toxic Combustion Products
-  Firefighting Hazards
-  Explosive Limits & Potential
-  Hazardous Reactivities & Incompatibilities
-  Hazardous Decomposition
-  Hazardous Polymerization
-  Other Hazardous Reaction
-  Prior History of Accidents
-  Immediately Dangerous to Life or Health
-  Protective Equipment & Clothing
-  Preventive Measures
-  Stability/Shelf Life
-  Shipment Methods and Regulations
-  Storage Conditions
-  Cleanup Methods
-  Disposal Methods
-  Radiation Limits & Potential

Occupational Exposure Standards

-  OSHA Standards
-  Threshold Limit Values
-  NIOSH Recommendations
-  Immediately Dangerous to Life or Health
-  Other Occupational Permissible Levels

Manufacturing/Use Information

-  Major Uses

-  Manufacturers
-  Methods of Manufacturing
-  General Manufacturing Information
-  Formulations/Preparations
-  Impurities
-  Consumption Patterns
-  U. S. Production
-  U. S. Import
-  U. S. Exports

Laboratory Methods

-  Clinical Laboratory Methods
-  Analytic Laboratory Methods
-  Sampling Procedures

Special References

-  Special Reports

Synonyms and Identifiers

-  Related HSDB Records
-  Synonyms
-  Associated Chemicals
-  Formulations/Preparations
-  Shipping Name/ Number
DOT/UN/NA/IMO
-  Standard Transportation Number
-  EPA Hazardous Waste Number
-  Wiswesser Line Notation
-  RTECS Number

Administrative Information

-  Hazardous Substances Databank
Number
-  Last Review Date



HSDB Search Exercises

Scenario 1 – Regulatory Information

Sonya, the parent of an elementary school student, receives a letter from the school stating that over the summer water from all sinks and drinking fountains in the building was tested for *lead* compounds. The letter states that the water contains safe levels of *lead* for consumption. None of the detected *lead* levels exceeded 2.0 micrograms per liter. Sonya would like to confirm that this level is safe for drinking water.

Search HSDB to determine the safe level: Locate the *lead* compounds record in HSDB. Open the *lead* compounds record. Locate the Federal Drinking Water Standards.

Suggested Solution:

- | | |
|--------|--|
| Type | lead in the search box |
| Click | the Search button |
| Click | <u>LEAD COMPOUNDS</u> in the search results list |
| Scroll | down to the Environmental Standards & Regulations section in the Table of Contents |
| Click | <u>Federal Drinking Water Standards</u> |
| |  States whose standards and guidelines differ from the federal values are listed when the data is available. States not listed follow the federal standards and guidelines. |
| View | the federal action level for safe drinking water: 15 ug/l |

Scenario 2 – Chemical Toxicity / Testing

A researcher reads an FDA consumer update on *Bisphenol A (BPA)*, a compound used in plastic food and beverage packaging, including baby bottles. The article states that “current evidence indicates that exposure levels to *BPA* from food contact materials...are below those that may cause health effects.” The researcher decides to take a look at completed and/or ongoing studies that may be included in the “current evidence.”

Search HSDB to examine studies: Locate the *Bisphenol A* record. Open the *Bisphenol A* record. Navigate the table of contents to locate information on scientific testing and toxicity.

Suggested Solution:

- | | |
|--------|--|
| Type | bisphenol a in the search box |
| Click | the Search button |
| Click | the primary record for Bisphenol A |
| Scroll | through Human Health Effects to examine case reports, surveillance, biomonitoring, and in vitro tests |

Click [National Toxicology Program Studies](#) and [Ongoing Test Status](#) in the **Table of Contents** to view NTP study results

Scenario 3 – Environmental Fate & Exposure

An environmental scientist is interested in examining current information on how *ethylene glycol* behaves in the environment based on the chemical's physical properties.

Search HSDB to find the information: Locate the *ethylene glycol* record in HSDB. Open the *ethylene glycol* record. Navigate the table of contents to locate the Environmental Fate & Exposure section.

Suggested Solution:

- Type **ethylene glycol** in the search box
- Click the **Search** button
- Click the primary record for ethylene glycol
- Scroll down to the Environmental Fate & Exposure section in the Table of Contents
 -  The Environmental Fate & Exposure Summary provides information on how a chemical behaves in air, soil, and water; routes of human occupational exposure; and more.
- Scroll through the Summary and other subsections
 -  Notice the physical properties provided to support statements within the summary (vapor pressure, octanol-water partition coefficient (Koc), and Henry's Law constant). Ethylene glycol is used in antifreeze and various other automotive and consumer products.

Scenario 4 – Limiting a search

A Department of Homeland Security employee is interested in finding out what chemical warfare agents have a record in HSDB.

Search HSDB using limits: Pull up the limits search options. Limit your search to major uses under Manufacturing/Use Information. Enter your specified use query.

Suggested Solution:

- Click the **Limits** button at the bottom of the search box
- Click the  icon to expand the Manufacturing/Use Information field
- Click to check the box next to major uses
- Type **chemical warfare** in the search box. Select “exact words” and “the phrase” below the search box. Click search
 -  Examine the use field text. Results may contain chemicals used against chemical warfare agent exposure.

Additional Exercises

 Go to toxnet.nlm.nih.gov

 Click  in the **Select Database** column

Exercise 1: What are the concerns of *bisphenol A* residue in baby bottles?

Suggested Solution:

- Type **bisphenol a baby bottles** in the search box
- Click the **Search** button
- Click **BISPHENOL A**
- Review the **Best Sections** information in the right frame
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 2: What is the military usage of *arsine*? View the ChemIDplus record for *arsine*.

Suggested Solution:

- Type **arsine military** in the search box
- Click the **Search** button
- Click **ARSINE**
- Review the **Best Sections** information in the right frame
- Click the **Other Files** button at the top of the page
- Click **ChemIDplus Chemical Structure** in the pop-up window
- Click **CDC EP&R** (CDC Emerg. Prep. & Response) under **Internet Locator**
- Review the information retrieved and close the CDC window
- Close the ChemIDplus window and return to HSDB
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 3: What is the average daily intake of *mercury*?

Suggested Solution:

- Type **mercury** in the search box
- Click the **Search** button
- Click **MERCURY COMPOUNDS**
- Click **Average Daily Intake** under **Human Health Effects** in the Table of Contents
- Review the information retrieved
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 4: Using the CAS Registry Number 298-00-0, find information on the occurrence or effects of this chemical in soil.

Suggested Solution:

Type **298-00-0** in the search box

Click the **Search** button

Click **METHYL PARATHION**

Review the **Best Sections** information in the right frame

Click the **TOXNET Home** button at the top right of the page to prepare for the next session

Toxicology Literature Online (TOXLINE)



TOXLINE

TOXLINE is NLMs bibliographic database for toxicology, providing information covering the biochemical, pharmacological, physiological, and toxicological effects of drugs and other chemicals. It contains more than 3 million bibliographic citations from 1965 to the present, most with abstracts and/or indexing terms and Chemical Abstracts Service (CAS) Registry Numbers.

The screenshot shows the TOXNET website interface. At the top left is the NLM logo and "United States National Library of Medicine". The main header is "TOXNET Toxicology Data Network". Navigation links include "TOXNET PDA Access", "SIS Home", "About Us", "Site Map & Search", and "Contact Us". Below the header, there are breadcrumb links: "Env. Health & Toxicology > TOXNET > TOXLINE". The main content area is titled "Toxicology Literature Online (TOXLINE) - References from toxicology literature." It features three main sections: "Select Database" with a list of databases including ChemIDplus, HSDB, TOXLINE (selected), CCRIS, DART, GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home; "Search TOXLINE" with a search input field, a "Search" button, and options to include PubMed records; and "Env. Health & Toxicology" with a "Support Pages" section containing links to Help, Fact Sheet, Sample Record, TOXNET FAQ, and Importing Citations into Reference Manager. An "Additional Resource" section at the bottom left lists CPDB and CTD.

toxnet.nlm.nih.gov

TOXLINE Components

TOXLINE references come from various sources organized into components. These components are searched together but may be used to limit searches.

- ▶ Standard biomedical/toxicology journal literature
 - PubMed/MEDLINE
- ▶ Special journal and other research literature
 - Developmental and Reproductive Toxicology (DART)
 - International Labour Office (CIS)
- ▶ Technical reports and research projects
 - Federal Research in Progress (FEDRIP)
 - Toxic Substances Control Act of Test Submissions (TSCATS)

- Toxicology Document and Data Depository (NTIS)
- Toxicology Research Projects (CRISP)
- ▶ Meeting Abstracts
- ▶ Archival Collection (no longer being updated)
 - Aneuploidy (ANEUPL)
 - Environmental Mutagen Information Center File (EMIC)
 - Environmental Teratology Information Center File (ETIC)
 - Epidemiology Information System (EPIDEM)
 - Hazardous Materials Technical Center (HMTTC)
 - Health Aspects of Pesticides Abstract Bulletin (HAPAB)
 - International Pharmaceutical Abstracts (IPA)
 - NIOSHTIC (NIOSH)
 - Pesticides Abstracts (PESTAB)
 - Poisonous Plants Bibliography (PPBIB)
 - Swedish National Chemicals Inspectorate (RISKLINE)
 - Toxicological Aspects of Environmental Health (BIOSIS)

Searching TOXLINE

Any terms you enter in the query box will automatically be searched against both the keyword and MeSH fields, in addition to other fields such as title, abstract, and author. Chemical names are mapped to names, synonyms, and CAS Registry Numbers derived from ChemIDplus. Words such as “a,” “an,” “and,” “for,” “the,” and “it” will not be searched.

Limits may be applied to narrow your search to:

- ▶ Include or exclude PubMed records
- ▶ Titles or authors
- ▶ Exact words or word variants
- ▶ Year of publication
- ▶ Documents added within a specified number of months
- ▶ TOXLINE components (more than one component can be selected)
- ▶ Language

You may also specify the maximum number of records you would like retrieved.

The screenshot shows the 'Search TOXLINE' interface with the following elements:

- A search input field with 'Search', 'Clear', and 'Help' buttons.
- Options to 'Add chemical synonyms and CAS numbers to search:' (Yes/No) and 'Include PubMed records:' (Yes/No).
- 'Search fields:' section with radio buttons for 'All fields' (selected), 'Titles', and 'Authors (e.g., Smith H)'.
- 'Search:' section with radio buttons for 'exact words', 'singular & plural forms' (selected), and 'word variants'.
- 'Search records with:' section with radio buttons for 'the phrase', 'all words' (selected), and 'any words'.
- 'Maximum records returned' set to 25000.
- 'Year of Publication:' range from 1900 to 2008.
- 'Only search documents added in the last' [] months.
- 'TOXLINE Components' dropdown menu with options: All, ANEUPL, BIOSIS, CRISP, DART (non-PubMed).
- 'Language' dropdown menu with options: All, English, Afrikaans, Arabic, Armenian, Azerbaijani.
- Instructions: 'To select more than one component, click while holding the CTRL (PC) or CMD (Mac) key.'
- 'Search' and 'Browse the Index' buttons at the bottom.

Search Results

Your initial retrieval is displayed as a list of bibliographic references in **relevancy ranked order** with the titles in blue and underlined. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

Each reference is followed by the field tag [in brackets] of the subfile from which the article was retrieved. References that come from PubMed/MEDLINE are identified with a green and blue M-encircled icon (M) and are linked to the same reference in PubMed. Clicking on this link takes you to PubMed where you can use functions such as LinkOut, Related Links, and document ordering.

The screenshot shows the TOXNET search results interface. The search term is "toluidine bladder cancer". The results are sorted by relevancy. The first result is "Excess number of bladder cancers in workers exposed to ortho-toluidine and aniline." by Ward E, Carpenter A, Markowitz S, Roberts D, Halperin W. The PubMed Citation icon is circled in green, and an arrow points to a larger version of the icon on the right labeled "Link to PubMed Citation".

The **Record** screen displays the complete record for the item you selected on the Results screen with your search terms shown in red:

The screenshot shows the TOXNET record screen for the selected item. The title is "Excess number of bladder cancers in workers exposed to ortho-toluidine and aniline." with "bladder cancers" in red. The authors are listed as Ward E, Carpenter A, Markowitz S, Roberts D, Halperin W. The source is "J Natl Cancer Inst. 1991. Apr 3; 83(7):501-6. [Journal of the National Cancer Institute]".

Individual author names, MeSH headings, keywords, and CAS Registry Numbers are in blue and linked to similar records in the database. Thus, by clicking on an author you can find other articles by that author, and by clicking on a keyword you can find other articles indexed with that keyword.

Other information on the record screen includes the article language, the month it was entered into the system, the year of publication, and a secondary source ID—a unique identifying number for the record and tagged to its subfile. References from PubMed again have the PubMed citation designation and the green-and-blue PubMed icon ().

Navigation buttons on the left are the same as shown on the results screen with two additions:

Related Records—search for articles similar in subject matter to the one displayed. The search used a formula based on data in the displayed record.

Search Results—return to the complete list of results.

Additional Resources

For further information, we recommend these additional resources:

- ▶ PubMed
pubmed.gov
- ▶ TOXLINE Fact Sheet
www.nlm.nih.gov/pubs/factsheets/toxlinfs.html
- ▶ Importing Citations into Reference Manager
sis.nlm.nih.gov/enviro/captivate/toxlinespecialimports.htm
- ▶ Free Full Text Health Science/Medical Journals
sis.nlm.nih.gov/pdf/FreeFullTextListApril07.pdf



TOXLINE Search Exercises

Scenario 1 – General Search

Michelle, a graduate student, is aware that many studies on pesticides have been conducted. She is also aware that pesticides are regulated in the United States. Michelle would like to get an idea of how much literature exists on cancer among agricultural workers since they may experience higher exposure to pesticides than the general public.

Suggested Solution:

- Type **cancer agricultural workers** in the search box
- Click the **Search** button
- Review the citation(s)
- Click the **Basic Search** button at the left of the page to prepare for the next search

Scenario 2 – Limiting Search Results

Thomas, a principal investigator, is designing a new breast cancer study for women. He would like to perform a literature search for recent articles focused on the effects of diet on breast cancer. Thomas would like articles published since 2006.

Suggested Solution:

- Type **diet breast cancer** in the search box
- Click the **Limits** button
- Select Titles under “Search fields:”
- Type **2006** in the first Year of Publication box (replacing “1900”)
- Click the **Search** button
- Review record(s) of your choice
- Click the **Basic Search** button at the left of the page to prepare for the next search

Scenario 3 – Sorting Search Results

Jean, an industrial hygienist, would like to examine articles on worker exposure to *caprolactam*. She is interested in how studies have changed over time, beginning older articles and ending with the most recent. Jean would also like to retrieve only English citations.

Search TOXLINE and sort the results:

Suggested Solution:

- Type **occupational exposure caprolactam** in the search box
- Click the **Limits** button
- Select English in the Language box
- Click the **Search** button
- Click the **Sort** button in the left margin
- Select Ascending after Year of Publication
- Click Sort
- Review the citation(s)
- Click the **Basic Search** button at the left of the page to prepare for the next search

Additional Exercises



Go to toxnet.nlm.nih.gov



Click **TOXLINE** in the **Select Database** column

Exercise 1: Search for the chemical of concern in baby bottles, *bisphenol A (BPA)*. Explore navigating through your retrieval, examining individual records, and going to linked records.

Suggested Solution:

- Type **bisphenol a baby bottles** in the search box
- Click the **Search** button
- Review record(s) of your choice
- Click the **Basic Search** button at the left of the page to prepare for the next search

Exercise 2: Find citations on the salmonella contamination in eggs. Limit your results to citations since 2006.

Suggested Solution:

- Type **salmonella eggs** in the search box
- Click the **Limits** button
- Type **2006** in the first Year of Publication box
- Click the **Search** button
- Review the citation(s)
- Click the **TOXNET Home** button at the right to prepare for the next session

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Chemical Carcinogenesis Research Information System (CCRIS)



CCRIS

CCRIS (Chemical Carcinogenesis Research Information System) is a toxicology data file of the NLM TOXNET system. It is a scientifically evaluated and fully referenced data bank, developed and maintained by the [National Cancer Institute](#) (NCI). It contains more than 8,000 chemical records with carcinogenicity, mutagenicity, tumor promotion, and tumor inhibition test results. Data are derived from studies cited in primary journals, current awareness tools, NCI reports, and other special sources. Test results have been reviewed by experts in carcinogenesis and mutagenesis.

toxnet.nlm.nih.gov

Searching CCRIS

Search CCRIS by any combination of words, chemical names, and numbers, including Chemical Abstracts Service (CAS) Registry Numbers (RN). By default, the system adds synonyms and CAS numbers to chemical searches.

Use truncation (*), Boolean operators (AND, OR, NOT), nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ Records with the phrase, all words, or any words

- ▶ In specific fields or categories of fields—Click the plus sign (+) to the left of a category to show all fields in that category. Use the (-) and (□) buttons above and to the right of the list of categories to contract or expand all categories.

With the **Browse the Index** feature, the system returns a list of index terms related to the search term entered and the number of records containing that term. Select one or more index terms in the **Check to Select** column and click the **Select** button for the search results. Scan the index above or below the original display by clicking the **Up** or **Down** button.

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	9	chloroform
<input type="checkbox"/>	2	chloroformate
<input type="checkbox"/>	1	chlorogenic
<input type="checkbox"/>	1	chlorohydrin
<input type="checkbox"/>	1	chloroisopropyl
<input type="checkbox"/>	2	chloromethoxy

Search Results

Your initial retrieval is displayed as a list of substance names in blue and their CAS Registry Numbers. Substances are listed in **relevancy ranked order**. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

When searching for a chemical, the initial matching chemical record (the “primary record”) may be followed by additional chemical records that contain the chemical name or search term you entered.

Primary Record

Other Chemical Records

Search Results Screen

Click on a Substance Name on the search results page to retrieve the record for that substance. The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical Data is shown in the right frame. Your search term(s) appear in red.

The screenshot shows the CCRIS Record Screen for Chloroform. At the top, there are navigation buttons: Next Item, Search Results, Basic Search, Details, Other Files, Modify Search, Download, Limits, Browse Index, and Help. A 'TOXNET Home' button and 'Item 1 of 3' indicator are also present. On the left, a 'Table of Contents' panel allows users to expand or contract categories such as FULL RECORD, Substance Identification, Studies Data, and Administrative Information. The main content area displays the record for Chloroform (CASRN: 67-66-3) with Substance Identification details, including Substance Name, CAS Registry Number, Major Use, and Data Type.

Record Screen

If you click the primary record, the system displays the full record. If you click a different chemical record, or if your search was for a term other than a chemical, the system will display the sections of the record best matching your query terms (**Best Sections**), those where the chemical search term appears with greatest frequency.

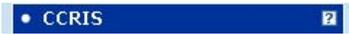
Additional Resources

For further information, we recommend these additional resources:

- ▶ CCRIS Fact Sheet
nlm.nih.gov/pubs/factsheets/ccrisfs.html

CCRIS Search Exercises

 Go to toxnet.nlm.nih.gov

 Click  in the Select Database column

Exercise 1: Does the record for *naphthalene* contain any positive carcinogenicity studies? Does it contain any positive mutagenicity studies?

Suggested Solution:

- Type **naphthalene** in the search box
- Click the **Search** button
- Click **NAPHTHALENE**
- Click **Carcinogenicity Studies** under **Studies Data**
- Review the information retrieved in the right frame
- Click **Mutagenicity Studies** under **Studies Data**
- Review the information retrieved in the right frame
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 2: Locate the *mirex* record and review the tumor promotion studies.

Suggested Solution:

- Type **mirex** in the search box
- Click the **Search** button
- Click **MIREX**
- Click **Tumor Promotion Studies** under **Studies Data**
- Review the information in the right frame
- Click the **Basic Search** button at the top of the page to prepare for a new search

Exercise 3: Review the *citral* record for carcinogenicity data and any associated human health effects.

Suggested Solution:

- Type **citral** in the search box
- Click the **Search** button
- Click **CITRAL**
- Click **Carcinogenicity Studies** under **Studies Data**
- Review the information in the right frame

- Click the **Other Files** button on the top of the page
- Click [HSDB Record](#) in the pop-up window
- Review the information in the right frame
- Click the **Return to CCRIS** button at the top of the page
- Click the **Basic Search** button at the top of the page to prepare for a new search

Exercise 4: How many substances are identified in CCRIS as positive for brain cancer?

Suggested Solution:

- Type **positive brain cancer** in the search box
- Click the **Search** button
- Click chemical record(s) of your choice
- Review the information in the right frame
- Click the **TOXNET Home** button at the top right of the page to prepare for a new session

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Developmental and Reproductive Toxicology Database (DART)



DART

DART is a bibliographic database that covers teratology and other aspects of developmental and reproductive toxicology. It contains more than 200,000 references to literature published since 1965.

The screenshot shows the TOXNET website interface. At the top, there is a header for the United States National Library of Medicine (NLM) and the TOXNET Toxicology Data Network. Below the header, there are navigation links for TOXNET PDA Access, SIS Home, About Us, Site Map & Search, and Contact Us. The main content area is titled "Developmental and Reproductive Toxicology Database (DART) - References to developmental and reproductive toxicology literature." It features a "Select Database" section with a list of databases including ChemIDplus, HSDB, TOXLINE, CCRIS, DART (selected), GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home. There is also an "Additional Resource" section with links to CPDB and CTD. The "Search DART" section includes a search box with a placeholder text "(e.g. neural tube defects, aromatic hydrocarbons embryo)", "Search", "Clear", and "Help" buttons. Below the search box, there are options to "Add chemical synonyms and CAS numbers to search:" (Yes/No) and "Include PubMed records:" (Yes/No). At the bottom of the search section are "Limits" and "Browse the Index" buttons. On the right side, there is a "Env. Health & Toxicology" section with a "Portal to environmental health and toxicology resources" link and a "Support Pages" section with links to Help, Fact Sheet, Sample Record, TOXNET FAQ, and Importing Citations into Reference Manager.

toxnet.nlm.nih.gov

Searching DART

Any term(s) you enter in the query box will automatically be searched against both the keyword and MeSH fields, in addition to other fields such as title, abstract, and author. Chemical names are mapped to names, synonyms, and CAS Registry Numbers derived from ChemIDplus. Words such as "a," "an," "and," "for," "the," and "it" will not be searched.

Limits may be applied to narrow your search to:

- ▶ Titles or Authors
- ▶ Exact words or word variants
- ▶ Year of publication
- ▶ Documents added within a specified number of months
- ▶ Language

You may also specify the maximum number of records you would like retrieved.

The screenshot shows a detailed view of the DART search interface. It includes a search box with "Search", "Clear", and "Help" buttons. Below the search box, there are options to "Add chemical synonyms and CAS numbers to search:" (Yes/No) and "Include PubMed records:" (Yes/No). The "Search fields:" section has radio buttons for "All fields" (selected), "Titles", and "Authors (e.g., Smith H)". The "Search:" section has radio buttons for "exact words", "singular & plural forms" (selected), and "word variants". The "Search records with:" section has radio buttons for "the phrase", "all words" (selected), and "any words". There are input fields for "Maximum records returned" (set to 25000) and "Year of Publication" (from 1900 to 2008). A section for "Only search documents added in the last" has an input field for months. A "Language" dropdown menu is open, showing options: All, English, Afrikaans, Arabic, Armenian, and Azerbaijani. At the bottom, there are "Search" and "Browse the Index" buttons. A note at the bottom states: "To select more than one component, click while holding the CTRL (PC) or CMD (Mac) key."

Search Results

Your initial retrieval is displayed as a list of bibliographic references in **relevancy ranked order** with the titles highlighted in blue and underlined. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

Each reference is followed by the field tag [in brackets] of the subfile from which the article was retrieved. References that come from PubMed/MEDLINE are identified with a green and blue M-encircled icon and are linked to the same reference in PubMed. Clicking on this icon takes you to PubMed where you can use functions such as LinkOut, Related Links, and document ordering.

The screenshot shows the TOXNET search results for 'caffeine'. The search results are displayed in a list format. The first result is 'Teratogen update: evaluation of the reproductive and developmental risks of caffeine.' with a PubMed Citation link. A green and blue M-encircled icon is next to the PubMed Citation link, and an arrow points from this icon to a larger version of the icon labeled 'Link to PubMed Citation'.

The **Record** screen displays the complete record for the item you selected on the Results screen with your search term(s) shown in red.

The screenshot shows the TOXNET record for the selected item. The search term 'caffeine' is highlighted in red. The record displays the title, authors, author address, source, and abstract.

Teratogen update: evaluation of the reproductive and developmental risks of caffeine.

Authors:
[Christian MS](#)
[Brent RL](#)

Author Address: Argus International and Argus Research Laboratories, Horsham, Pennsylvania 19044, USA. mildred.christian@primedica.com

Source: Teratology. 2001, Jul; 64(1):51-78. [Teratology]

Abstract:
Caffeine is a methylated xanthine that acts as a mild central nervous system stimulant. It is present in many beverages, including coffee, tea, and colas, as well as chocolate. **Caffeine** constitutes 1-2% of roasted coffee beans, 3.5% of fresh tea leaves, and approximately 2% of

Individual author names, MeSH headings, keywords, and CAS Registry Numbers are in blue and linked to similar records in the database. Thus, by clicking on an author you can find other articles by that author, and by clicking on a keyword you can find other articles indexed with that keyword.

Other information on the record screen includes the article language, the month it was entered into the system, the year of publication, and a secondary source ID—a unique identifying number for the record and tagged to its subfile. References from PubMed again have the PubMed citation designation and the green-and-blue PubMed icon (📖).

Navigation buttons on the left are the same as shown on the results screen with two additions:

Related Records—search for articles similar in subject matter to the one displayed. The search used a formula based on data in the displayed record.

Search Results—return to the complete list of results.

Additional Resources

For further information, we recommend these additional resources:

- ▶ DART Fact Sheet
nlm.nih.gov/pubs/factsheets/dartfs.html
- ▶ PubMed
pubmed.gov
- ▶ Importing citations into Reference Manager
sis.nlm.nih.gov/enviro/captivate/toxlinespecialimports.htm



DART Search Exercises



Go to toxnet.nlm.nih.gov



Click  in the Select Database column

Exercise 1: Find the latest citations pertaining to food allergies and prevention. Sort the citations by author in descending order.

Suggested Solution:

- Type **food allergies prevention** in the search box
- Click the **Search** button
- Review the citation(s)
- Click the **Sort** button on the left of the page
- Select **Author** and **Descending** order
- Click the gray **Sort** button to the right
- Review the citation(s) as they now appear
- Click the **Basic Search** button at the left of the page to prepare for the next search

Exercise 2: Locate articles on psychomotor stimulants.

Suggested Solution:

- Type **psychomotor stimulants** in the search box
- Click the **Search** button
- Review the citation(s)
 -  The results will be in relevancy ranked order.
- Click The **Basic Search** button at the left of the page to prepare for a new search

Exercise 3: Find information on the effects of alcohol on the fetus.

Suggested Solution:

- Type **alcohol fetus** in the search box
- Click the **Search** button
- Click the record of your choice to view the abstract
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 4: Find articles on the adverse effect of *citalopram*. Download the first three records to full format.

Suggested Solution:

- Type **adverse effect citalopram** in the search box
- Click the **Search** button
- Review the citation(s)
- Click the box to the left of the first three records
- Click the **Download** button to the left of the page
- Change the number in the "Download" box to **3** (for the first 3 records)
- Select Full for the format
- Click the **Download** button to the right
- Close the pop-up window
- Review the full format records
- Click your browser's **Back** button to return to the DART Search Results page
- Click The **TOXNET Home** button at the left of the page to prepare for the next session

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Genetic Toxicology Data Bank (GENE-TOX)



GENE-TOX

GENE-TOX is a toxicology data file of the National Library of Medicine's Toxicology Data Network (TOXNET®). It is created by the U.S. Environmental Protection Agency and contains genetic toxicology (mutagenicity) test data, resulting from expert peer review of the open scientific literature, on more than 3,000 chemicals. The GENE-TOX program was established to select assay systems for evaluation, review data in the scientific literature, and recommend proper testing protocols and evaluation procedures for these systems.

toxnet.nlm.nih.gov

Searching GENE-TOX

Search GENE-TOX by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number, and/or subject terms. By default, the system adds synonyms and CAS numbers to chemical searches.

Use truncation (*), Boolean operators (AND, OR, NOT), nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ Records with the phrase, all words, or any words
- ▶ In specific fields or categories of fields—Click the plus

sign (+) to the left of a category to show all fields in that category. Use the (-) and (□) buttons above and to the right of the list of categories to contract or expand all categories.

Click the **Browse the Index** button on the home page to search a list of index terms related to the search term entered and the number of records containing that term. Select the record(s) you want to view by clicking the appropriate box in the “Check to Select” column and clicking the **Select** button. Scan the index above or below the original display by clicking the **Up** or **Down** button.

The left screenshot shows the 'Browse GENETOX' search form. The search term 'benzene' is entered in the search box. Below the search box, there are radio buttons for 'All Words', 'CAS Registry Number', and 'Chemical Name'. The 'All Words' option is selected. There are 'Search', 'Clear', and 'Help' buttons, and a 'Return to Basic Search' button at the bottom.

The right screenshot shows the 'GENETOX Browse Results' page. The search term 'benzene' is entered in the search box. Below the search box, there are radio buttons for 'All Words', 'CAS Registry Number', and 'Chemical Name'. The 'All Words' option is selected. There are 'Search', 'Clear', and 'Return to Basic Search' buttons. Below the search box, there are 'Up', 'Down', and 'Select' buttons. A table shows the search results:

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	352	benzene
<input type="checkbox"/>	3	benzeneacetic
<input type="checkbox"/>	1	benzenediamine

Search Results

Your initial retrieval is displayed as a list of substance names in blue and their CAS Registry Numbers. Substances are listed in **relevancy ranked order**. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

When searching for a chemical, the initial matching chemical record (the “primary record”) may be followed by additional chemical records that contain the chemical name or search term you entered.

The screenshot shows the 'GENE-TOX Search Results' page. The search term 'benzene' is entered in the search box. Below the search box, there are 'Search', 'Clear', and 'Limits' buttons. There is a checkbox for 'For chemicals, add synonyms and CAS numbers to search:' which is checked. Below the search box, there is a message: 'Items 1 through 20 of 352. Page 1 of 18. Go to page []'. Below the message, there is a note: 'Substance Names are sorted in relevancy ranked order.' Below the note, there is a table with columns 'Select Record' and 'Substance Name'. The first row is highlighted and has an arrow pointing to it from the label 'Primary Record'. The second and third rows have arrows pointing to them from the label 'Other Chemical Records'.

Select Record	Substance Name
<input type="checkbox"/>	BENZENE 71-43-2
<input type="checkbox"/>	RESERPINE 50-55-5
<input type="checkbox"/>	NIALAMID 51-12-7

Search Results Screen

Click on a Substance Name on the search results page to retrieve the record for that substance. The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical Data is shown in the right frame. Your search term(s) appear in red.

The screenshot shows the GENE-TOX Record Screen for Benzene. The interface is divided into three main sections:

- Navigation Buttons:** Located at the top, including "Next Item", "Search Results", "Basic Search", "Details", "Other Files", "Modify Search", "Download", "Limits", "Browse Index", and "Help".
- Table of Contents:** Located on the left, listing categories such as "FULL RECORD", "Substance Identification", "Mutagenicity Studies", and "Administrative Information".
- Record Details:** Located on the right, displaying information for Benzene (CASRN: 71-43-2), including "Substance Identification", "Chemical Classification Category" (Benzene ring), and "Taxonomic Name & Assay" (Plants - gene mutation, In vitro mammalian - chromosome effects).

Record Screen

If you click the primary record, the system displays the entire record. If you click a different chemical record, or if your search was for a term other than a chemical, the system will display the sections of the record best matching your query terms (**Best Sections**), those where the chemical search term appears with greatest frequency.

Additional Resources

For further information, we recommend these additional resources:

- ▶ GENE-TOX Fact Sheet
nlm.nih.gov/pubs/factsheets/genetxfs.html



GENE-TOX Search Exercises

 Go to toxnet.nlm.nih.gov

 Click **GENETOX** in the Select Database column

Exercise 1: Using the CAS registry number 108-95-2, identify the chemical it represents. Review the mutagenicity studies panel report.

Suggested Solution:

- Type **108-95-2** in the search box
- Click the **Search** button
- Click **PHENOL**
- Click **Mutagenicity Studies** in the Table of Contents frame on the left
- Review the information retrieved in the right frame
- Click the link for the Panel Report of your choice to view the abstract
- Review the abstract
- Click your browser's Back button to return to the GENE-TOX results page
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 2: Has *cyclophosphamide* been studied for effects on human male fertility and sterility?

Suggested Solution:

- Type **cyclophosphamide human male fertility** in the search box
- Click the **Search** button
- Click **CYCLOPHOSPHAMIDE**
- Review the **Best Sections** information in the right frame
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 3: Search GENE-TOX for Mutagenicity study results for *caffeine*. How do study results compare with results in CCRIS?

Suggested Solution:

- Type **caffeine** in the search box
- Click the **Search** button
- Click **Mutagenicity Studies** in the Table of Contents frame on the left

- Review the information retrieved in the right frame
- Click the Other Files button on the top of the page
- Click CCRIS Record in the pop-up window
- Click **Mutagenicity Studies** in the Table of Contents frame on the left
- Review the information in the right frame
- Click the **Return to GENE-TOX** button at the top of the page
- Click the **TOXNET Home** button at the top right of the page to prepare for the next session

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Integrated Risk Information System (IRIS)



IRIS

The **Integrated Risk Information System (IRIS)** contains data for more than 500 chemicals, compiled by the Environmental Protection Agency (EPA), in support of human health risk assessment. Overall, IRIS focuses on the human health effects that may result from exposure to various substances found in the environment with data on hazard identification and dose-response assessments.

The screenshot displays the TOXNET website interface. At the top, there is a header for the United States National Library of Medicine (NLM) and the TOXNET Toxicology Data Network. Below the header, there is a navigation menu with links for TOXNET PDA Access, SIS Home, About Us, Site Map & Search, and Contact Us. The main content area is titled "Integrated Risk Information System (IRIS) - Hazard identification and dose-response assessments for over 500 chemicals." On the left, there is a "Select Database" section with a list of databases, including ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, IRIS (highlighted), ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home. A bracket on the left side of this list is labeled "The TOXNET Databases". In the center, there is a "Search IRIS" section with a search box, a "Search" button, a "Clear" button, and a "Help" button. Below the search box, there is a text input field with the example "(e.g. arsenic blackfoot disease, lead, 78-00-2)". Below the search buttons, there is a section for "For chemicals, add synonyms and CAS numbers to search:" with radio buttons for "Yes" and "No". At the bottom of the search section, there are "Limits" and "Browse the Index" buttons. On the right side, there is a "Support Pages" section with links for Help, Fact Sheet, Sample Record, EPA Disclaimer, and TOXNET FAQ. There is also a "Env. Health & Toxicology" section with a "Portal to environmental health and toxicology resources" link and a "VISIT SITE" button.

toxnet.nlm.nih.gov

IRIS data are reviewed by work groups of EPA scientists and represent EPA consensus. Key data provided in IRIS include EPA carcinogen classifications, unit risks, slope factors, oral reference doses, and inhalation reference concentrations.

Searching IRIS

Search IRIS by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number (RN), and/or subject terms. Search results, displayed in relevancy ranked order, can easily be viewed, printed, or downloaded.

Use truncation (*), Boolean operators (AND, OR, NOT), phrase searching, nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ Records with the phrase, all words, or any words
- ▶ In specific fields or categories of fields—Click the plus sign (+) to the left of a category to show all fields in that category. Use the (-) and (□) buttons above and to the right of the list of categories to contract or expand all categories.

Click the **Browse the Index** button on the home page to search a list of index terms related to the search term entered and the number of records containing that term. Select the record(s) you want to view by clicking the appropriate box in the “Check to Select” column and clicking the **Select** button. Scan the index above or below the original display by clicking the **Up** or **Down** button.

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	6	arsenic
<input type="checkbox"/>	1	arsenic*
<input type="checkbox"/>	1	arsenical
<input type="checkbox"/>	1	arsenicism
<input type="checkbox"/>	1	arsenite

Search Results

Your initial retrieval is displayed as a list of chemical names, in blue and underlined, and their CAS Registry Numbers. Substances are listed in **relevancy ranked order**. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

When searching for a chemical, the initial matching chemical record (the “primary record”) may be followed by additional chemical records that contain the chemical name or search term you entered.

Primary Record

Other Chemical Records

Search Results Screen

Click on a Substance Name on the search results screen to retrieve the record for that substance. The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical data is shown in the right frame. Your search term(s) appear in red.

The screenshot shows the IRIS Record Screen for Benzene. The top navigation bar includes buttons for 'Next Item', 'Search Results', 'Basic Search', 'Details', 'Other Files', 'Modify Search', 'Download', 'Limits', 'Browse Index', and 'Help'. The left sidebar contains a 'Table of Contents' with a tree view of record sections, including 'FULL RECORD', 'Substance Identification', and 'Chronic Health Hazard Assessment'. The main content area displays the record for Benzene (CASRN 71-43-2) and includes a table of data for Benzene.

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	on-line	04/17/2003
Inhalation RfC Assessment (I.B.)	on-line	04/17/2003
Carcinogenicity Assessment (II)	on-line	01/19/2000

Record Screen

If you click the primary record, the system displays the entire record. If you click a different chemical record, or if your search was for a term other than a chemical, the system will display the sections of the record best matching your query terms (**Best Sections**), those where the chemical search term appears with greatest frequency.

Additional Resources

For further information, we recommend these additional resources:

- ▶ IRIS Fact Sheet
nlm.nih.gov/pubs/factsheets/irisfs.html
- ▶ EPA IRIS Web Site
epa.gov/iris



IRIS Search Exercises

 Go to toxnet.nlm.nih.gov

 Click  in the Select Database column

Exercise 1: What is the NOAEL (No Observed Adverse Effect Level) for significant proteinuria from *cadmium*?

Suggested Solution:

- Type **cadmium proteinuria** in the search box
- Click the **Search** button
- Click **Cadmium**
- Review the **Best Sections** information in the right frame
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 2: What is the Inhalation Reference Concentration (RfC) of *ammonia*? (Note: The RFC is a non-carcinogenic risk assessment parameter) Also, view the Download options available.

Suggested Solution:

- Type **ammonia** in the search box
- Click the Search button
- Click **Ammonia**
- Click **I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)**
- Click the Download button at the top of the page
- Review the Custom Formats

Exercise 3: How does the U.S. Environmental Protection Agency characterize the carcinogenicity of *methylmercury*?

Suggested Solution:

- Type **methylmercury** in the search box
- Click the **Search** button
- Click **methylmercury (MeHg)**
- Click **II.A. Evidence for Human Carcinogenicity**
- Review the information retrieved

Exercise 4: What is the Inhalation BMC (Benchmark Concentration) for *n*-hexane?

Suggested Solution:

- Type **n-hexane** in the search box
- Click the **Search** button
- Click **n-Hexane**
- Click I.B.1. Inhalation RfC Summary
- Review the information retrieved
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 5: Review the carcinogenicity assessment documentation listed for *boron*.

Suggested Solution:

- Type **boron** in the search box
- Click the **Search** button
- Click II. Carcinogenicity Assessment for Lifetime Exposure
- Review the information retrieved
- Click the **TOXNET Home** button at the top right of the page to prepare for the next session

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International Toxicity Estimates for Risk (ITER)



ITER

ITER (International Toxicity Estimates for Risk) is a toxicology data file on the National Library of Medicine's (NLM) Toxicology Data Network (TOXNET) and contains data in support of human health risk assessments. Compiled by Toxicology Excellence for Risk Assessment, ITER is a small database with data on 650 chemical records. It is structured to provide a comparison of international risk assessment information in a side-by-side format and explains differences in risk values derived by different organizations.

The screenshot displays the TOXNET website interface. At the top left is the NLM logo. The main header reads "TOXNET Toxicology Data Network". Below this is a navigation bar with links for "TOXNET PDA Access", "SIS Home", "About Us", "Site Map & Search", and "Contact Us". A breadcrumb trail shows "Env. Health & Toxicology > TOXNET > ITER". The main content area is titled "International Toxicity Estimates for Risk (ITER) - Risk information for over 600 chemicals from authoritative groups worldwide." It features three main sections: "Select Database" with a list of databases including ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, IRIS, **ITER**, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home; "Search ITER" with a search input field, a search button, and a "Browse the Index" button; and "Env. Health & Toxicology" with a "VISIT SITE" button. A "Support Pages" section lists links like "ITER Glossary", "What's New", "Risk Methods", "More about ITER", "Risk Assessment Links", "Help", "Fact Sheet", "Sample Record", and "TOXNET FAQ". An "Additional Resource" section at the bottom left lists "CPDB" and "CTD".

toxnet.nlm.nih.gov

ITER provides both risk data and cancer classifications. Information is derived from:

- ▶ Agency for Toxic Substances & Disease Registry (ATSDR)
- ▶ Health Canada
- ▶ U.S. Environmental Protection Agency (EPA)
- ▶ International Agency for Research on Cancer (IARC)
- ▶ NSF International (National Sanitation Foundation)
- ▶ National Institute of Public Health & the Environmental (RIVM), The Netherlands

Searching ITER

Search ITER by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number, and/or subject terms. By default, the system adds synonyms and CAS numbers to chemical searches.

Use truncation (*), Boolean operators (AND, OR, NOT), nested parentheses, limits, and index browsing to refine your search results.

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or word variants
- ▶ Records with the phrase, all words, or any words
- ▶ In specific fields or categories of fields—Click the plus sign (+) to the left of a category to show all fields in that category. Use the (-) and (□) buttons above and to the right of the list of categories to contract or expand all categories.

Click the **Browse the Index** button on the home page to search a list of index terms related to the search term entered and the number of records containing that term. Select the record(s) you want to view by clicking the appropriate box in the “Check to Select” column and clicking the **Select** button. Scan the index above or below the original display by clicking the **Up** or **Down** button.

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	10	benzene
<input type="checkbox"/>	3	benzenediamine
<input type="checkbox"/>	1	benzenediamines
<input type="checkbox"/>	4	benzines
<input type="checkbox"/>	1	benzidine
<input type="checkbox"/>	1	benzofuran

ITER Search Results

Your initial retrieval is displayed as a list of substance names highlighted in blue and their CAS Registry Numbers. Substances are listed in relevancy ranked order. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

The screenshot shows the TOXNET search results page. The search term is 'benzene'. The results are sorted by relevancy. The primary record is 'BENZENE' (CAS 71-43-2). Other records include 'DICHLOROBENZENE, 1,2-' (CAS 95-50-1) and 'ALPHA-HEXACHLOROCYCLOHEXANE' (CAS 319-84-6). Arrows point from the labels 'Primary Record' and 'Other Chemical Records' to the respective records in the list.

Search Results Page

When searching for a chemical, the initial matching chemical record (the “primary record”) may be followed by additional chemical records that contain the chemical name or search term you entered. (See next page.)

Click on a Substance Name on the search results screen to retrieve the record for that substance. The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Chemical Data is shown in the right frame. Your search term(s) appear in red.

The screenshot shows the record screen for 'BENZENE'. The search term 'BENZENE' is highlighted in red. The screen is organized into three sections: 1. Navigation buttons at the top, 2. Table of Contents on the left, and 3. Chemical Data on the right. A table titled 'Summary Risk Table for: BENZENE' is displayed, showing risk values for various organizations and health effects.

Risk Value Type \ Organization	ATSDR ¹	Health Canada ²	IARC ³	IEPR ⁴	ITER ⁵ P ⁶	NSF Inf ⁷	RIVM ⁸	U.S.E.P.A. ⁹
Noncancer Oral	✓	✓	---	---	---	---	✓	✓
Cancer Oral	✓	✓	---	---	---	---	✓	✓
Noncancer Inhalation	✓	✓	---	---	---	---	✓	✓
Cancer Inhalation	✓	✓	---	---	---	---	✓	✓

Record Screen

If you click the primary record, the system displays the entire record. If you click a different chemical record, or if your search was for a term other than a chemical, the system will display the sections

of the record best matching your query terms (**Best Sections**), those where the chemical search term appears with greatest frequency.

Additional Resources

For further information, we recommend these additional resources:

- ▶ ITER Fact Sheet
nlm.nih.gov/pubs/factsheets/toxnetfs.html



ITER Search Exercises

 Go to toxnet.nlm.nih.gov

 Click  in the **Select Database** column

Exercise 1: Do ATSDR and U.S. EPA currently have any noncancer oral risk data for the chemical *acetone*?

Suggested Solution:

- Type **acetone** in the search box
- Click the **Search** button
- Click **ACETONE**
- Click **Risk Data – Noncancer Oral** under **Risk Data** in the Table of Contents frame on the left
- Review the **Noncancer Oral Risk Table** in the right frame
- Click **Risk Data – Cancer Oral** under **Risk Data** in the Table of Contents frame on the left
- Review the **Cancer Oral Risk Table** in the right frame
- Click the **Basic Search** button at the top of the page to prepare for the next search

Exercise 2: How many international agencies have classified *dichloroacetic acid* as carcinogenic to humans?

Suggested Solution:

- Type **dichloroacetic acid** in the search box
- Click the **Search** button
- Click **DICHLOROACETIC ACID**
- View the full record
- Click the **TOXNET Home** button at the top right of the page to prepare for the next search

Exercise 3: How do the Dutch RIVM, Health Canada, and ATSDR compare in their non-cancer inhalation risk values for *nickel oxide*?

Suggested Solution:

- Type **nickel oxide** in the search box
- Click the **Search** button
- Click **NICKEL OXIDE**
- Click **RISK Data – Noncancer Inhalation** in the Table of Contents to the left
- Review the Noncancer Inhalation Table
- Click the **Basic Search** button at the top of the page to prepare for the next search

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LactMed



LactMed

LactMed is a database of more than 800 drugs and other chemicals to which breastfeeding mothers may be exposed. It includes information on the levels of such substances in breast milk and infant blood, and the possible adverse effects in the nursing infant. All data are derived from the scientific literature and fully referenced. Data are organized into substance-specific records, which provide a summary of the pertinent reported information and include links to other NLM databases.

The screenshot shows the TOXNET website interface. At the top, there is a header with the NLM logo and the text "United States National Library of Medicine" and "TOXNET Toxicology Data Network". Below the header, there are navigation links: "TOXNET PDA Access", "SIS Home", "About Us", "Site Map & Search", and "Contact Us". A breadcrumb trail shows "Env. Health & Toxicology > TOXNET > LactMed".

The main content area is titled "Drugs and Lactation Database (LactMed) - A peer-reviewed and fully referenced database of drugs to which breastfeeding mothers may be exposed. Among the data included are maternal and infant levels of drugs, possible effects on breastfed infants and on lactation, and alternate drugs to consider." Below this, there are three main sections:

- Select Database:** A list of databases with checkboxes and external links: ChemIDplus, HSDB, TOXLINE, CCRIS, DART, GENETOX, IRIS, ITER, LactMed (selected), Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home.
- Search LactMed:** A search interface with a text input field (example: "e.g. Advil, oral contraceptives, Prozac"), "Search" and "Clear" buttons, and a checkbox for "Add chemical synonyms and CAS numbers to search: Yes No". Below are "Limits" and "Browse the Index" buttons.
- Env. Health & Toxicology:** A section with a "Portal to environmental health and toxicology resources" link and a "Support Pages" list: LactMed Record Format, Database Creation & Peer Review Process, Help, Fact Sheet, Sample Record, TOXNET FAQ, Glossary, and Breastfeeding Links.

At the bottom left, there is an "Additional Resource" section with a link to CPDB.

toxnet.nlm.nih.gov

Searching LactMed

Search LactMed by chemical, brand name, Chemical Abstracts Service (CAS) Registry Number, pharmacologic category, and/or subject terms. By default, the system adds synonyms and CAS numbers to chemical searches. Search results, displayed in relevancy ranked order, can easily be viewed, printed, or downloaded.

Limits

Click the **Limits** button on the home page to search:

- ▶ Exact words, singular & plural forms, or words variants
- ▶ Records with the phrase, all words, or any words
- ▶ In specific fields or categories of fields: LactMed contains ten search fields organized under two

The screenshot shows the "Search LactMed" interface. It includes a search input field, "Search", "Clear", and "Help" buttons. Below the input field, there are options for "Add chemical synonyms and CAS numbers to search: Yes No" and "Search: exact words singular & plural forms word variants". There are also options for "Search records with: the phrase all words any words".

The "Search in fields:" section is highlighted in green. It includes a note: "(If no box is checked, all fields will be searched.)". There are two checkboxes: "Drug Levels and Effects" and "Substance Identification". To the right, there are links for "Contract all categories" and "Expand all categories". At the bottom, there are "Search" and "Browse the Index" buttons.

broad categories. Click the plus sign (+) to the left of a category to show all fields in that category. Use the ([-]) and ([+]) buttons above and to the right of the list of categories to contract or expand all categories.

Search Results

Your initial retrieval is displayed as a list of chemical names, highlighted in blue and underlined, and their CAS Registry Numbers. If your search was for a chemical or drug (e.g., codeine) and there is a match for it in the database, the record for this chemical—referred to as the primary chemical record—will display first, followed by a list of other chemical records which also contain some mention of the chemical you entered. This latter list of chemicals is displayed according to a Relevancy Ranking algorithm. Clicking directly on any of the items will provide a display of the Selected Record Screen, containing all the data for that item.

If your query consists of words that are not chemical or drug terms, this same Relevancy Ranking algorithm determines the order of display of all your search results.

Records in LactMed include:

- ▶ Generic Name
- ▶ Summary of use during lactation
- ▶ Drug levels
- ▶ Effects in Breastfed Infants
- ▶ Possible Effects on Lactation
- ▶ AAP Category
- ▶ Alternative Drugs
- ▶ Drug Class

Additional Resources

For further information, we recommend these additional resources:

- ▶ Drugs and Lactation Database (LactMed) Fact Sheet
nlm.nih.gov/pubs/factsheets/lactmedfs.html
- ▶ LactMed Basics Brochure
nlm.gov/mcr/resources/consumer/LactMed.pdf
- ▶ Pregnancy Riskline (University of Arizona College of Pharmacy)
www.pharmacy.arizona.edu/outreach/pregnancy
- ▶ Organization of Teratology Information Specialists
otispregnancy.org/otis_find_a_tis.asp



LactMed Search Exercises

Scenario 1 – Summary Information

Carolyn, a nursing mother, has been prescribed *methotrexate* due to an early onset of rheumatoid arthritis. Her doctor has told her that she may continue to nurse her baby since he has prescribed a low dose of the medication. Carolyn would like to do some research herself to confirm her doctor's statements.

Search LactMed to gather information: Locate the *methotrexate* record in LactMed. Open the *methotrexate* record. Browse the record for information.

Suggested Solution:

- Type **methotrexate** in the search box
 - Click the **Search** button
 - Click the **Methotrexate** record in the search results list
 - Scroll through the record or use the Table of Contents
-  The Summary of Use during Lactation supports the doctor's statements.

Scenario 2 – Alternative Drug Field

While browsing the *methotrexate* record, Carolyn (Scenario 1) notices *auranofin* listed as an alternate drug to consider. Have any effects in infants been reported after use of *auranofin* by a nursing mother?

Use links within the *methotrexate* record to find information: Locate the alternate drugs within the *methotrexate* record. Open the *auranofin* record. Locate the infant effects section of the record.

Suggested Solution:

- Click **Alternate Drugs to Consider** in the Table of Contents
- Click the link to the auranofin record
- Click **Auranofin**
- Click **Effects in Breastfed Infants** in the table of contents

Additional Exercises



Go to toxnet.nlm.nih.gov



Click  in the **Select Database** column

Exercise 1: To which class of drugs does *clomipramine* belong?

Suggested Solution:

- Type **clomipramine** in the search box
- Click the **Search** button
- Click **Clomipramine**
- Click **Drug Class** under **Substance Identification** in the Contents frame to the left
- Click the **Basic Search** button at the top of the screen to prepare for the next search

Exercise 2: Is there a substitute for the use of *hydrocodone* during lactation?

Suggested Solution:

- Type **hydrocodone** in the search box
- Click the **Search** button
- Click **Hydrocodone**
- Click **Alternate Drugs to Consider** under **Drug Levels and Effects** in the Contents frame to the left
- Click **TOXNET Home** button at the top right of the page to prepare for the next session

Toxics Release Inventory (TRI) and TOXMAP



Toxics Release Inventory

The **Toxics Release Inventory (TRI)** is a publicly available resource of the U.S. Environmental Protection Agency containing detailed information on approximately 600 chemicals and chemical categories which more than 23,000 U.S. industrial and federal facilities manage through disposal or other releases, recycling, energy recovery, or treatment. This inventory was established under the Emergency Planning and Community Right to Know Act of 1986 (EPCRA) and was expanded by the Pollution Prevention Act of 1990. TRI's data, beginning with the 1987 reporting year, cover air, water, land, and underground injection releases as well as transfers to waste sites.

The screenshot shows the TOXNET interface with the following elements:

- Select Database:** A list of databases including ChemIDplus, HSDb, TOXLINE, CCRIS, DART, GENETOX, IRIS, ITER, LactMed, Multi-Database, TRI, Haz-Map, Household Products, TOXMAP, and TOXNET Home.
- Search TRI:** A search form with a text input for 'Chemical Name or CAS Registry Number', 'Search', 'Clear', and 'Help' buttons. Below the input is a section for 'Add synonyms and CAS numbers to search:' with radio buttons for 'Yes' (selected) and 'No'.
- TRI Files:** A grid of checkboxes for years from 1987 to 2008. The 'TRI2008' checkbox is checked and highlighted with a red box. A red arrow points from the text 'Select File Year(s)' to this checkbox.
- Env. Health & Toxicology:** A section with a 'VISIT SITE' button and a description: 'Portal to environmental health and toxicology resources'.
- Support Pages:** A list of links including 'Help', 'Fact Sheet', 'Sample Record', and 'TOXNET FAQ'.

toxnet.nlm.nih.gov

Select
File Year(s)

Searching TRI

Search TRI by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number, and/or subject terms. By default, the system adds synonyms and CAS numbers to chemical searches. Use truncation (*), Boolean operators (AND, OR, NOT), nested parentheses, and limits to refine your search results.

TRI currently contains data from 1987 through 2008. By default the system will search the most current year. You can also limit your search with the following criteria:

- ▶ Facility Name
- ▶ Facility Location
 - Select State, City/State, County/State, or Zip

The search criteria form includes the following sections:

- Facility Names:** A text input field for separate multiple entries with commas.
- Facility Location:** A text input field for separate multiple entries for state, city/state, or zip with commas. Below it are radio buttons for 'State', 'City/State', 'County/State', and 'Zip'.
- TRI Reporting Form Type:** Radio buttons for 'Both Form R and Form A' (selected), 'Form R (long form) only', and 'Form A (short form) only'.
- Standard Industrial Classification Code, North American Industry Classification System Code:** A text input field for separate multiple entries with commas.
- Greater Than:** A dropdown menu set to '0 lbs' and a text input field for 'for'.
- Buttons:** 'Search' and 'Browse the Index'.

- ▶ TRI Reporting Form Type
 - Ability to search for either Form R or Form A or both
- ▶ Standard Industrial Classification Code or North American Industry Classification System Code
 - Separate multiple entries with commas
- ▶ Weight in pounds (**Greater Than**)
- ▶ Type of release (air, water, land, underground injection, disposal, and production-related waste)

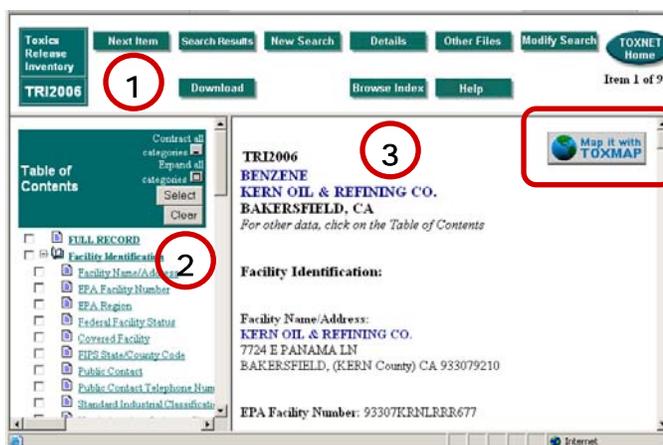
With the **Browse the Index** feature, the system returns a list of index terms related to the search term entered and the number of records containing that term. Select one or more index terms and click the **Select** button for the search results. Scan the index above or below the original display by clicking the **Up** or **Down** button.

TRI Search Results

Your initial retrieval is displayed in relevancy ranked order as a list of abbreviated records with facility name in blue and hot-linked, chemical name, and city and state where the facility is located. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

The **Record** screen is organized into three sections:

1. Navigation buttons at the top of the screen allow you to link to **Other Files** (NLM databases), **Modify Search**, **Download**, return to the **Basic Search** screen, and more.
2. A **Table of Contents** in the left frame allows you to choose categories and fields for display.
3. Data is shown in the right frame—Click the **Map it with TOXMAP** button to visually explore on-site releases in TOXMAP



Additional Resources

For further information, we recommend these additional resources:

- ▶ TRI Fact Sheet
nlm.nih.gov/pubs/factsheets/trifs.html

TOXMAP

TOXMAP is a Geographic Information System (GIS) that uses maps of the United States to help users visually explore data from the Environmental Protection Agency's Toxics Release Inventory (TRI) and Superfund programs. TOXMAP helps users create nationwide, regional, or local area maps showing where TRI chemicals are released **on-site** into the air, water, and ground. Maps can also show locations of Superfund sites on the National Priorities List (NPL). The NPL guides the federal government in determining which sites should be investigated. It is updated on a regular basis.

Quick Search

More Search Options

TOXMAP® Environmental Health e-Maps

Use Quick Search or click on a map to explore on-site toxic releases and hazardous waste sites from the EPA's Toxics Release Inventory (TRI) and the Superfund National Priorities List (NPL).

TRI facilities (blue) and Superfund NPL sites (red).

[toxmap.nlm.nih.gov](#)

Map Features

TOXMAP offers several ways to create maps: using the tabs and sub-tabs along the top of the page, the **Quick Search** box on the home page, and the **Map Controls** below each created map.

TOXMAP can create several types of maps:

- ▶ TRI Facilities
- ▶ TRI Chemical Releases
- ▶ TRI Chemical Trends
- ▶ Superfund Maps
- ▶ Combination (Combo) Maps
- ▶ Search (Advanced)

MAP CONTROLS		
TRI ? [Save results] <input type="radio"/> None <input checked="" type="radio"/> Facilities : 2008 <input type="radio"/> Releases : 2008 <input type="radio"/> Trends	Superfund ? <input checked="" type="radio"/> None <input type="radio"/> All NPL <input type="radio"/> NPL Final <input type="radio"/> NPL Deleted <input type="radio"/> NPL Proposed	Demographic ? <input checked="" type="radio"/> None <input type="radio"/> Population Density - 2000 Apply other demographics
Define a combo map Start over		

TOXMAP also overlays map data such as:

- ▶ U.S. Census Data—1990 and 2000 demographics (population, ethnicity, age, gender ratio)
- ▶ Income Data—per capita personal income
- ▶ Health Data—mortality data for cancer and various causes
- ▶ Reference Data—cities, roads, hospitals, federal land, and urban areas

DISCLAIMER: The co-occurrence of a substance and a particular health problem does not by itself imply an effect on human health by that substance.

Searching and Creating Maps in TOXMAP

TOXMAP's **Quick Search** feature on the home page allows you to search TRI and Superfund data by chemical and to zoom the resulting map to a specific city, state, or zip code. Advanced search options are available by clicking the [More search options...](#) link or by selecting the **Search** tab at the top of the page.

The **Search** page allows users to search a chemical CAS/RN, TRI facility name/ID, release year ranges, release medium, release amount, Superfund NPL site name/ID/status, and Hazard Ranking System (HRS) score. You can also select specific geographic regions. Release color coding is calibrated only for releases in that region rather than for the entire nation.

Quick Search

Select Dataset(s):
 TRI Superfund NPL

Chemical Name

City

State ZIP [Lookup]

[Choose a region...](#)
[More search options...](#)

Home
TRI Facilities
TRI Releases
TRI Trends
Superfund
Combi
Search
Help
Contact Us

▶ Edit Search
Display Map
Set Region
Other Data
Download

Search

Click the "Set Region" tab to show results only in a specified geographic region. [?](#)

CHOOSE A CHEMICAL [?](#)

Chemical:
 CAS RN [?](#):

1,1'-Biphenyl [?](#)

CHOOSE A DATASET

Toxics Release Inventory (TRI) [?](#)

Search all TRI facilities
 Search only facilities with the selected chemical
 Do not search TRI facilities

Superfund National Priorities List (NPL) [?](#)

Search all Superfund sites
 Search only NPL sites with the selected chemical
 Do not search Superfund sites

TRI Facility Name

TRI Facility ID [?](#)

Release Medium [?](#)
 Any Medium
 Water
 Air
 Land
 Underground Injection

Release Years [?](#) 2008 [?](#) to 2008 [?](#)

Release Exceeds [?](#) lbs.

NPL Site Name

EPA ID [?](#)

NPL Status [?](#) All
 Final
 Proposed
 Deleted

Hazard Ranking System Score [?](#) 0 [?](#) to 100 [?](#)

Auto-zoom map to include all search results

Additional Resources

For further information, we recommend these additional resources:

- ▶ TOXMAP Tour
toxmap.nlm.nih.gov/toxmap/tour/index.html
- ▶ TOXMAP Fact Sheet
nlm.nih.gov/pubs/factsheets/toxmap.html
- ▶ Online Tutorial: TOXMAP Basics
toxmap.nlm.nih.gov/toxmap/tour/misc/ToxmapBasics.html

TRI/TOXMAP Decision Tree

TRI (Toxics Release Inventory) is the Environmental Protection Agency's (EPA) publicly available database that contains information on toxic chemical releases and waste management activities, and more recently, source reduction and recycling information, reported annually by U.S. industrial and federal facilities beginning with the 1987 reporting year. TRI is accessible via the National Library of Medicine's (NLM) **TOXNET®** (TOXicology Data NETwork) databases, which cover toxicology, hazardous chemicals, environmental health and related areas.

TOXMAP is a geographic information system from the NLM Division of Specialized Information Services that uses maps of the United States to help users visually explore data from the EPA's TRI and Superfund Program. With TOXMAP, users can create nationwide, regional, or local area maps showing where TRI chemicals are released **on-site** into the air, water, and ground. Information on the releasing facilities is provided. Maps can also show locations of Superfund sites, with listings of all chemical contaminants present at these sites.

Use this Decision Tree to choose the correct database:

TOXNET/TRI	TOXMAP
You want full-reference, book-style information on TRI facilities or releases	You are interested in a health-related presentation of data
You are using other TOXNET resources	You want to see TRI locations on a map
You want to benefit from chemical synonyms	You are interested only in on-site chemical releases
You would like to use a browse interface	You want to search by combinations of states and/or counties
You want to calculate the total release of chemicals	You are also interested in Superfund sites and/or demographic data
You want multiple sorting options for search results	You want location data from the Federal Registry System (not self-reported locations)



TRI/TOXMAP Search Exercises

Scenario 1 – General Search by State using TRI

Michael, a senior in high school, is writing a report for chemistry class. He has decided to report on *methanol*, a widely used solvent. Michael would like to include an environmental section in his report and provide some information specific to his state, Mississippi. Michael would like to include information in his report such as: how much *methanol* was released in Mississippi, where did these release(s) occur, and what type of release(s) occurred.

Search the Toxics Release Inventory to gather information.

Suggested Solution:

- Type **methanol** in the Chemical Name or CAS Registry Number search box
- Type **MS** in the **Facility Location** search box
 -  Note below the search box that “State” is selected by default.
- Click the **Search** button
- Click the **Calculate Release!** button at the left of the page
 -  Information is for the most recently reported year available from EPA.
- Click the **TOXNET Home** button to prepare for the next search

Scenario 2 – Mapping TRI and Health Data in TOXMAP

Teresa, an epidemiologist, is familiar with the TRI database. She has learned about TOXMAP and decides to take a look at cancer data for females and chemical releases from 2001 to 2005 for styrene in her home state of New Jersey, excluding Superfund NPL. Monitoring data indicate that populations may be exposed to styrene through inhalation of air polluted by industrial sources, so she wants to limit her search to air releases. Teresa knows current studies do not provide adequate evidence to classify styrene as a human carcinogen.

Search TOXMAP to examine information.

Suggested Solution:

- Click the **Search** tab
- Type **styrene** in the Chemical Name search box
- Click the Water, Land, and Underground Injection checkboxes to deselect them
- Select 2001 and 2005 in the **Release Years** drop-down menus
- Click the **Search** button
 -  Note that this shows releases for all of the U.S. and territories.

- Select the **Set Region** sub-tab
- Click the Create a new region link
- Click New Jersey in the **Region Name** text box
 -  Note that assigning a region name is optional. However, naming the search makes it easy to identify when saved as a previous search.
- Click the **Submit** button
- Click Continue to map
- Click Health Data under **Map Other Data** on the left side of the page
- Select All Malignant Cancers - All Races - Female from the top-most list
- Click the **Submit** button
- Click Show legend values in the legend below the map
- View the map legend to interpret the information
- Click **Start Over** to prepare for the next search

Scenario 3 – Mapping TRI and Health Data in TOXMAP

You are a public health professional researching lung cancer. You are interested in all releases of *benzene*, a known carcinogen, in Texas between 1995 and 2001.

Search TOXMAP to examine information.

Suggested Solution:

- Click the **Search** tab
- Type **benzene** in the Chemical Name search box or select it from the chemical drop-down menu
- Select 1995 and 2001 in the **Release Years** drop-down menus
- Click the **Search** button
 -  Note that this zooms the map to include all search results.
- Select TX from the **ZOOM TO** drop-down menu to the left of the map
- Click Health Data under **Map Other Data** on the left side of the page
- Select Lung and Bronchus - All Races - Female from the top-most list
- Click the **Submit** button
- Click Show legend values in the legend below the map
- View the map legend to interpret the information
- Click **Start over** at the top right of the page to prepare for the next search

Additional Exercises

The following exercises have been designed to be searched in sequence, beginning in TRI and moving to TOXMAP.

 Go to toxnet.nlm.nih.gov

 Click  in the **Select Database** column

Exercise 1: Did any facilities in Mississippi release more than 100 pounds of *methanol* to the air in 2006? Map the releases in TOXMAP and view the environmental release information for the first facility.

Suggested Solution:

- Type **methanol** in the Chemical Name search box
- Select MS in the state search box
- Select 100 lbs from the **Greater Than** pull-down menu at the bottom of the TRI home page
- Select Total Air Release from the **for** pull-down menu
- Click the **Search** button
- Click the first facility link in the list of **Facility/Substance** names
- Click **Environmental Release of Chemical** in the Table of Contents
- Review the information in the right frame
- Click the **Map it with TOXMAP** button ()
- Select MS from the **ZOOM TO** pull-down menu at the right of the map
- Click TRI on-site release details at the right of the map below **Map Details**
- Click the facility name link under **Facilities reporting to TRI** to the right of the map
- Review the **On-site Release Estimates** and All chemicals reported by this facility

Exercise 2: Link to NLM's HSDB to explore the human health effects of *methanol*.

Suggested Solution (continued from previous exercise):

- Scroll to the top of the page and find the **Chemical Information** section to the top left of the map
- Click Human Health Effects under **Information about this Chemical**
- Review the information in the HSDB Search Results window
- Close the HSDB window and return to the TOXMAP results page
- Click **Start over** at the top right of the page to prepare for the next search

Exercise 3: What TRI facility in EPA Region 5 released the most chemicals on site in 2004? What were the top five chemicals released by that facility in 2004?

Suggested Solution:

- Click [Choose a Region](#) in the **Quick Search** box
- Select [EPA Region 5](#) from the **Predefined Region** list
- Click the **Submit** button
- Select the **Define Map** sub-tab
- Select [2004](#) from the **Facilities** drop-down menu
- Click [TRI Facilities Details](#) in the **Map Details** box
- Click the first facility name in the **Facilities Reporting to TRI** list
- View the facility name and the chemicals listed in the chemical summary table
- Click **[Start over](#)** at the top right of the page to prepare for the next search

Exercise 4: How many NPL Final Superfund sites are located in New England?

Suggested Solution:

- Click [Choose a Region](#) in the **Quick Search** box
- Select [New England](#) from the **Predefined Region** list
- Click the **Submit** button
- Click the **Superfund** tab at the top of the page
- Click the **NPL Final** sub-tab
- View the search results above the map to see how many NPL Final sites are in this region

Haz-Map



Haz-Map

Haz-Map is an occupational health database designed for health and safety professionals and for consumers seeking information about the health effects of exposure to chemical and biological agents used in industry, on the job and at home. Haz-Map lists more than 3,400 chemical/biological agents with links to at-risk occupations and approximately 225 associated occupational diseases and their symptoms. The database was compiled from information from occupational medicine textbooks, journal articles, and electronic databases.

[Haz-Map Search](#) [More Searches](#) [Haz-Map Help](#) [Glossary](#) [References](#)

Browse Haz-Map

<ul style="list-style-type: none"> • Hazardous Agents <ol style="list-style-type: none"> 1. By Types of Agents 2. By Adverse Effects 3. Alphabetically • Occupational Diseases <ol style="list-style-type: none"> 1. By Types of Diseases 2. By Jobs and Symptoms 3. Alphabetically • High Risk Jobs <ol style="list-style-type: none"> 1. By Types of Jobs 2. Alphabetically 	<div style="border: 1px solid black; border-radius: 10px; padding: 10px; margin-bottom: 10px;"> <p>Agents: Chemical and biological agents associated with occupational diseases.</p> </div> <div style="border: 1px solid black; border-radius: 10px; padding: 10px; margin-bottom: 10px;"> <p>Diseases: Medical conditions and symptoms based on the International Classification of Diseases (ICD-9) system.</p> </div> <div style="border: 1px solid black; border-radius: 10px; padding: 10px;"> <p>Jobs: High risk jobs and tasks that could result in exposure to hazardous agents.</p> </div>
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hazmap.nlm.nih.gov

Searching Haz-Map

Search as [Agent](#) [Disease](#) [Job](#) [Text Search](#)

You can search Haz-Map by keyword, agent, disease, or job from almost any page of the site. Simply enter your query in the search box and click the appropriate button (**Agent**, **Disease**, **Job**, or **Text Search**) to the right of “as.” You can also browse alphabetically in each category or by Types of Agents, Adverse Effects, Types of Diseases, Jobs and Symptoms, or Types of Jobs by clicking the appropriate link (see above).

Special features for chemical searching: If there is an exact match of an agent name with the query, the primary record will be returned first in the search results. If the search query is enclosed by double quotes (“”), only the primary record will be displayed. You can also search a chemical by its CAS Registry Number.

Other categories: Click the More Searches tab for additional categories of information, including Activities, Industries, Job Tasks, Processes, and Symptoms. The query words will be searched as text words in the selected category and the results will display in relevancy ranked order.

Browse Haz-Map	
Job Task Name	Dye or bleach hair, or use ethanolamines in beauty culture
Comments	Occupational asthma caused by ammonium persulphate, henna, and ethanolamine has been reported. [Malo]
Job Task Category	Beauty Culture
Exposed To	Allergens
Related Information in Haz-Map	
Diseases	Diseases associated with this job task: <ul style="list-style-type: none"> • Asthma, occupational
Jobs	Jobs associated with this job task: <ul style="list-style-type: none"> • Hairdressers, Hair Stylists & Cosmetologists
Industries	Industries associated with this job task: <ul style="list-style-type: none"> • Beauty Salons • Cosmetology and Barber Schools

← Click the **Search TOXNET** button to search all TOXNET databases. Enter search words in the pop-up prompt box:

You may also highlight text on the results page and then click the **Search TOXNET** button to launch a search.

Additional Resources

For further information, we recommend these additional resources:

- ▶ Haz-Map Help
hazmap.nlm.nih.gov/hazhelp.html
- ▶ Haz-Map Brochure
hazmap.nlm.nih.gov/635906-brochure.pdf
- ▶ Sources of Information for Haz-Map
hazmap.nlm.nih.gov/hazref.html



Haz-Map Search Exercises

Scenario – Jobs and Agents Associated with Disease

Gloria, an occupational analyst, performs research used to assist in the processing of employee compensation claims for a government agency. Gloria has a list of specific chemicals from various work sites where certain job tasks were performed. She needs to determine if specific conditions/diseases are associated with these chemicals and job tasks. Gloria needs to begin her research by determining if aplastic anemia is associated with aviation mechanics that performed maintenance on fuel tanks.

Search Haz-Map to identify associations: Browse the High Risk Jobs by type. Select the appropriate job category. Select the appropriate job name. Select the appropriate job task. Browse related information.

Suggested Solution:

- Click [By Types of Jobs](#) under High Risk Jobs
- Click [Installation, Maintenance, & Repair](#)
- Click [Aircraft Mechanics & Service Technicians](#)
- Click [Repair or maintain gasoline or jet fuel tanks](#)
- View the job task record and note any chemicals and diseases listed
- Click [aplastic anemia](#) under diseases
- View the disease record and note additional information and references

Additional Exercises

 Go to hazmap.nlm.nih.gov

Exercise 1: What are some high risk tasks associated with sheet metal workers?

Keyboard Help:

- Click [Alphabetically](#) under **High Risk Jobs**
- Click [S](#)
- Click [Sheet Metal Workers](#)
- Click the high risk job task of your choice under [Related Information in Haz-Map](#)
- Review the information about this job task
- Click the **Haz-Map Search** tab to prepare for the next search

**Exercise 2: What are some of the agents, jobs, and diseases associated with asthma?
Perform a text search.**

Keyboard Help:

Type	asthma in the search box
Click	Text Search to the right of the search box
Scroll	down the page and view the lists of records under each category
Click	the record of your choice in the Agents list
Review	the results
Click	your browser's back button to return to the search results page
Scroll	down to the search results found in the Jobs table
Click	the record of your choice
Review	the results
Click	the Haz-Map Search tab to prepare for the next search

Household Products Database



Household Products Database

Household Products Database links more than 10,000 consumer brands of household products to their health effects from Material Safety Data Sheets provided by the manufacturers.

Quick Search ►

Household Products Database
Health & Safety Information on Household Products

National Institutes of Health
National Library of Medicine
Specialized Information Services

Home | Products | Manufacturers | Ingredients | Health Effects

Quick Search
Product, Manufacturer etc...

Advanced Search ►

Browse by Category
Auto Products
Inside the Home
Pesticides
Landscape/Yard
Personal Care
Home Maintenance
Arts & Crafts
Pet Care
Home Office

Browse A-Z
Product Names
Types of Products
Manufacturers
Ingredients

Support
About the Database
FAQ
Product Recalls
Help
Glossary
Contact Us
More Resources

What's under your kitchen sink, in your garage, in your bathroom, and on the shelves in your laundry room? Learn more about what's in these products, about potential health effects, and about safety and handling.

Auto Products Brake Fluid, De-icer, Lubricant, Sealant, and more...	Inside the Home Air Freshener, Bleach, Cleaners, Toilet Bowl Cleaner, and more...	Pesticides Animal Repellent, Fungicide, Herbicide, Insecticide, and more...
Landscape/Yard Fertilizer, Lawn Care, Swimming Pool Products, and more...	Personal Care Antiperspirant, Hair Spray, Makeup, Shampoo, Soap and more...	Home Maintenance Caulk, Grout, Insulation, Paint, Putty, Stain, and more...
Arts & Crafts Adhesive, Glaze, Glue, Primer, Varnish, and more...	Pet Care Flea & Tick Control, Litter, Stain/Odor Remover, and more...	Home Office Ink, Toner, Correction Fluid, Electronics Cleaners, Pens and more...

For advice if someone is poisoned, call your local Poison Center at 1-800-222-1222.

Home | Products | Manufacturers | Ingredients | Health Effects

hpd.nlm.nih.gov

Household Products Database is designed to help answer the following typical questions:

- ▶ What are the chemical ingredients and their percentage in specific brands?
- ▶ Which products contain specific chemical ingredients?
- ▶ Who manufactures a specific brand? How do I contact this manufacturer?
- ▶ What are the acute and chronic effects of chemical ingredients in a specific brand?
- ▶ What other information is available about chemicals in the toxicology-related databases of the National Library of Medicine?

Searching Household Products Database

The Household Products Database is divided into four categories: **Products**, **Manufacturers**, **Ingredients**, and **Health Effects**. Navigate to a category by clicking the appropriate tab at the top of the page.

Search Household Products by using the Quick Search box on the home page or by selecting the Advanced Search link for a more detailed search. Clicking the **Health Effects** tab will bring up the Advanced Search screen with the Health Effects category selected for searching.

Browse Household Products by product category or alphabetically by product names, types of products, manufacturers, or ingredients (see left sidebar).

Additional Resources

For further information, we recommend these additional resources:

MSDS Information Resources

- ▶ SIRI MSDS Archive
hazard.com/msds
- ▶ MSDSprovider: Free Access to Manufacturer-Direct MSDSs
msdsprovider.com

Government Information Resources

- ▶ OSHA's MSDS Regulation – Hazard Communication 1910.1200
osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099&p_text_version=FALSE
- ▶ Read the Label *First!* Campaign (EPA)
epa.gov/pesticides/label/
- ▶ Household Hazardous Waste (EPA)
epa.gov/epawaste/conservation/materials/hhw.htm

From the National Library of Medicine

- ▶ TOXNET—databases in toxicology and environmental health
toxnet.nlm.nih.gov
- ▶ Tox Town—an interactive guide to commonly encountered toxic substances
toxtown.nlm.nih.gov

Product Recalls

- ▶ Product Safety and Recall Lists
hpd.nlm.nih.gov/recalls.htm



Household Products Database Search Exercises

Scenario – Browse by Category

Cassie, an avid home gardener, adopted a puppy to enjoy with her grandchildren. She is concerned about a weed killer product she uses in spring and fall since the children and puppy will be playing in the yard. She uses a popular brand of extended residual fertilizer with weed control. Are there health effects Cassie should be aware of?

Browse the Household Products Database to find information: Select the appropriate product category. Select the appropriate Landscape/Yard product category. Select the appropriate type of product. Select the appropriate product.

Suggested Solution:

- Click **Landscape/Yard** in the left margin or next to the picture on the main page
- Click **Weed Killer**
- Click **preemergent weed killer** under **Type**
- Click the extended residual product with weed control
- View the **Health Effects** and **Handling/Disposal** information

Additional Exercises



Go to hpd.nlm.nih.gov

Exercise 1: How can I find information about specific brands of teeth whiteners, including their manufacturing information, ingredients, and health effects?

Suggested Solution:

- Click Personal Care
- Click **Oral Hygiene** in the Personal Care column
- Click **teeth whitener** in the Type column
- Click the Brand Name of your choice and review the product information
- Click the Home tab to prepare for the next search

Exercise 2: What household products are associated with cyanosis?

Suggested Solution:

- Click the **Health Effects** tab
- Type **cyanosis** in the search box

- Click the **Search** button and view the list of products
- Click a product of your choice and review the information under **Health Effects**
- Click the **Home** tab to prepare for the next search

Exercise 3: How can I do a quick search to find information on *bleach*?

Suggested Solution:

- Type **bleach** in the **Quick Search** box on the left of the home page
- Click the **Go** button
- Click the [Bleach \(unspecified\)](#) link at the top of the page
- Click the [Search TOXNET](#) link in the **Chemical Information** section to the right of **Toxicity Information** to launch a search in TOXNET
- Click the HSDB link in the results list under **Chemical, Toxicological, and Environmental Health Data**
- Click record(s) of your choice and review the information
- Close the HSDB window and return to Household Products Database
- Click the **Home** tab to prepare for the next search

Exercise 4: What auto products contain *oleic acid*?

Suggested Solution:

- Click the **Ingredients** tab
- Click [O](#) in the alphabetic list at the top
- Select [Oleic acid](#) from the list of ingredients
- Click the **brand name** of your choice with “Auto products” in the **Category** column
- Review the information retrieved
- Click the NLM logo in the header bar at the top of the page to prepare for the next session

More to Explore



Drug Information Portal

NLM's **Drug Information Portal** provides current information on more than 17,000 selected drugs from their entry into clinical trials through entry into the market place. Information includes consumer health, clinical trials, AIDS-related drug information, MeSH® pharmacological actions, PubMed biomedical literature.



druginfo.nlm.nih.gov

Resources include summaries tailored to various audiences, NLM search systems useful in searching for a drug, NLM research resources, resources organized by drug audience and class, and other NIH and government resources such as FDA and CDC. Resources are shown as links at the top of the page. Experimental drugs or untested folk remedies not covered by NIH and government resources are not covered in this portal.

Searching the Drug Information Portal

Search on a drug's trade name or generic name by entering your search term(s) in the search box on the home page to search many resources simultaneously. A spellchecker provides suggestions for misspelled names. You can find embedded portions of names by using an asterisk (*) at the beginning and/or end of a search term. Results will include the drug's type and usage as well as links leading to further information. JavaScript must be enabled in your browser for the NLM Drug Information Portal to work properly.

Additional Resources

For further information, we recommend these additional resources:

- ▶ Drug Information Portal Fact Sheet
nlm.nih.gov/pubs/factsheets/druginfportalfs.html
- ▶ MedlinePlus
medlineplus.gov
- ▶ PubMed
pubmed.gov
- ▶ DailyMed
dailymed.nlm.nih.gov/dailymed
- ▶ AIDSinfo
aidsinfo.nih.gov
- ▶ Federal Drug Administration Center for Drug Evaluation and Research
www.fda.gov/AboutFDA/CentersOffices/CDER/default.htm
- ▶ CDC Drug Service Scientific Resources Program
cdc.gov/ncidod/srp/drugs/drug-service.html
- ▶ U.S. Drug Enforcement Administration Drug Information
usdoj.gov/dea/concern/concern.htm
- ▶ USA.gov – Prescription Drugs
usa.gov/Citizen/Topics/Health/Prescription_Drugs.shtml
- ▶ National Guideline Clearinghouse
guideline.gov

Dietary Supplements Labels Database

The **Dietary Supplements Labels Database** contains information from the labels of more than 5,000 brands of dietary supplements in the marketplace, including online stores and practitioners, and provides direct links to pertinent health information, fact sheets, research findings and on-going clinical studies at the National Institutes of Health (NIH).

Browse & Search →

Quick Search ←

dietarysupplements.nlm.nih.gov

Features include a glossary, Warnings and Recalls from the U.S. Food and Drug Administration, and links to other NLM databases such as MedlinePlus and PubMed for further information including that on the characteristics of ingredients and the results of research pertaining to them.

Searching the Dietary Supplements Labels Database

Enter an active ingredient or a manufacturer in the Quick Search box to query the whole database. You can also search or browse brand names, active ingredients, and manufacturers by clicking the appropriate link under **Browse and Search** in the left sidebar.

Additional Resources

For further information, we recommend these additional resources:

- ▶ Office of Dietary Supplements
dietary-supplements.info.nih.gov
- ▶ MedlinePlus Herbs and Supplements
nlm.nih.gov/medlineplus/druginfo/herb_All.html

Tox Town

Tox Town provides an introduction to toxic chemicals and environmental health risks that may be encountered in everyday life, in everyday places. Tox Town allows visitors to tour a **Town, City, Farm, Port, or US-Mexico Border** community to identify common environmental hazards. It is a companion to the extensive information in the TOXNET collection of databases that are typically used by toxicologists and health professionals.

Spanish version

toxtown.nlm.nih.gov

Tox Town is highly interactive, with graphics, animation, and sound to add interest to learning about connections between chemicals, the environment, and the public's health. It is recommended for high school and college students, educators, and the concerned public. This is an excellent resource for health educators who are asked to find easy-to-understand information about environmental toxins in their community.

The Tox Town Web site is designed to give you information on:

- ▶ Non-technical descriptions of chemicals
- ▶ Links to selected, authoritative chemical information on the Internet
- ▶ How the environment can impact human health
- ▶ Internet resources on environmental health topics

Radiation Emergency Medical Management System

Radiation Emergency Medical Management System (REMM) provides easy-to-follow algorithms on clinical diagnosis, treatment, and management of radiation contamination and exposure during mass casualty radiological/nuclear emergencies. REMM is primarily for physicians with little to no formal radiation training. REMM also provides information for those who may be involved in responding to a radiation emergency in other capacities. REMM can be downloaded in advance to personal computers and to mobile devices, so that it can be used offsite and if the Internet is not available.

remm.nlm.gov

REMM is extensively hyperlinked and interconnected. The hyperlinks are organized in eight content categories. The following are the most commonly used categories and appear across the top of the page beneath the REMM logo.

- ▶ **What Kind of Emergency?**—information relevant to each type of radiation emergency, including radiological dispersal devices, radiological exposure devices, nuclear explosions, nuclear reactor accidents, and transportation accidents
- ▶ **Initial Event Activities**—information regarding activities that should occur as part of an initial response following an emergency, including onsite activities, triage guidelines, and hospital activities
- ▶ **Patient Management**—patient management procedures to assist medical responders following a radiological or nuclear emergency determine whether patients have been exposed contaminated, or both

- ▶ **Management Modifiers**—provides detailed information about radiation + trauma (combined injury), burn triage and treatment, mass casualty, psychological issues and specific populations
- ▶ **Tools & Guidelines**—tools to facilitate quick look-up of information

“Quick Links,” on the right hand side of most REMM pages, can help you navigate through the portal. Quick Links offers easy access to some of the portal’s most important features and tools, including a link to all of the animations, illustrations, and photos founding REMM.

REMM was produced by the Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response, Office of Planning and Emergency Operations, in cooperation with the National Library of Medicine, Division of Specialized Information Services, with subject matter experts from the National Cancer Institute, the Centers for Disease Control and Prevention, and many U.S. and international consultants.

Additional Resources

For further information, we recommend these additional resources:

- ▶ Sources of Radiological/Nuclear Information
remm.nlm.nih.gov/remm_SourcesofRadInfo.htm
- ▶ Animated, 13-minute tour of REMM
remm.nlm.gov/quicktour/index.htm
- ▶ Earn Continuing Medical Education credits
remm.nlm.gov/cme.htm
- ▶ Download REMM to Your Computer
remm.nlm.gov/download.htm
- ▶ Join REMM ListServ
remm.nlm.gov/email.htm

Wireless Information System for Emergency Responders

Wireless Information System for Emergency Responders (WISER) provides a wide range of information on hazardous substances, including substance identification support, physical characteristics, human health information, and containment and suppression advice.

Wireless Information System for Emergency Responders

United States National Library of Medicine Specialized Information Services

Search SIS Site

Home About News Download WebWISER Help Contact Us

Welcome to WISER

the Wireless Information System for Emergency Responders

WISER is a system designed to assist first responders in hazardous material incidents. WISER provides a wide range of information on hazardous substances, including substance identification support, physical characteristics, human health information, and containment and suppression advice.

New! As of 8/21/09, the 4.3 version of WISER is available for [download](#) or via [WebWISER](#). See [what's new in 4.3](#).

Download

WISER is available as a standalone application on Windows Mobile devices, Palm OS PDAs, and Microsoft Windows PCs. [Download for free!](#)

Visit the [training page](#) to download materials that aid with training on the usage of WISER.

WebWISER

When an Internet connection is available, use your web browser to access the same functionality of the standalone applications. [WebWISER](#) supports both PC- and PDA-based browsers, including **BlackBerry** and **iPhone**.

Join the E-mail List

Want to get notices of WISER updates and news? [Join the WISER E-mail List](#) to automatically receive important announcements about WISER.

Other Hazmat-Related Resources at NLM

- Radiation Event Medical Management (REMM)
- TOXNET
- MedlinePlus offers trusted links to general health topics
 - Fire Safety
 - Disasters and Emergency Preparedness
 - Poisoning
 - and more...
- Household Products Database
- Tox Town
- Other Environmental Health Topics

Other Hazmat-Related Resources

- DOT ERG - (Department of Transportation - Emergency Response Guidebook)
- EPA Chemical Fact Sheets
- ATSDR ToxFAQs
- New Jersey Hazardous Substance Fact Sheets
- CHEMTREC

wiser.nlm.nih.gov

Features of WISER include rapid access to the most important information about a hazardous substance, comprehensive decision support, access to NLMs Hazardous Substances Data Bank, radiological support, and more. WISER is currently available on Palm, Pocket PC, and Microsoft Windows™ platforms and a Web-based WISER (WebWISER) supports Web browsers for PCs and PDAs, including BlackBerry.

Additional Resources

For further information, we recommend these additional resources:

- ▶ WISER Fact Sheet
nlm.nih.gov/pubs/factsheets/wiser.html
- ▶ WISER updates and news
wiser.nlm.nih.gov/listserv_join.html

Enviro-Health Links

Enviro-Health Links, available from the NLM Environmental Health and Toxicology Portal, is a list of links to Internet resources on toxicology and environmental health issues of recent special interest. All resources are evaluated and selected according to specific criteria. You may also search TOXNET from this page. From the Environmental Health and Toxicology Portal, click [Enviro-Health Links](#) under **More to Explore**.

Enviro-Health Links	Disaster Health Links	Targeted Populations
▶ Arsenic and Human Health	▶ Animals in Disasters	▶ American Indian Health
▶ Climate Change and Health	▶ Biological Warfare	▶ Arctic Health
▶ Dietary Supplements	▶ Chemical Warfare	▶ Asian American Health Web Site
▶ Education, Careers and Outreach in Toxicology and Environmental Health	▶ Crude Oil Spills and Human Health	▶ Children's Environmental Health Information Resources
▶ Environmental Justice Internet Guide	▶ Disaster Recovery and Environmental Health	▶ Multi-Cultural Resources for Health Information
▶ Imported (Chinese) Drywall	▶ Earthquakes	▶ Refugee Health Information Network (RHIN®)
▶ Indoor Air Pollution	• Chile Earthquake	▶ Women's Health Resources
▶ Keeping the Artist Safe: Hazards of Arts and Crafts Materials	• Health Resources for Haiti	
▶ Lead and Human Health	▶ Floods	
▶ Mercury and Human Health	▶ H1N1 Flu (Swine Flu)	
▶ Nanotechnology	▶ Health Effects from the Collapse of the World Trade Center	
▶ Outdoor Air Pollution	▶ Hurricanes	
▶ Pesticide Exposure	• Hurricanes Katrina, Rita, and Wilma: Impact on Environmental Health	
▶ Toxicology Web Links	▶ Public Health Preparedness for Mass Gatherings	
▶ Toxicogenomics	▶ Special Populations: Emergency and Disaster Preparedness	
▶ West Nile Virus: Pesticides Used for Mosquito Control	▶ Tornadoes	
	▶ TVA Kingston Fossil Plant Coal Ash Spill, December 2008	
	▶ Wildfires	

sis.nlm.nih.gov/enviro/envirohealthlinks.html

Links to information of special interest include:

- ▶ Arsenic and Human Health
- ▶ Biological Warfare
- ▶ Chemical Warfare
- ▶ Climate Change and Health
- ▶ Dietary Supplements
- ▶ Environmental Justice Internet Guide
- ▶ Health Effects from the Collapse of the World Trade Center
- ▶ Hurricanes Katrina, Rita, and Wilma: Impact on environmental health
- ▶ Indoor Air Pollution
- ▶ Keeping the Artist Safe: Hazards of Arts and Crafts Materials
- ▶ Lead and Human Health
- ▶ Mercury and Human Health
- ▶ Outdoor Air Pollution
- ▶ Pesticide Exposure
- ▶ Special Populations: Emergency and Disaster Preparedness
- ▶ Tornadoes
- ▶ Toxicogenomics
- ▶ West Nile Virus: Pesticides Used for Mosquito Control

Additional Resources



Disaster Information Management Research Center

The **Disaster Information Management Research Center (DIMRC)** provides health information resources and informatics research related to disasters of natural, accidental, or deliberate design.

disasterinfo.nlm.nih.gov

Areas of research and activities supported by the DIMRC include.

- ▶ Participation in emergency preparedness and response efforts at local, State, and Federal levels
- ▶ Information Triage Hubs/Databases
- ▶ Education/Training
- ▶ Research & Development of Communications Interoperability Technologies and Maintaining Information Access
- ▶ Syndromic & other Surveillance Research

Additional Resources

For further information, we recommend these additional resources:

- ▶ **DIMRC Fact Sheet**
nlm.nih.gov/pubs/factsheets/dimrcfs.html

Carcinogenic Potency Database

The **Carcinogenic Potency Database (CPDB)**, developed at the University of California, Berkeley, and Lawrence Berkeley Laboratory, provides standardized analyses of the results of 6540 chronic, long-term animal cancer tests (both positive and negative for carcinogenicity) that have been conducted since the 1950's and reported in the general published literature or by the National Cancer Institute and the National Toxicology Program.

The screenshot shows the TOXNET website interface. At the top, there is a header with the NLM logo and the text 'United States National Library of Medicine'. Below this is the 'TOXNET Toxicology Data Network' title. A navigation bar includes links for 'TOXNET PDA Access', 'SIS Home', 'About Us', 'Site Map & Search', and 'Contact Us'. A breadcrumb trail shows 'Env. Health & Toxicology > TOXNET > CPDB'. The main content area starts with a description of the Carcinogenic Potency Database, followed by a 'List of Chemicals' section. This section includes a grid of letters (A-Z) representing chemical categories, a note about color coding, and a list of chemical names with their CAS numbers. To the right, there are two sidebars: 'Env. Health & Toxicology' with a 'VISIT SITE' button, and 'Support Pages' with links to 'Fact Sheet', 'Sample Record', 'CPDB Overview', 'CPDB Methods', and 'TOXNET FAQ'.

toxnet.nlm.nih.gov

Searching CPDB

Search by chemical name or fragment, or Chemical Abstracts Service Registry Number. Results include a summary for each sex-species tested, including carcinogenicity, target organs, and carcinogenic potency values. Detailed results from each experiment on that particular chemical are given in a plot format suitable for screen viewing.

Additional Resources

For further information, we recommend these additional resources:

- ▶ Carcinogenic Potency Database Fact Sheet
nlm.nih.gov/pubs/factsheets/cpdbfs.html

Comparative Toxicogenomics Database

The **Comparative Toxicogenomics Database (CTD)** is a research tool that includes extensive curated scientific data describing relationships between chemicals, genes and human diseases. A primary goal of CTD is to advance the understanding of the effects of environmental chemicals on human health. It is maintained by The Mount Desert Island Biological Laboratory in Salisbury Cove, Maine, with support from the National Institutes of Environmental Health Sciences and the National Center for Research Resources of the National Institutes of Health.

toxnet.nlm.nih.gov

Primary Data categories include

- ▶ Chemicals
- ▶ Diseases
- ▶ Genes
- ▶ Chemical-Genes Interactions
- ▶ References
- ▶ Gene Ontology
- ▶ Pathways
- ▶ Organisms

Searching CTD

Search CTD by chemical or other name, diseases, Chemical Abstracts Service Registry Number, genes, GO terms, organisms, pathways, and references. Use truncation (asterisks: *), Boolean operators (AND, OR, NOT), and index browsing to refine your search results.

Additional Resources

For further information, we recommend these additional resources:

- ▶ CTD About Us
<http://ctd.mdibl.org/about/?jsessionid=E21A2DAEE8C4041C85DDEB77ABA077C1>
- ▶ CTD Resource Guide
http://ctd.mdibl.org/pwa-resources/help/ctd_resource_guide.pdf
- ▶ Glossary
<http://ctd.mdibl.org/help/glossary.jsp>
- ▶ Tutorials
<http://ctd.mdibl.org/help/tutorials.jsp>
- ▶ CTD – Users Email List
<http://ctd.mdibl.org/help/emailListHelp.jsp>
- ▶ Frequently Asked Questions
<http://ctd.mdibl.org/help/emailListHelp.jsp>

Environmental Health & Toxicology Portal

Decision Tree

The National Library of Medicine's Environmental Health and Toxicology Portal provides access to many resources. The following chart is a guide to selecting the appropriate resource or database depending on user information needs. Database and resource links can be accessed at: sis.nlm.nih.gov/enviro.html.

Use this Decision Tree to choose the correct database or resource:

FOR THE FOLLOWING TYPE OF INFORMATION:	GO TO:
Journal references to toxicology literature including developmental/reproductive and teratology (birth defects) information	TOXLINE or DART
Summary of peer-reviewed human health effects and emergency medical treatment for chemicals	HSDB
Animal Toxicity Studies	HSDB
Environmental Fate, Exposure, Standards and Regulations	HSDB
Chemical/Physical properties and safety/handling/disposal of chemicals	HSDB
Manufacturing, formulation and use of chemicals	HSDB
Chemical names and synonyms	ChemIDplus or HSDB
Chemical structures and structure searching/drawing capability	ChemIDplus
InChI and/or SMILES structure notations	ChemIDplus
List of links to NLM/NIH and other government agency information for a single chemical	ChemIDplus
Carcinogenicity, mutagenicity, tumor promotion and tumor inhibition data from the National Cancer Institute (NCI)	CCRIS
Peer-reviewed mutagenicity test data from the U.S. Environmental Protection Agency (EPA) including species, type of assay, test result and more	GENE-TOX
Hazard identification and dose-response risk assessment information from the U.S. EPA	IRIS
Cancer and noncancer oral and inhalation risk values and types from government and independent risk information groups worldwide	ITER

FOR THE FOLLOWING TYPE OF INFORMATION:	GO TO:
Results and analyses of chronic and long-term animal cancer test from NCI, the National Toxicology Program (NTP) and the general published literature	CPDB
Drug information related specifically to breastfeeding mothers and their nursing infants including maternal/infant drug levels, possible effects and more	LactMed
Environmental releases of chemicals and waste management activities reported by facilities to the U.S. EPA	TRI
Electronic maps of chemical releases, Superfund sites, health, census, income data and more	TOXMAP
Chemicals, occupations, job tasks, and associated diseases/conditions	Haz-Map
Drug information including names, descriptions, labels, drug categories and links to additional resources	Drug Information Portal
Ingredient, health benefit claims and manufacturer information for dietary supplements with links to research	Dietary Supplements Labels Database
Safety and health information for products used in and around the home	Household Products Database
Material Safety Data Sheets (MSDS) and consumer product recalls	Household Products Database
Health information and research related to natural, accidental or deliberate disasters	DIMRC
PDA and/or online tool about chemicals of concern for first responders, hazmat workers, firefighters and others	WISER
Diagnosis and treatment information for radiological events and emergencies	REMM
Interactive website on toxic chemicals and environmental health concerns in the community	ToxTown
Bibliography on alternatives to animal testing in biomedical research	ALTBIB
Selected links to internet resources on environmental issues of special interest	Enviro-Health Links
Directory of Health Organizations	DIRLINE
Online tutorials on basic toxicology principles and concepts	Toxicology Tutorials
Interactive children's learning site about household chemical hazards	ToxMystery

Contacting the National Library of Medicine for Database Assistance

Toll-free: 888-FIND-NLM (346-3656)

E-mail: custserv@nlm.nih.gov

TOXNET E-mail: tehip@teh.nlm.nih.gov

Online TOXNET Resources

Training Manuals	http://sis.nlm.nih.gov/enviro/manuals.html
Toxicology Tutorials	http://sis.nlm.nih.gov/enviro/toxtutor.html
Fact Sheets	http://www.sis.nlm.nih.gov/sisfactsheets.html
Frequently Asked Questions	http://www.sis.nlm.nih.gov/toxnet_faq.html
See also Help and FAQ links on each database home page.	

National Network of Libraries of Medicine

Toll-free number for all Regional Medical Libraries: 800-338-7657
Monday-Friday 8:30 a.m.–5:00 p.m. in all time zones

Web site: <http://nnlm.gov>

National Training Center and Clearinghouse

Toll-free number: 800-338-7657, press 2

Web site: <http://nnlm.gov/ntcc/>