NATIONAL LIBRARY OF MEDICINE

Web Resources for Environmental Health Research

SEPTEMBER 12, 2010

THE SEVENTH INTERNATIONAL SYMPOSIUM ON
RECENT ADVANCES AND ENVIRONMENTAL HEALTH RESEARCH

THE NATIONAL LIBRARY OF MEDICINE WEB RESOURCES FOR ENVIRONMENTAL HEALTH RESEARCH

A Specialized Training Course
developed for the

Seventh International Symposium on Recent Advances in Environmental Health Research

Presented at

Jackson State University

Jackson, Mississippi
September 12, 2010

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.

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Preface

The *National Library of Medicine Web Resources for Environmental Health Research* is designed to meet the needs of environmental and biomedical scientists, researchers, and policy makers who need information on health issues related to exposure to hazardous substances in the environment—including those that are naturally-occurring—and environmental agents known to induce illnesses, including cancer and health disparities.

The National Library of Medicine (NLM) is sponsoring this course to increase awareness of the availability and value of NLM's online environmental health and toxicology information resources that provide invaluable tools to address these issues—for professionals and consumers alike. Participants will receive hands-on practice with selected NLM resources, and demonstrations of other valuable resources will be provided.

Major emphasis will be placed on navigating NLM's TOXNET® (Toxicology Data Network) databases and related resources, which provide access to references, online handbooks, and databases related to the adverse affects of chemicals and other agents. MEDLINE®/PubMed®, NLM's premier medical database will also be covered.

This workbook is designed to be used as a reference following the course. It contains exercises using realistic scenarios for the NLM resources covered as well as information on some of NLM's newest resources and lists of other health information resources selected for their quality and relevant content.

Table of Contents

Agenda

12:30 p.m. Welcome and Introductions

12:40 p.m. Introduction

- The NLM Environmental Health and Toxicology Portal
- TOXNET and Related Files: Overview

12:55 p.m. ChemIDplus, HSDB, and IRIS 💻 *(with hands-on practice)*

1:30 p.m. CCRIS, GTENE-TOX, and ITER 💻 *(with hands-on practice)*

1:50 p.m. TRI and TOXMAP 💻 *(with hands-on practice)*

2:45 p.m. MEDLINE/PubMed, TOXLINE, and DART 💻 *(with hands-on practice)*

3:10 p.m. More to Explore *(instructor demonstrations)*

3:50 p.m. Questions and Post-test

4:00 p.m. Class Ends

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Introduction

Introduction

Purpose

The purpose of this training is to familiarize participants, such as biomedical scientists, researchers, and community leaders, with reliable online health information from the National Library of Medicine (NLM) and other resources that address toxicological and environmental health issues pertaining to environmental health disparities and related medical conditions. Skills and knowledge acquired in this course will enable representatives of minority-serving academic institutions to reduce health disparities through the access, use and delivery of environmental health information on their campuses and in their communities.

Objectives

After completing this course, participants will be able to:

- Identify and evaluate 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 toxicology and environmental health information.
- Apply the skills and knowledge obtained in this course to their campus curricula and local communities.

NLM Online Resources Covered in this Course

The following key resources will be covered in depth with time given 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 over 5,000 chemicals
- **Integrated Risk Information System (IRIS)**—carcinogenic and non-carcinogenic information on over 500 chemicals
- **Chemical Carcinogenesis Research Information System (CCRIS)**—scientifically evaluated and fully referenced data on over 9,000 chemicals
- **GENE-TOX**—genetic toxicology test data on over 3,000 chemicals resulting from expert peer review of the open scientific literature
- **International Toxicity Estimates for Risk (ITER)**—side-by-side comparisons of international risk assessment information on over 600 chemicals with links to source documentation
- **Toxics Release Inventory (TRI)**—information on annual environmental releases of over 600 toxic chemicals from the U.S. Environmental Protection Agency (EPA)

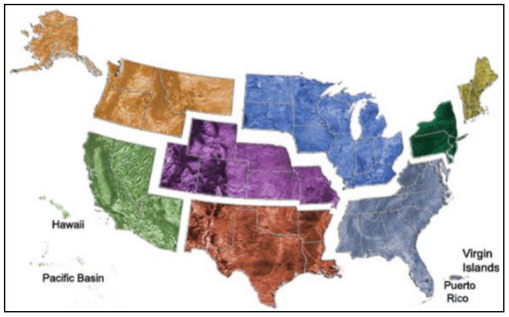
- **TOXMAP**—a geographic information system that uses maps of the United States to help users visually explore TRI data
- **MEDLINE/PubMed**—access to more than 19 million references to journal articles published in 5,400 journals in the fields of medicine and the life sciences
- **Toxicology Literature Online (TOXLINE)**—a bibliographic toxicology database covering over 4 million bibliographic citations
- **Developmental and Reproductive Toxicology (DART)**—a bibliographic toxicology database covering over 4 million bibliographic citations

The following resources are included in the "More to Explore" section of this workbook. There may not be time for hands-on practice for all of these resources. However, exercises are included in the book for your reference, and the resources will be demonstrated.

- **Enviro-Health Links**—selected links to Internet resources on toxicology and environmental health issues of recent special interest
- **ToxSeek**—a metasearch engine that enables simultaneous searching of many different information resources on the World Wide Web
- **ALTBIB**—a bibliography on alternatives to the use of live vertebrates in biomedical research and testing
- **Carcinogenic Potency Database**—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 1950s and reported in the general published literature or by the National Cancer Institute and the National Toxicology Program
- **Haz-Map**—an occupational toxicology database that links job tasks to occupational diseases and their symptoms
- **Household Products Database**—human health effects information on over 10,000 brand-name consumer products

NLM Database Assistance

NLM database assistance is available online, by phone, by e-mail, and through the National Network of Libraries of Medicine (NN/LM) health science libraries and information centers.



The 8 Regions of the NN/LM

The NN/LM is organized into eight regions coordinated by the NLM. The regional libraries work closely with NLM to provide equal access to biomedical information.

Please refer to the inside back cover of this workbook for information on how to contact these help resources

The NLM Environmental Health and Toxicology Portal

The NLM's **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

Search all TOXNET Databases

Reference Tools & Additional Resources

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.

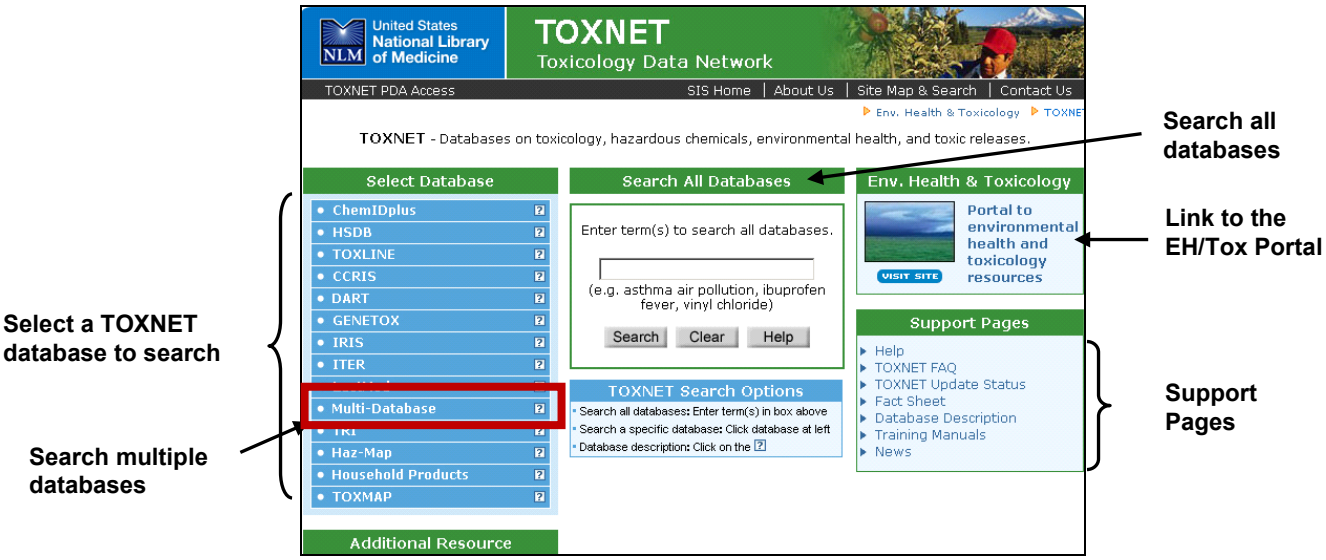
Additional Resources

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

TOXNET and Related Files: Overview

NLM's **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. Information includes specific chemicals, mixtures, and products; unknown chemicals; and special toxic effects of chemicals in humans and/or animals.



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 (?) 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.

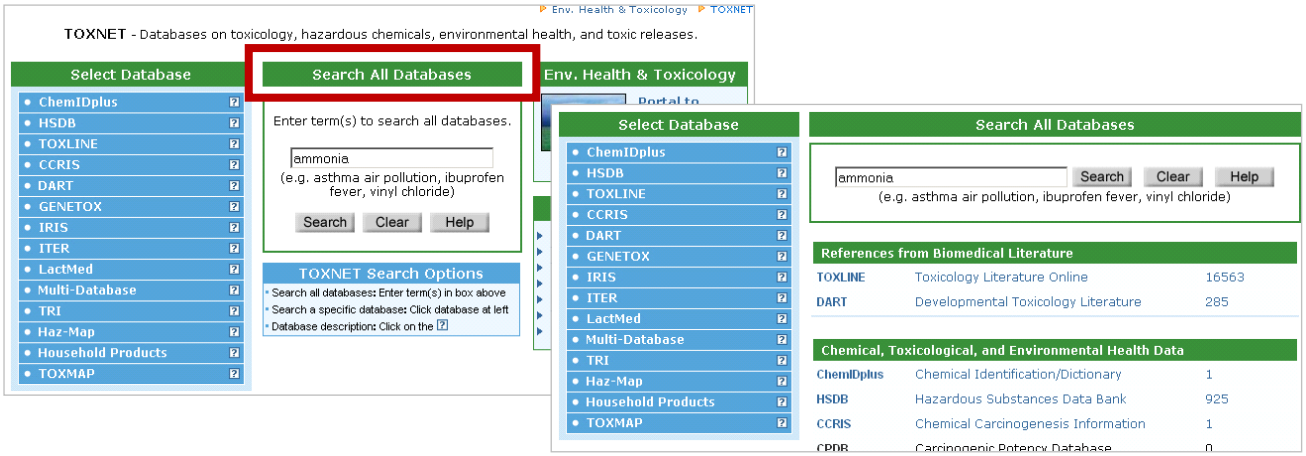
The TOXNET Databases

The TOXNET databases can be grouped in the following categories:

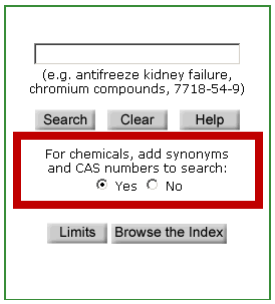
- Chemical Nomenclature—ChemIDplus
- Toxicology Data (one record per chemical)—HSDB, IRIS, CCRIS, GENE-TOX, ITER, and LactMed—can also search any combination of these files with the **Multi-Database** feature
- Toxicology Literature (bibliographic references)—TOXLINE and DART
- Toxic Releases—TRI and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

Searching the TOXNET Databases

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 Data** (all others).



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).

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

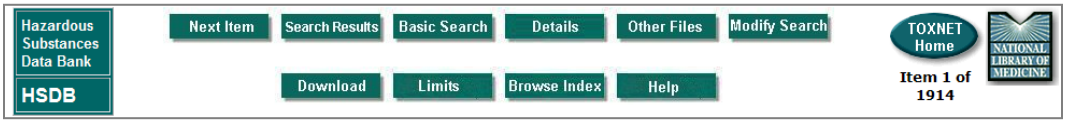
Browse the Index—This feature provides a scannable index of all terms beginning with the search term you entered and the number of records for each term. In the Toxicology Data databases, selectable items indexed are **All Words**, **CAS Registry Number**, and **Chemical Name**. In the Toxicology Literature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

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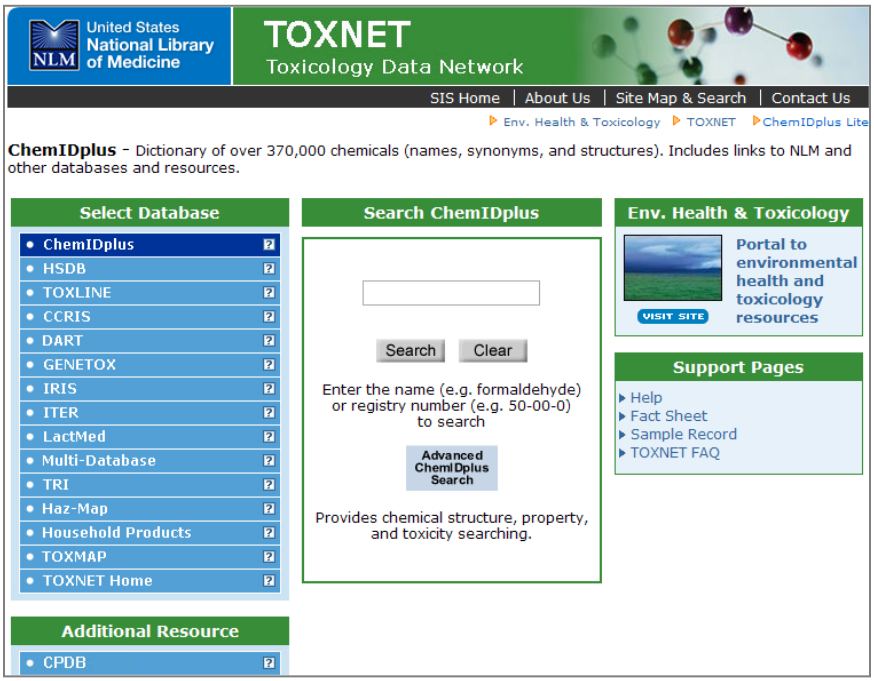
ChemIDplus, HSDB, and IRIS

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 over 370,000 chemical records, of which over 295,000 include chemical structures. Each record in ChemIDplus represents a single chemical or substance. The ChemIDplus database has two different applications: **ChemIDplus Lite** (for basic searching) and **ChemIDplus Advanced** (for more experienced users).



toxnet.nlm.nih.gov

Content

Information in the ChemIDplus database includes:

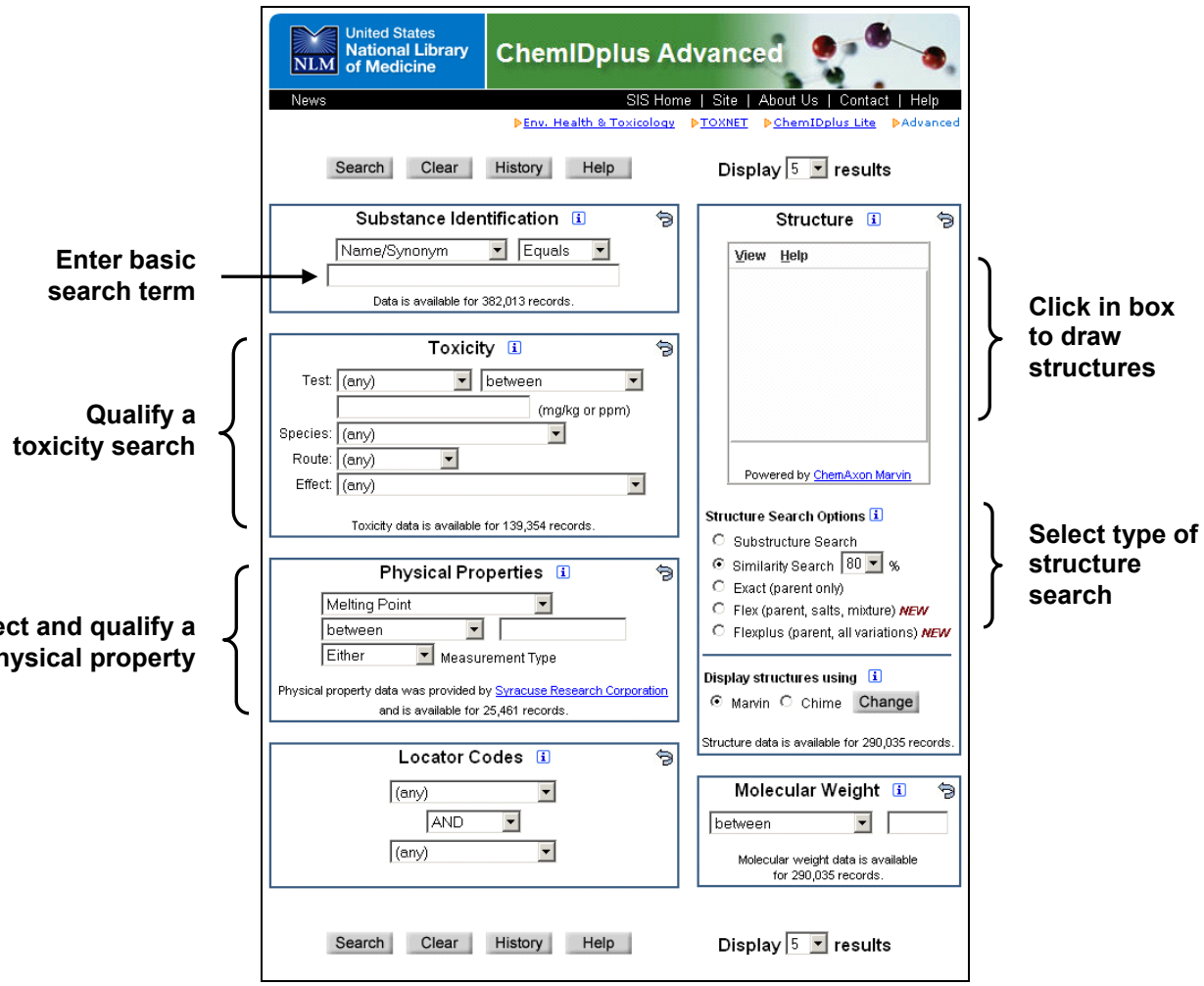
- Systematic, generic, and trade names
- Synonyms
- CAS registry numbers
- Molecular formulas
- Classification codes
- Chemical structures (ChemIDplus Advanced)

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.

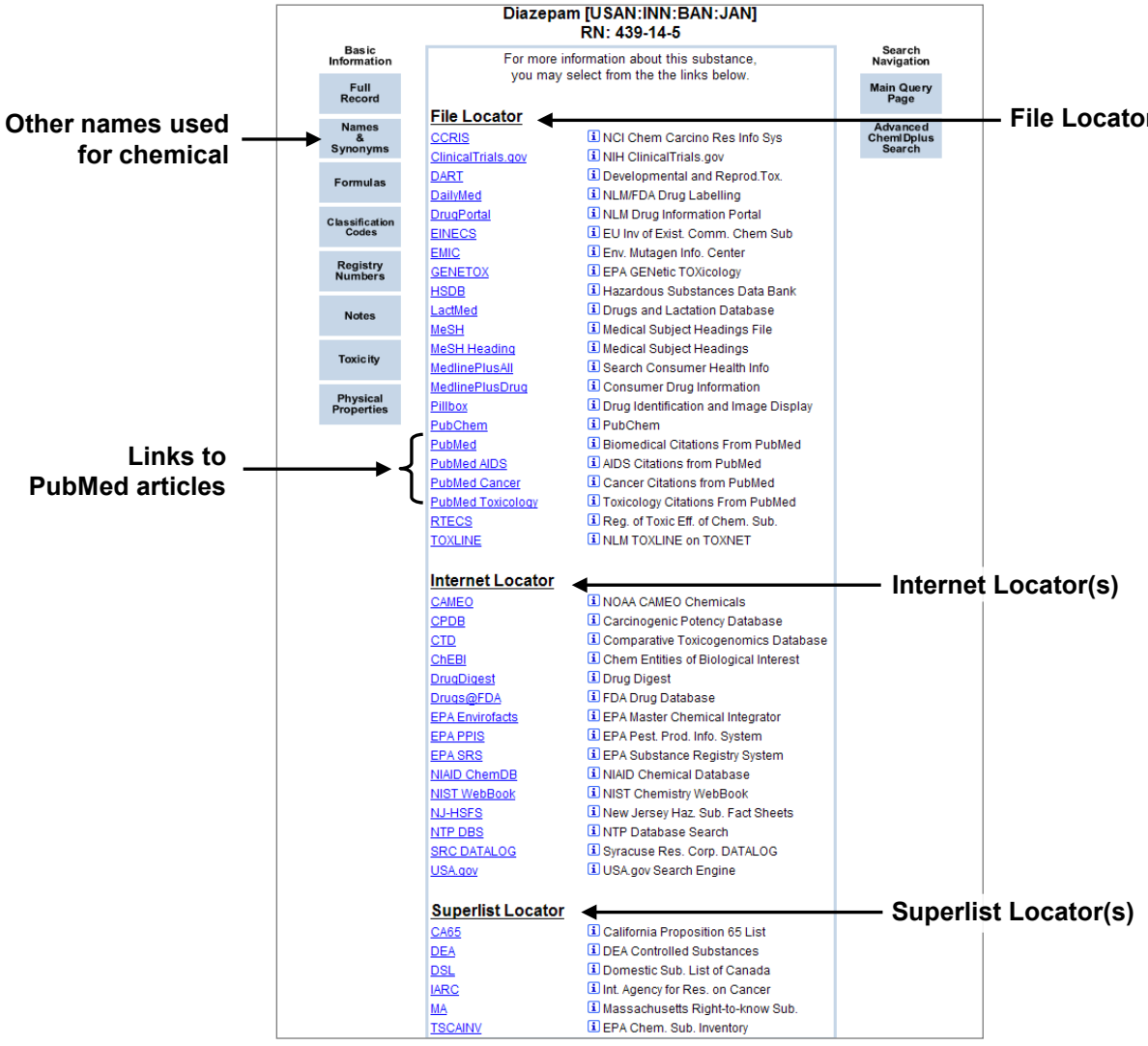


Search Results

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 detailed information such as Names & Synonyms, Formulas, Classification Codes, Registry Numbers, and Notes. In the center of the page, lists of "locators" provide links to other resources in three categories:

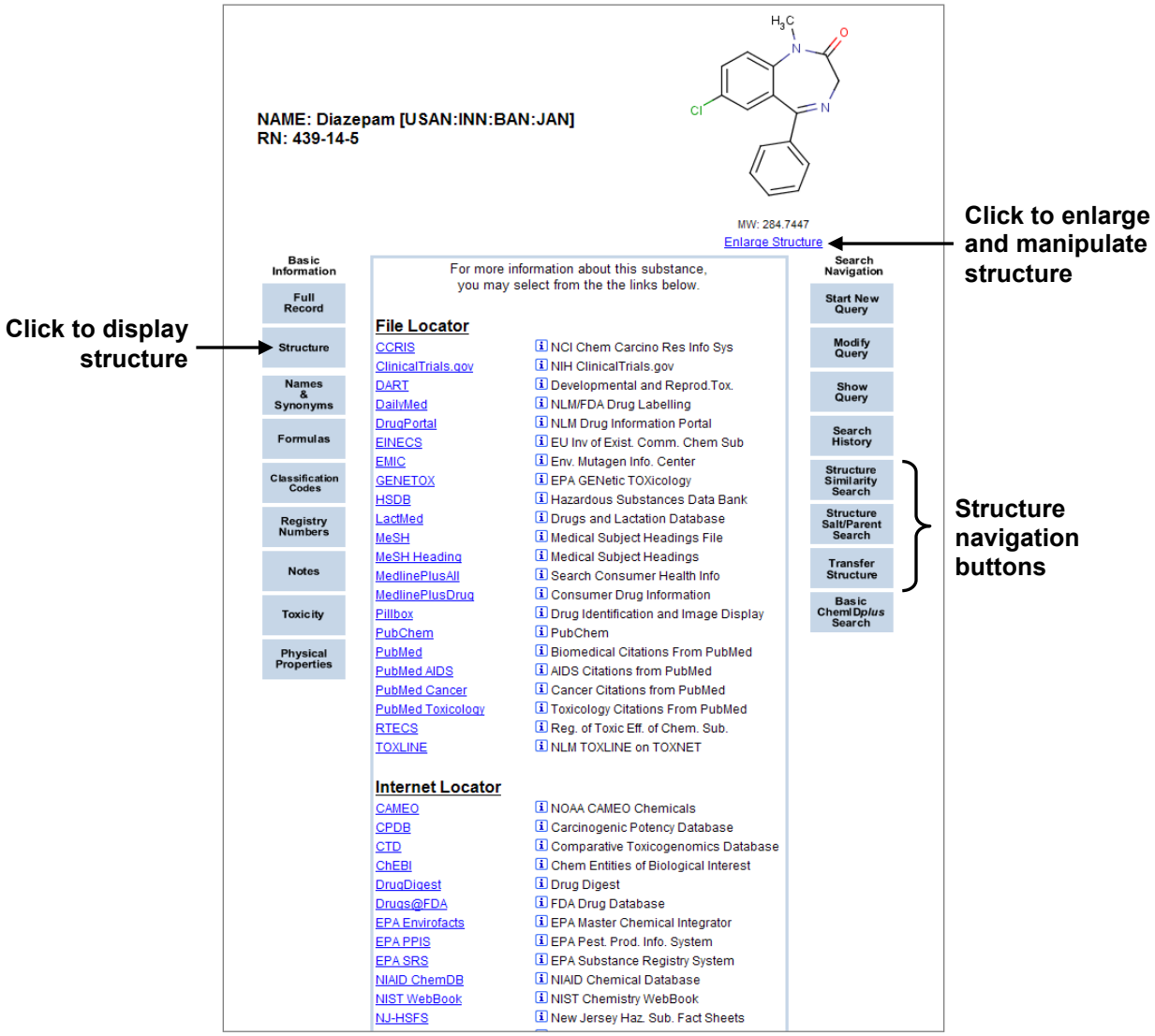
- **File Locators**—point to a set of NLM associated databases
- **Internet Locators**—point to a set of resources with biomedical data of interest for the chemical
- **SuperList Locators**—point to a set of regulatory and scientific lists that contain information about the chemical

Record for Diazepam (ChemIDplus Lite)



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)



Additional Resources

For further information, we recommend these additional resources:

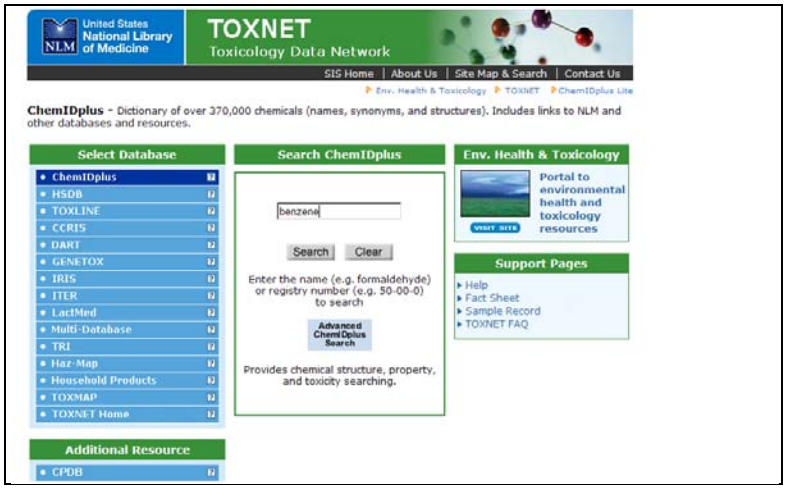
- ChemIDplus Fact Sheet
  www.nlm.nih.gov/pubs/factsheets/chemidplusfs.html
- TOXNET Manual
  sis.nlm.nih.gov/enviro/manuals.html

ChemIDplus Search Exercises

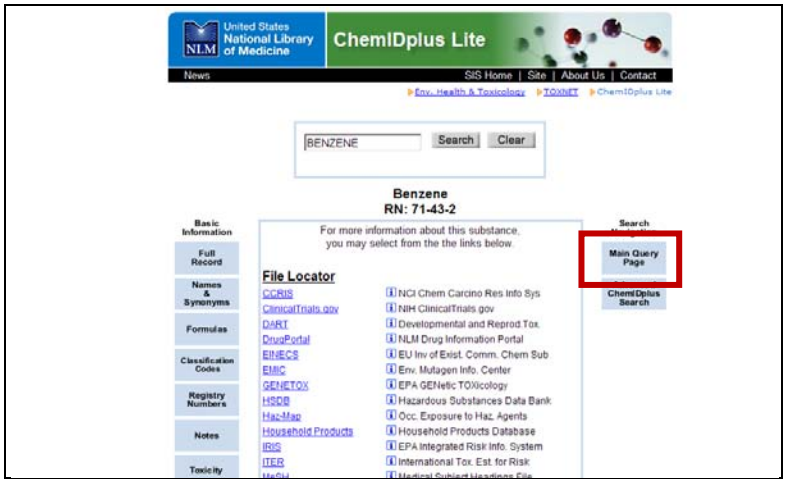
Search Example: Locate the record for *benzene*. See what other NLM databases contain information on *benzene*.

Suggested Solution:

- Go to toxnet.nlm.nih.gov
- Click **ChemIDplus** in the **Select Database** column
- Type **benzene** in the search box
- Click the **Search** button



- Review the list of other NLM databases (under **File Locator**) that contain information on benzene
- Click the **Main Query Page** button at the right to prepare for a new search



Exercise 1: 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 2: 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

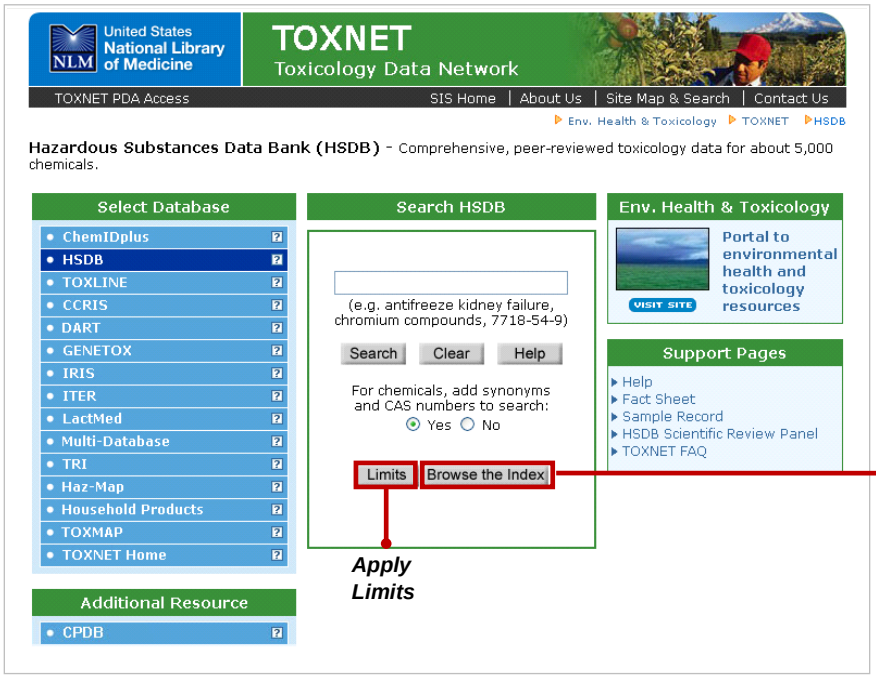
Exercise 3: Using ChemIDplus Advanced to perform a structure similarity search on *methyl parathion*.

Suggested Solution:

Click	the **Advanced ChemIDplus** Search button
Type	**methyl parathion** in the substance identification box
Click	the **Search** button
Click	the **Structure Similarity Search** button at the right
Review	the results
Click	the **TOXNET Home** button at the left of the page to prepare for the next search

HSDB

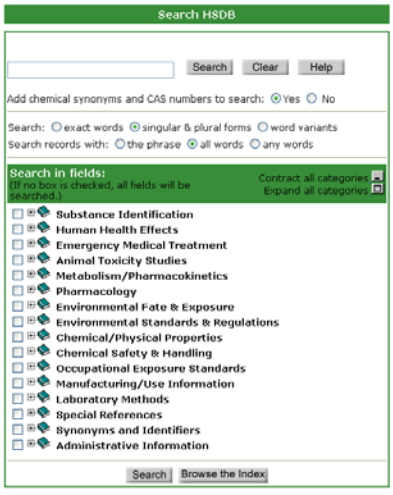
HSDB is a comprehensive toxicology data file on the NLM TOXNET system. It contains data on over 5,000 chemicals, organized into individual records—the average record is approximately 25 printed pages. Content is peer-reviewed by the Scientific Review Panel, a committee of experts in the major subject 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.



toxnet.nlm.nih.gov

Searching HSDB

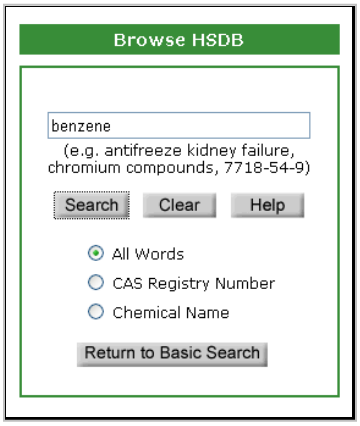
Search HSDB by chemical or other name, chemical name fragment, Chemical Abstracts Service (CAS) Registry Number, and/or subject terms (basic searching). By default, the system searches for synonyms and CAS numbers of chemicals. Use truncation (*), Boolean operators (AND, OR, NOT), phrase searching, nested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

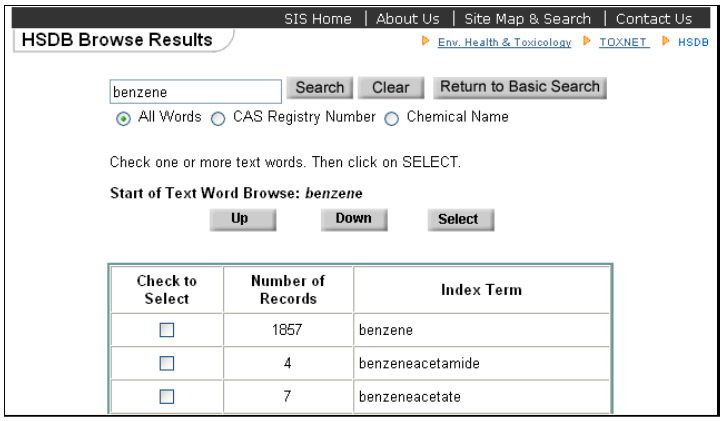


Click the **Limits** button on the home page to search

- 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

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.

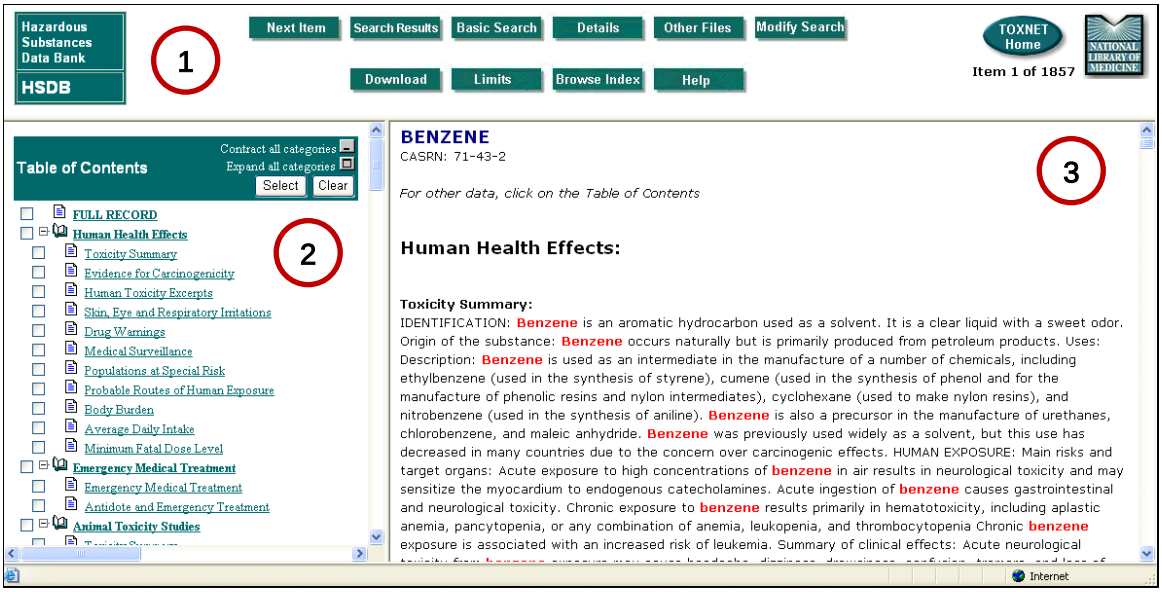
When searching for a chemical, the initial matching chemical record (the “primary record”) may be followed by additional chemical records that contain the chemical name or search term you entered.

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(s) in red.



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(s) appear(s) with greatest frequency.

Additional Resources

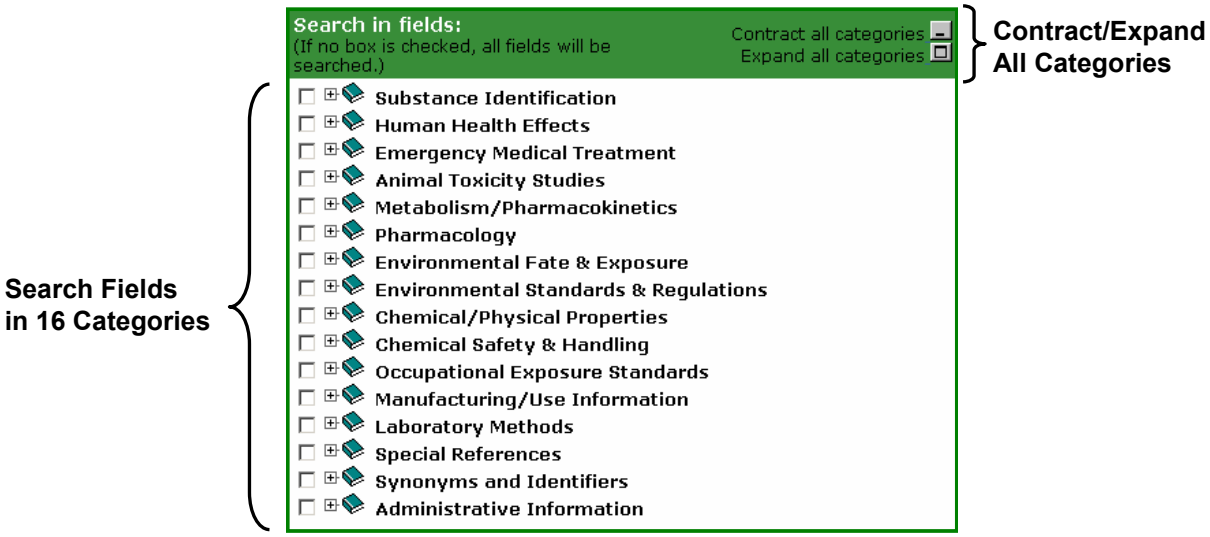
For further information, we recommend these additional resources:

- HSDB Skill Kit
  www.nlm.nih.gov/pubs/techbull/ma07/ma07_hsdb_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.



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
  - Probable 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
  - Absorption, Distribution & Excretion
  - Biological Half-Life
  - 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
- Probable 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

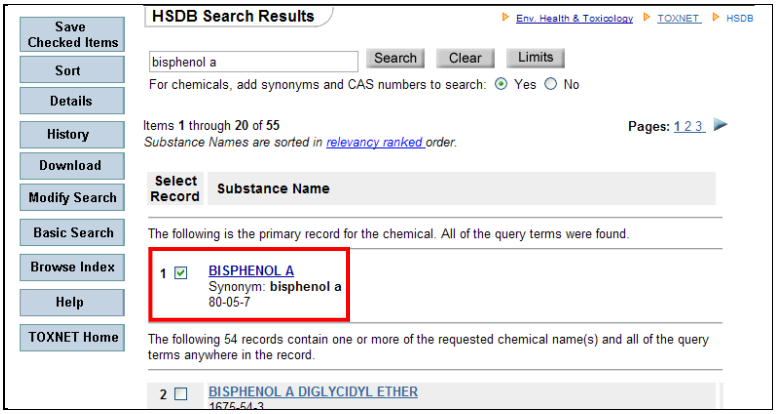
HSDB Search Exercises

Search Example: Locate information on the human health effects of *Bisphenol A*.

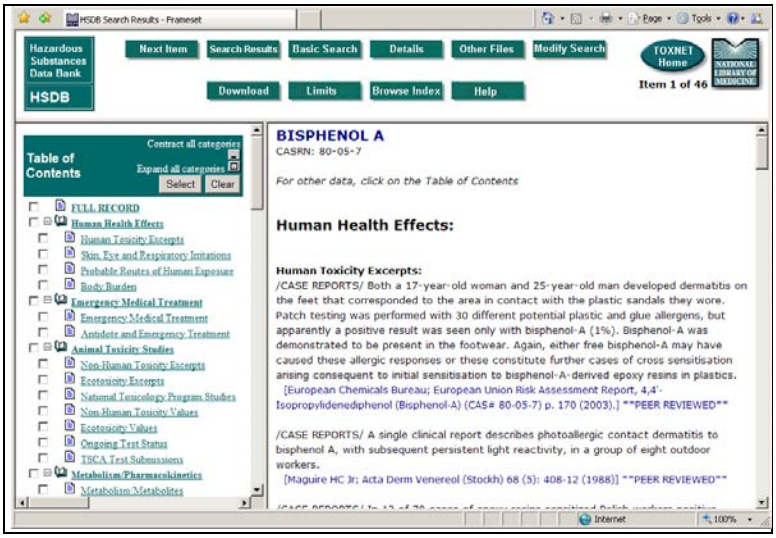
Suggested Solution:

- Go to toxnet.nlm.nih.gov
- Click **HSDB** in the **Select Database** column
- Type **bisphenol a** in the search box
- Click the **Search** button

- Click the primary record **BISPHENOL A**



- Review the **Human Health Effects** information in the right frame
- Click the **Basic Search** button at the top of the page to prepare for the next search



Exercise 1: What current information is available on how *ethylene glycol* behaves in the environment based on the chemical's physical properties?

Suggested Solution:

Type	**ethylene glycol** in the search box
Click	the **Search** button
Click	**ETHYLENE GLYCOL**
Scroll	down to the **Environmental Fate & Exposure** section in the **Table of Contents**
Click	a subsection of your choice
Review	the information
Click	the **Basic Search** button at the top of the page to prepare for the next search

Exercise 2: What is the average daily intake of *mercury*?

Suggested Solution:

Type	**mercury** in the search box
Click	the **Search** button
Click	**MECURY, ELEMENTAL**
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 3: Using the CAS Registry Number 7439-95-4, find the FDA requirements of this chemical.

Suggested Solution:

Type	**7439-95-4** in the search box
Click	the **Search** box
Click	**MAGNESIUM ELEMENTAL** - the primary record
Scroll	down to the **Environmental Standards & Regulations** section in the **Table of Contents**
Click	FDA Requirements
Review	the information
Click	the **Basic Search** button at the top of the page to prepare for the next search

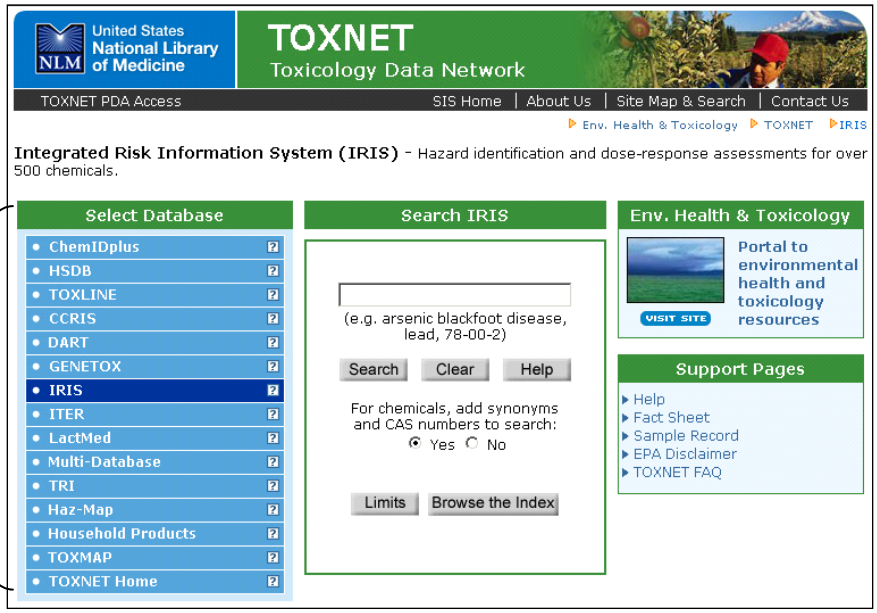
Exercise 4: Using the limits feature, locate how many pesticide chemicals records contain average daily intake information.

Suggested Solution:

Click	the **Limits** button at the bottom of the Search HSDB frame
Click	the "+" icon to expand the **Human Health Effects** category
Click	to check the box next to Average Daily Intake
Type	**pesticide** in the search box
Select	"exact words" and "the phrase" below the search box
Click	the **Search** button
Review	the list of chemicals
Click	the **TOXNET Home** button at the top of the page to prepare for the next search

IRIS

The **Integrated Risk Information System (IRIS)** contains data for over 600 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.



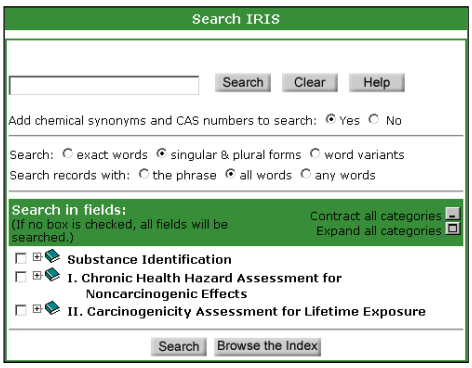
The TOXNET Databases

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.

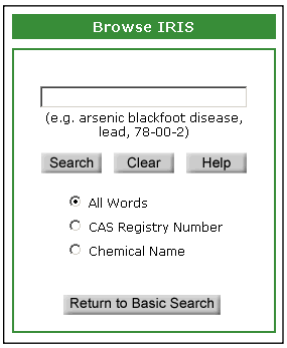


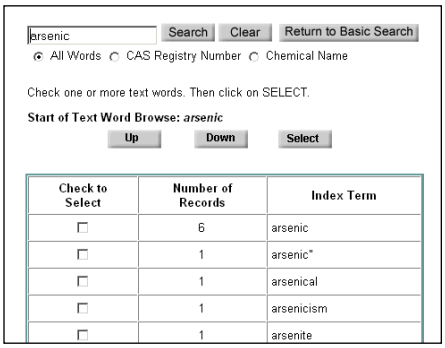
Use truncation (*), Boolean operators (AND, OR, NOT), phrase searching, nested parentheses, limits, and index browsing to refine your search results.

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.

With the **Browse the Index** feature, the system returns a list of index terms related to the search term entered. Select one or more index terms and click the **Select** button for the search results.



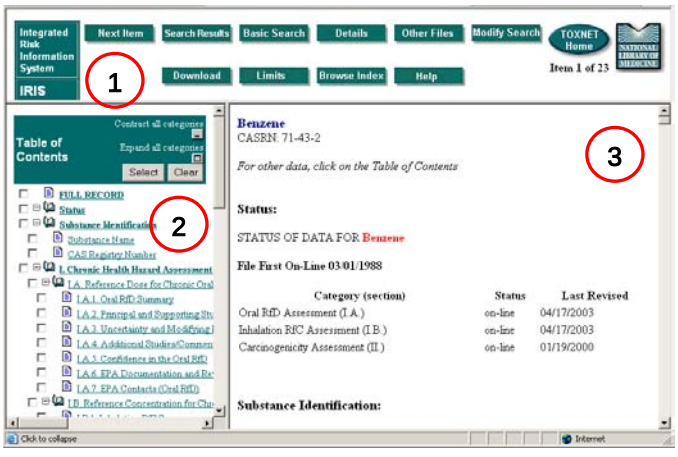


Search Results

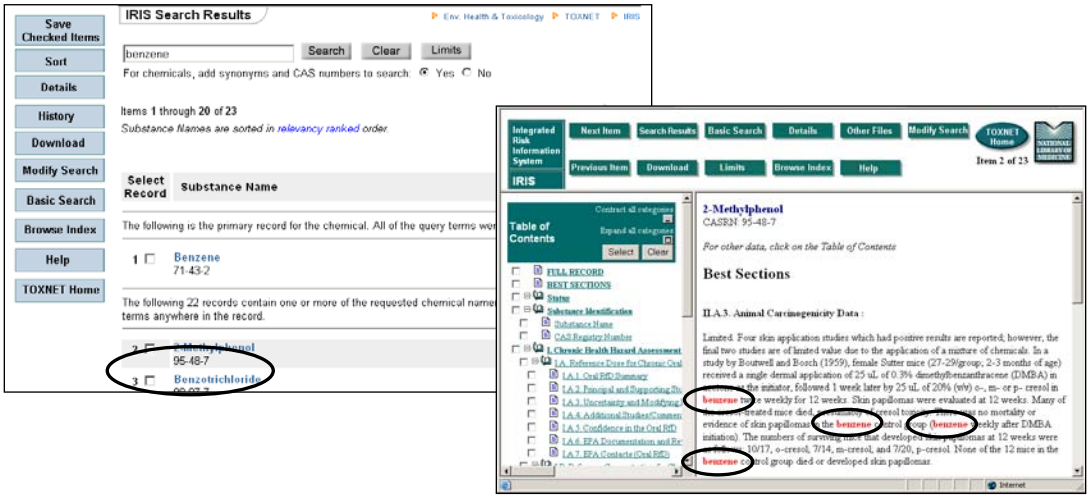
Search results are relevancy ranked. Relevancy ranking is based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms.

The search results 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.



When searching for a chemical, your retrieval may include other chemical records in addition to the initial matching chemical record (the “primary” record). These additional records appear if they contain the chemical name or search term. Click any of these non-primary chemicals on the Search Results screen to display the Best Sections, those where the chemical search term(s) appear(s) with greatest frequency. The term(s) searched appear(s) in red.



Additional Resources

For further information, we recommend these additional resources:

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

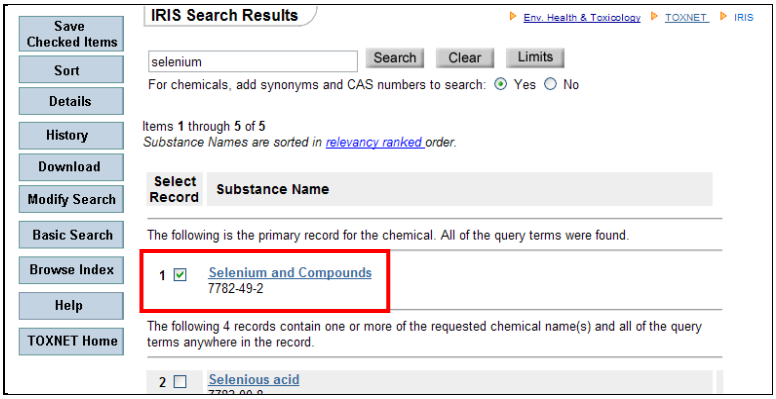
IRIS Search Exercises

Search Example: Locate the full record for *selenium*.

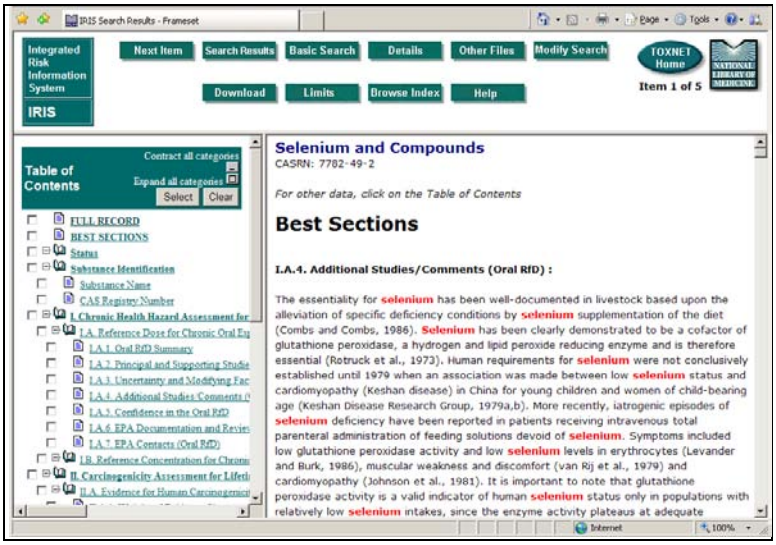
Suggested Solution:

- Go to toxnet.nlm.nih.gov
- Click **IRIS** in the **Select Database** column
- Type **selenium** in the search box
- Click the **Search** button

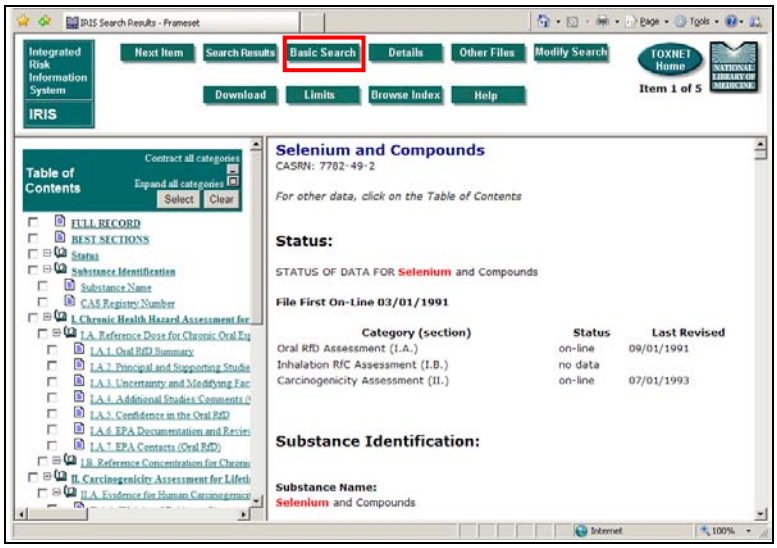
- Click **Selenium and Compounds**



- Click **FULL RECORD** in the **Table of Contents**



- Review the information in the right frame
- Click the **Basic Search** button at the top of the page to prepare for the next search



Exercise 1: 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** under **Carcinogenicity Assessment for Lifetime Exposure** in the **Table of Contents**
Review	the 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	the ⊞ icon to expand the **Chronic Health Hazard Assessment for Noncarcinogenic Effects** category in the **Table of Contents**
Click	**I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)**
Review	the information in the right frame

Click	the **Download** button at the top of the page
Review	the Custom Formats
Close	the pop-up window
Click	the **TOXNET Home** button to prepare for a new session

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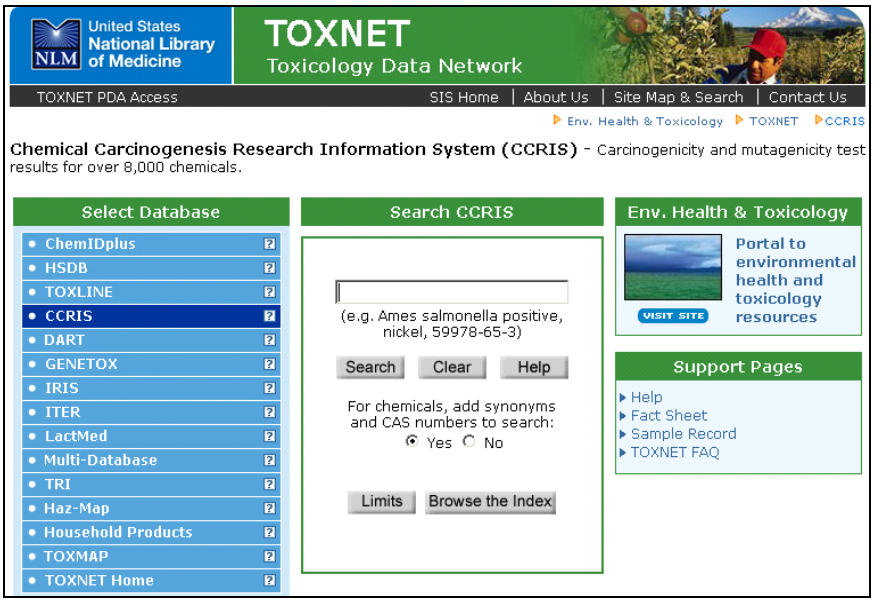
3

CCRIS, GENE-TOX, and ITER

CCRIS

CCRIS (Chemical Carcinogenesis Research Information System) is a toxicology data file of the NLM's TOXNET®. It is a scientifically evaluated and fully referenced data bank, developed and maintained by the National Cancer Institute (NCI). It contains over 9,000 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

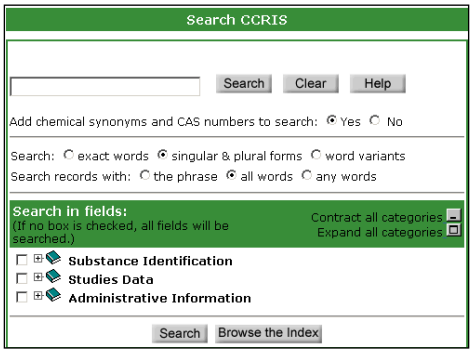
Searching CCRIS

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.

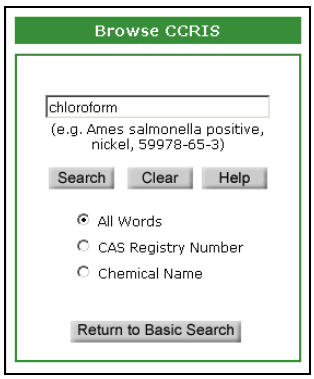
Use truncation (*), Boolean operators (AND, OR, NOT), nested parentheses, limits, and index browsing to refine your search results.

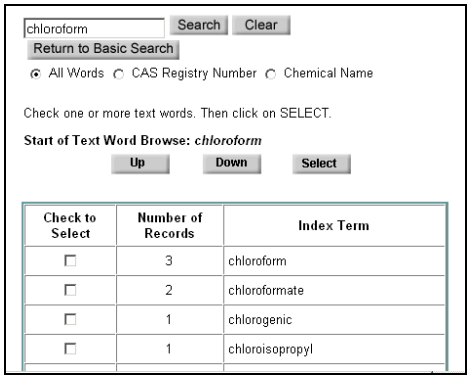
Click the **Limits** button on the home page to search:

- 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.



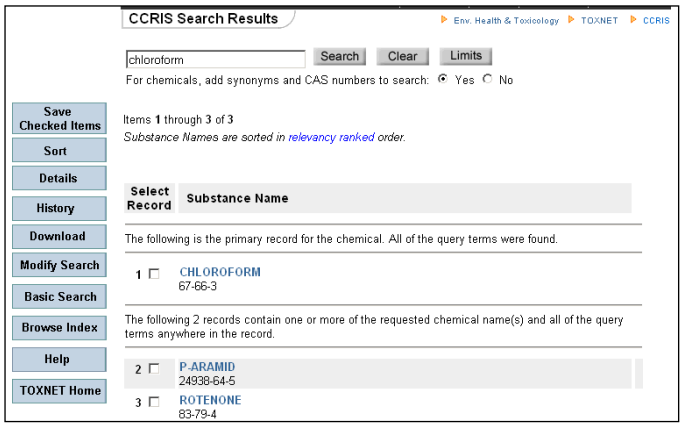
With the **Browse the Index** feature, the system returns a list of index terms related to the search term entered and the number of records containing that term. Select one or more index terms in the **Check to Select** column and click the **Select** button for the search results. Scan the index above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





CCRIS Search Results

Your initial retrieval is displayed as a list of substance names in blue and their CAS Registry Numbers.

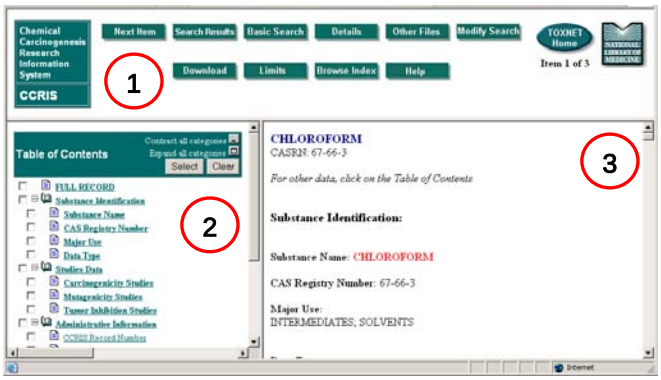


Substances are listed in **relevancy ranked order**—based on the number of individual search terms occurring in a document, the number of times each search term occurs in a document, the rarity of the search terms within the database, and the nearness of search terms to each other. Records containing combinations of search terms tend to be ranked higher than records with isolated occurrences of search terms. Click the substance name 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.

When searching for a chemical, your retrieval may include other chemical records in addition to the initial matching chemical record (the “primary” record). These additional records appear if they contain the chemical name or search term. Click any of these non-primary chemicals on the **Search Results** screen to display the sections of the record best matching your query term(s) (**Best Sections**), those where the chemical search term(s) appears with greatest frequency. The term(s) searched appear(s) in red.

Additional Resources

For further information, we recommend these additional resources:

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

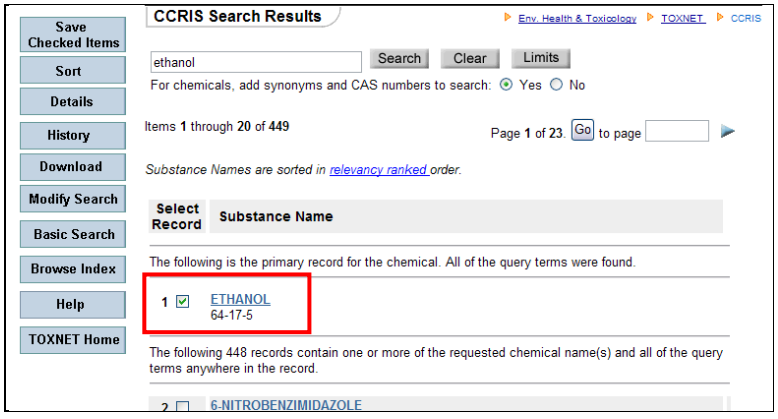
CCRIS Search Exercises

Search Example: Locate the record for *ethanol* and review the carcinogenicity studies.

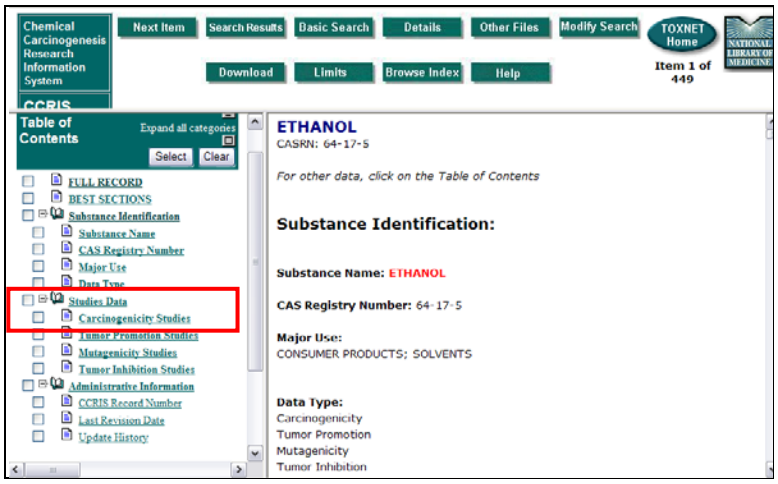
Suggested Solution:

- Go to toxnet.nlm.nih.gov
- Click **CCRIS** in the **Select Database** column
- Type **ethanol** in the search box
- Click the **Search** button

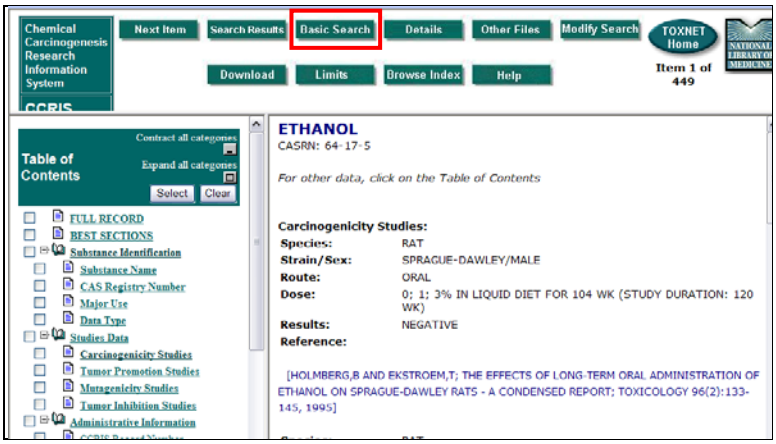
- Click **ETHANOL**



- Click Carcinogenicity Studies under **Studies Data** in the **Table of Contents**



- 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 1: Does the record for *chromium* contain any positive mutagenicity studies?

Suggested Solution:

Type	**chromium** in the search box
Click	the **Search** button
Click	**CHROMIUM COMPOUNDS**
Click	Mutagenicity Studies under **Studies Data** in the **Table of Contents**
Review	the information 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 record for *asbestos* and view the other files available.

Suggested Solution:

Type	**asbestos** in the search box
Click	the **Search** button
Click	**ASBESTOS**
Click	the **Other Files** button at the top of the page
Review	other database sources
Close	the pop-up window
Click	the **Basic Search** button at the top of the page to prepare for the next search

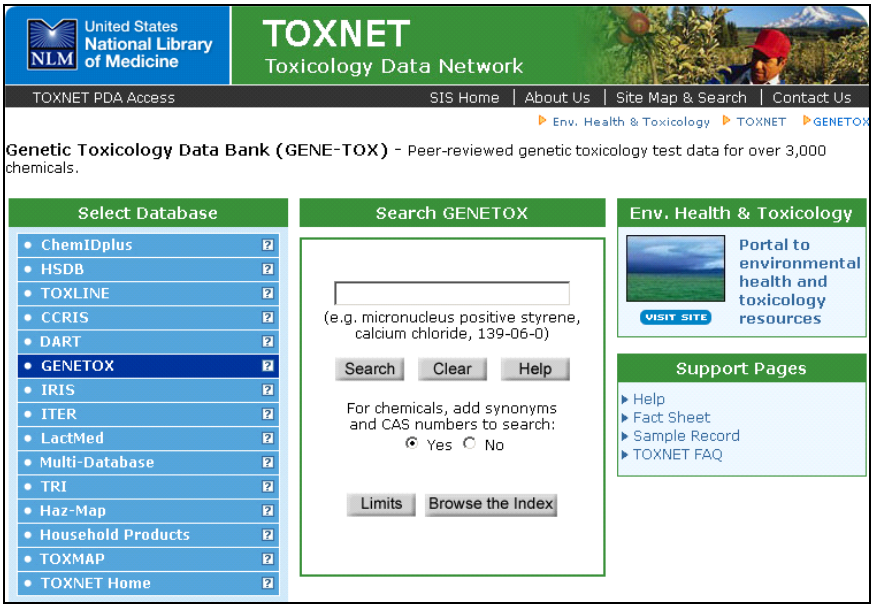
Exercise 3: How many substances are identified in CCRIS as positive for brain cancer?

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

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 over 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:

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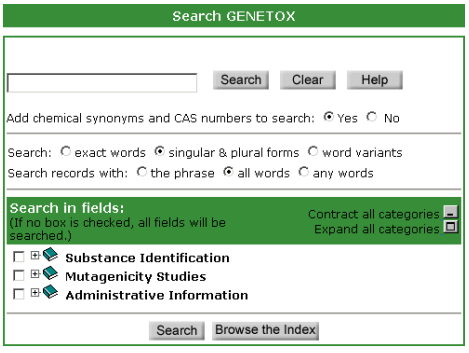

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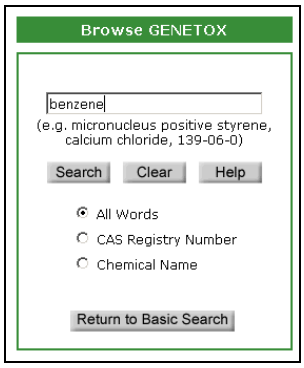

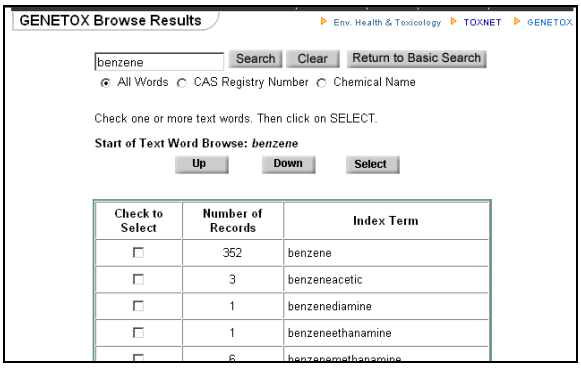

GENE-TOX Search Results

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.

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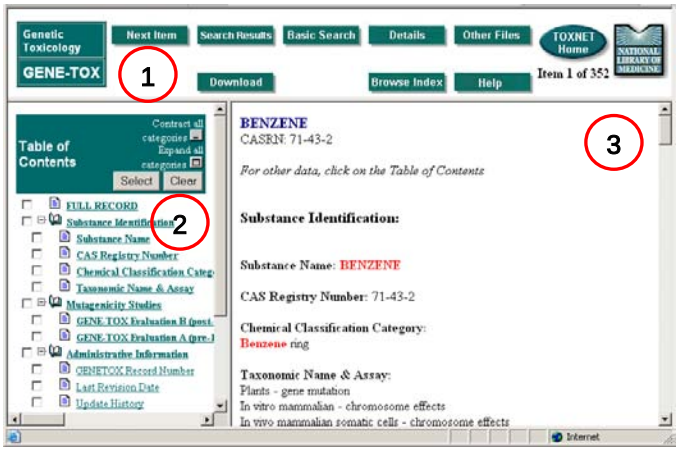
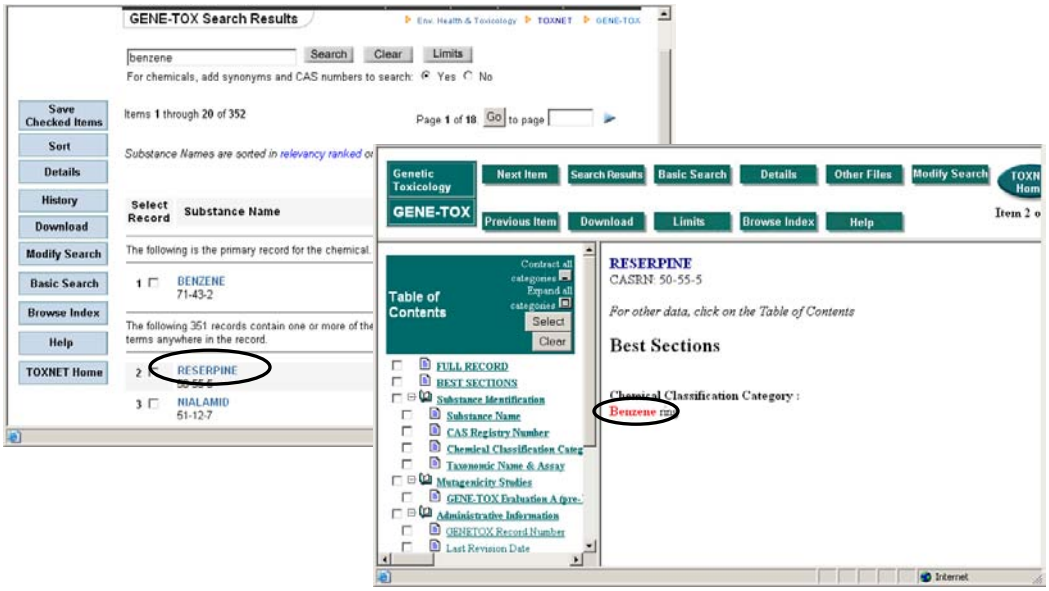
3. Chemical Data is shown in the right frame.



When searching for a chemical, your retrieval may include other chemical records in addition to the initial matching chemical record (the “primary” record). These additional records appear if they contain the chemical name or search term. Click any of these non-primary chemicals on the **Search Results** screen to display the sections of the record best matching your query term(s) (**Best Sections**), those where the chemical search term(s) appear(s) with greatest frequency.

Search term(s) appear(s) in red:



Additional Resources

For further information, we recommend these additional resources:

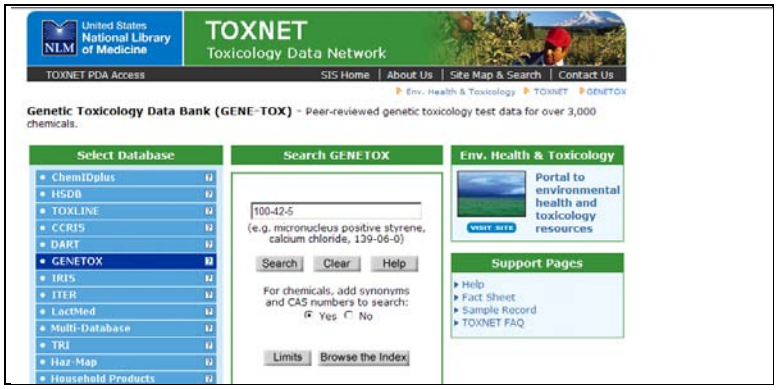
- GENE-TOX Fact Sheet:
  www.nlm.nih.gov/pubs/factsheets/genetxfs.html

GENE-TOX Search Exercises

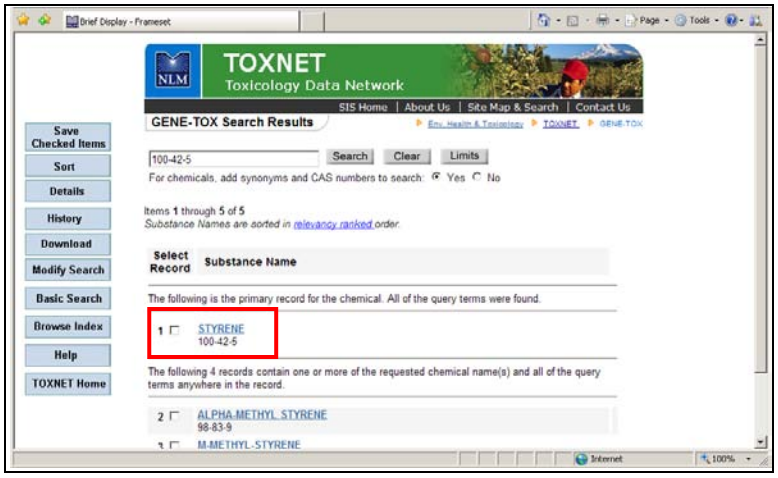
Search Example: Using the CAS registry number 100-42-5, locate the full record for this chemical.

Suggested Solution:

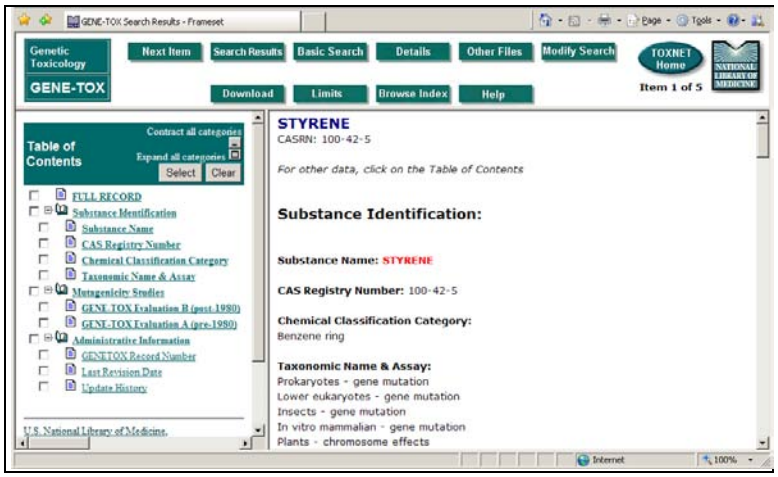
- Go to toxnet.nlm.nih.gov
- Click **GENETOX** in the **Select Database** column
- Type **100-42-5** in the search box
- Click the **Search** button



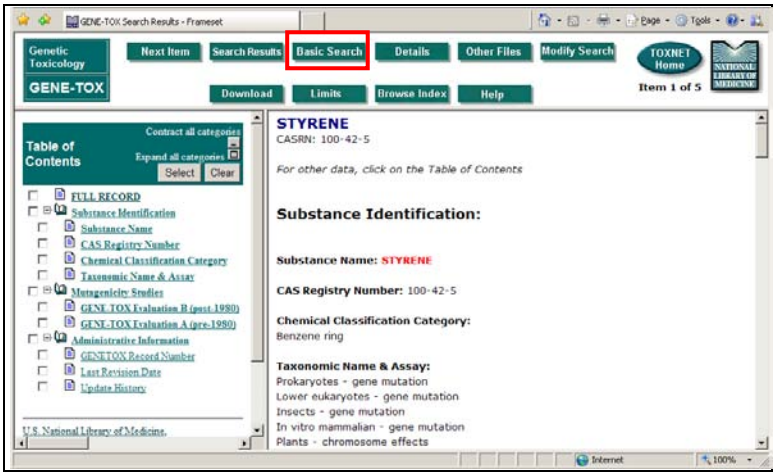
- Click **STYRENE**



- Click **FULL RECORD** under the **Table of Contents**



- Review the information in the right frame
- Click the **Basic Search** button at the top of the page to prepare for the next search



Exercise 1: Are there any mutagenicity study panel reports for *xylene*?

Suggested Solution:

Type	**xylene** in the search box
Click	the **Search** button
Click	**XYLENE**
Click	**Mutagenicity Studies** in the **Table of Contents**
Review	the information in the right frame
Click	the link for the **Panel Report** of your choice to view the abstract
Review	the abstract in TOXLINE
Click	the browser's **Back** button to return to the GENE-TOX results page
Click	the **Basic Search** button at the top right of the page to prepare for the next session

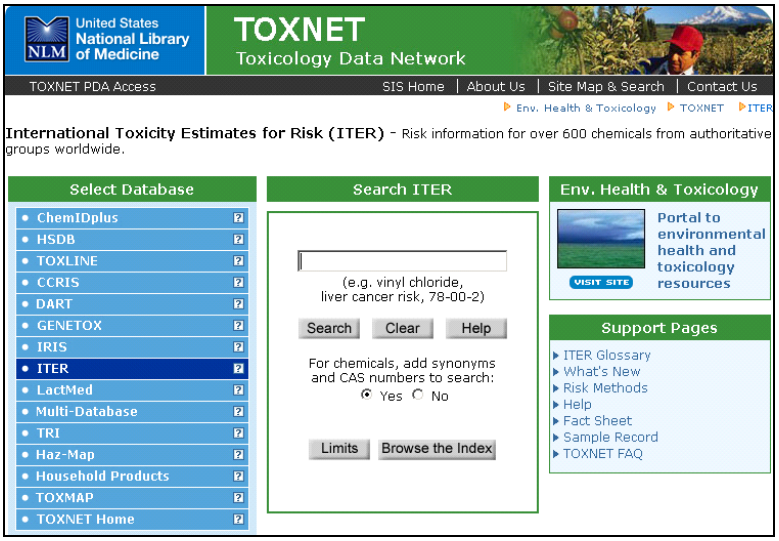
Exercise 2: Has *cyclophosphamide* been studied for effects on human male fertility and sterility?

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

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 over 600 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.



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

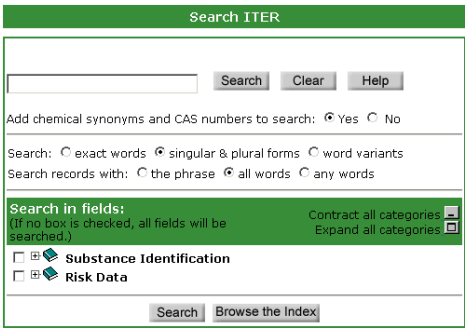
Searching ITER

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.

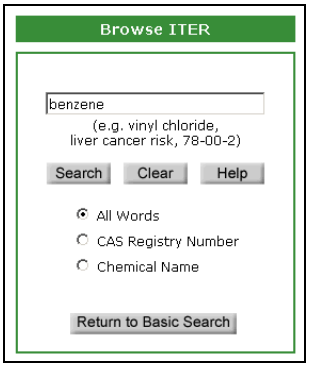
Use truncation (*), Boolean operators (AND, OR, NOT), nested parentheses, limits, and index browsing to refine your search results.

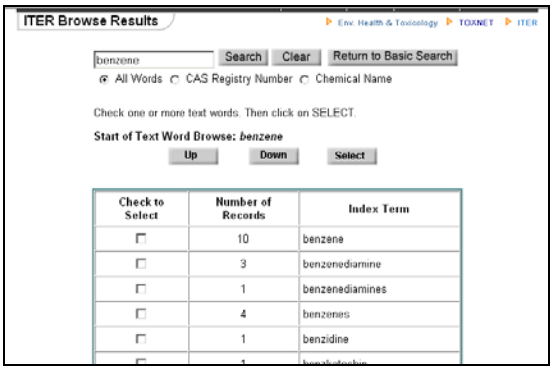
Click the **Limits** button on the home page to search:

- 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.



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.



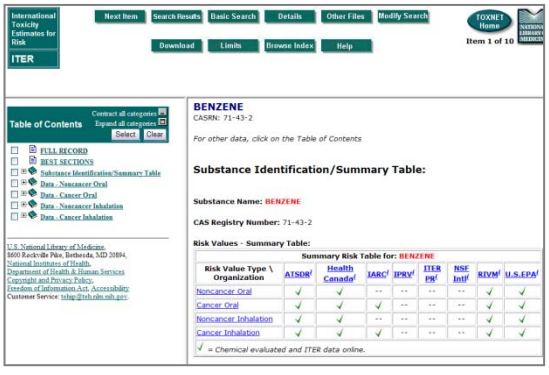


ITER Search Results

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 **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.



When searching for a chemical, your retrieval may include other chemical records in addition to the initial matching chemical record (the “primary” record). These additional records appear if they

contain the chemical name or search term. Click any of these non-primary chemicals on the **Search Results** screen to display the sections of the record best matching your query terms (**Best Sections**), those where the chemical search term(s) appear(s) with greatest frequency. Search term(s) appear(s) in red.

Additional Resources

For further information, we recommend these additional resources:

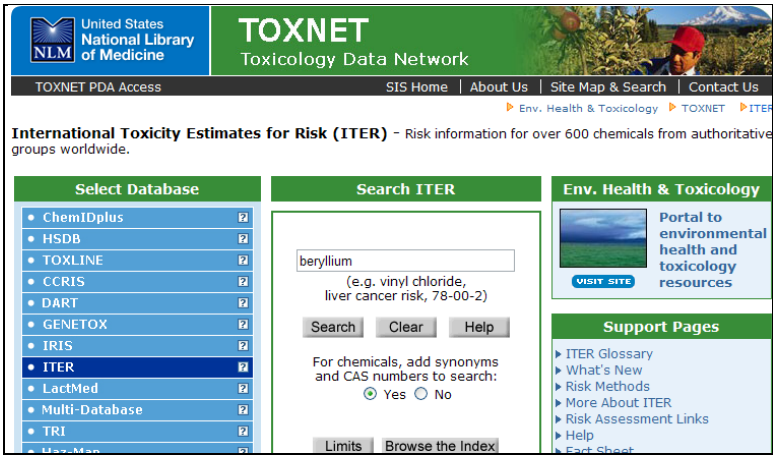
- ITER Fact Sheet:
  www.nlm.nih.gov/pubs/factsheets/toxnetfs.html

ITER Search Exercises

Search Example: Locate noncancer oral risk data for the chemical *beryllium*.

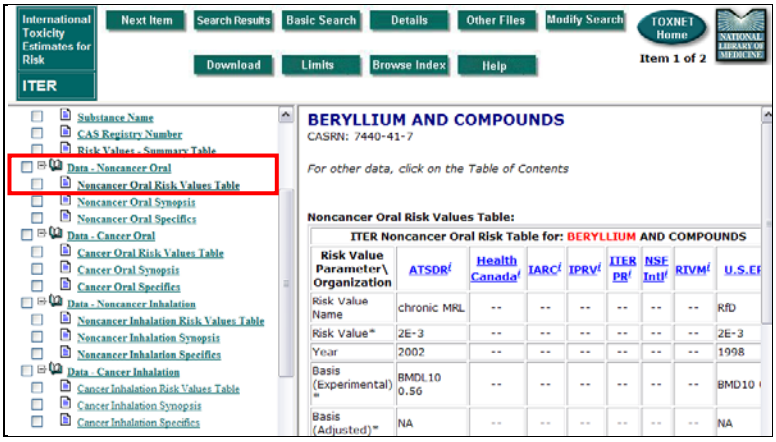
Suggested Solution:

- Go to toxnet.nlm.nih.gov
- Click **ITER** in the **Select Database** column
- Type **beryllium** in the search box
- Click the **Search** button



- Click **BERYLLIUM AND COMPOUNDS**

- Click Noncancer Oral Risk Values Table under **Data-Noncancer Oral** in the **Table of Contents**



- Review the information in the right frame
- Click the **Basic Search** button at the top of the page to prepare for the next search.

Exercise 1: Locate the record for *sulfur dioxide*. Do ATSDR and IARC have any risk data for oral cancer?

Suggested Solution:

Type	**sulfur dioxide** in the search box
Click	the **Search** button
Click	**SULFUR DIOXIDE**
Click	**Data-Cancer Oral** in the **Table of Contents**
Review	the Data-Cancer Oral table in the right frame
Click	the **Basic Search** button at the top right of the page to prepare for the next search

Exercise 2: How do the Dutch RIVM, Health Canada, and ATSDR compare in their evaluation of carcinogenicity data for *ethylene glycol*?

Suggested Solution:

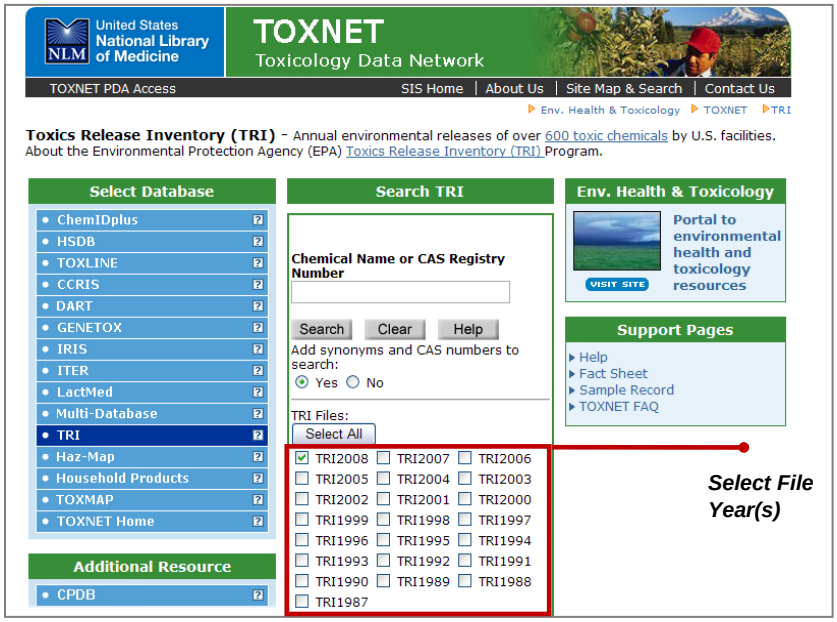
Type	**ethylene glycol** in the search box
Click	the **Search** button
Click	**ETHYLENE GLYCOL**
Click	**Data – Cancer Inhalation** in the **Table of Contents** to the left
Review	the Cancer Inhalation Table in the right frame
Scroll	down to review Cancer Inhalation Synopsis
Click	the **Basic Search** button at the top of the page to prepare for the next search

4

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 650 chemicals and chemical categories, which over 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.



toxnet.nlm.nih.gov

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

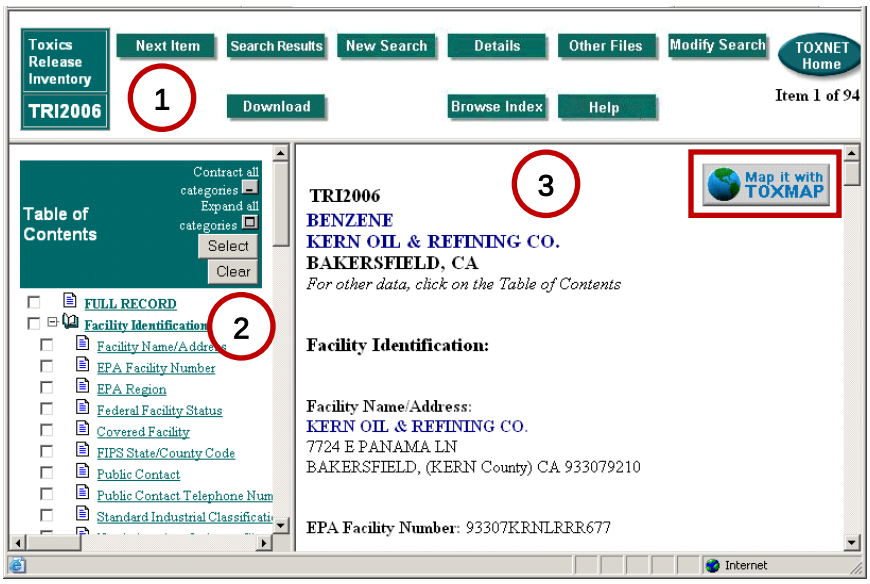
- Standard Industrial Classification Code or North American Industry Classification System Code
- Separate multiple entries with commas
- Weight in pounds (Great Than)
- Type of release (air, water, land, underground injection, or total environmental release)

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.

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 on the right to visually explore on-site releases in TOXMAP

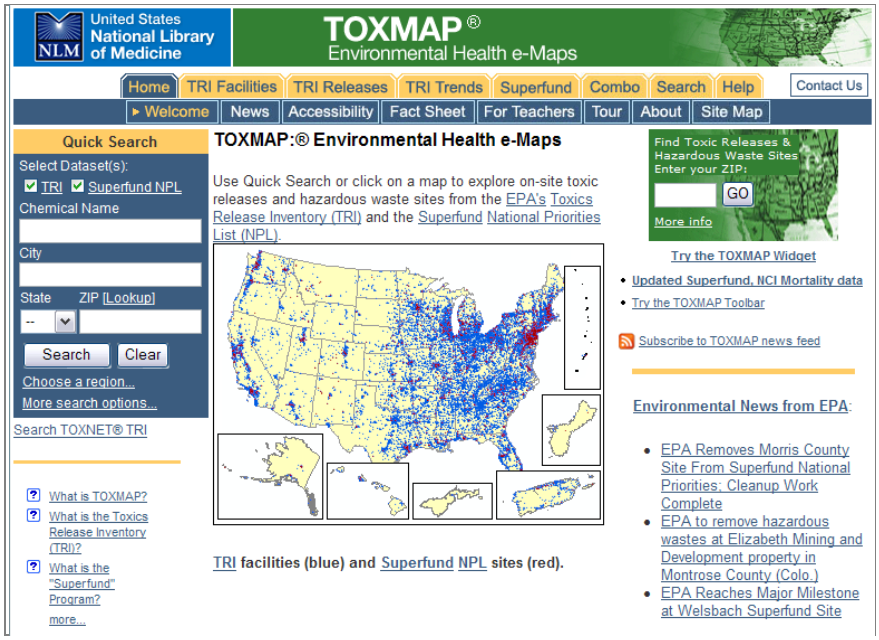
Additional Resources

For further information, we recommend these additional resource:

- TRI Fact Sheet
  www.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 is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation.

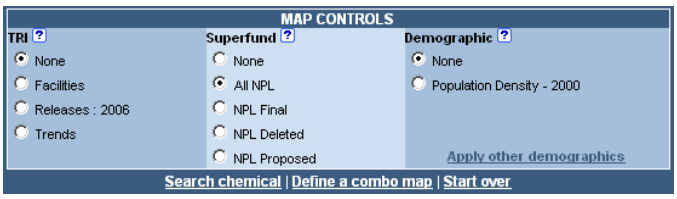


Map Features

TOXMAP offers several ways to create maps using the tabs and buttons along the top of the page, the **Quick Search** box on the home page, and the map controls below the map.

TOXMAP can create several types of maps:

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



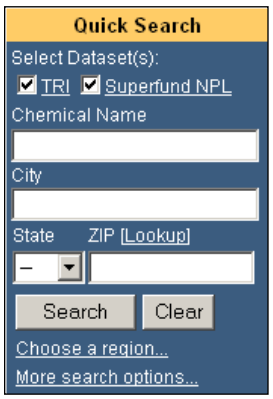
TOXMAP also overlays map data such as:

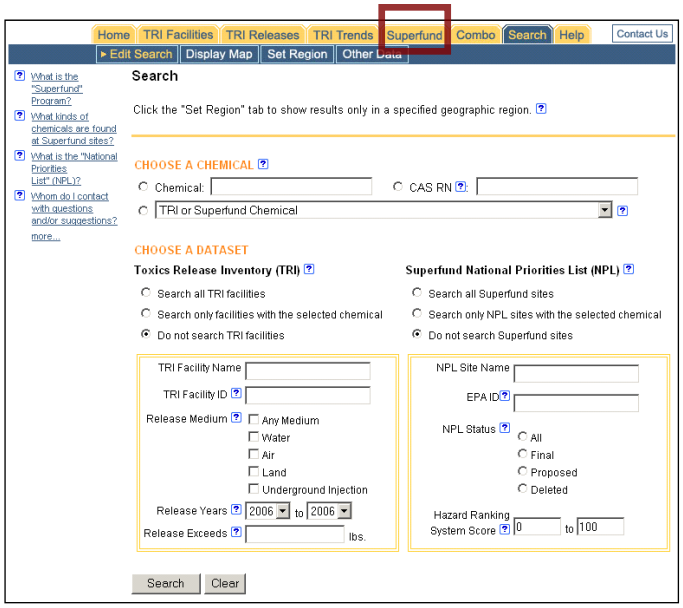
- U.S. Census Data—1990 and 2000 demographics (population, ethnicity, age, gender ratio)
- Income Data—per capita personal Income
- Health Data—mortality data for cancer and various causes
- Reference Data—cities, roads, federal land, and urban areas

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. More 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** tab page allows users to search a chemical CAS/RN, TRI facility name/ID, release year ranges, release amount, Superfund NPL site name/ID, and Hazard Ranking System (HRS) score.





Additional Resources

For further information, we recommend these additional resources:

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

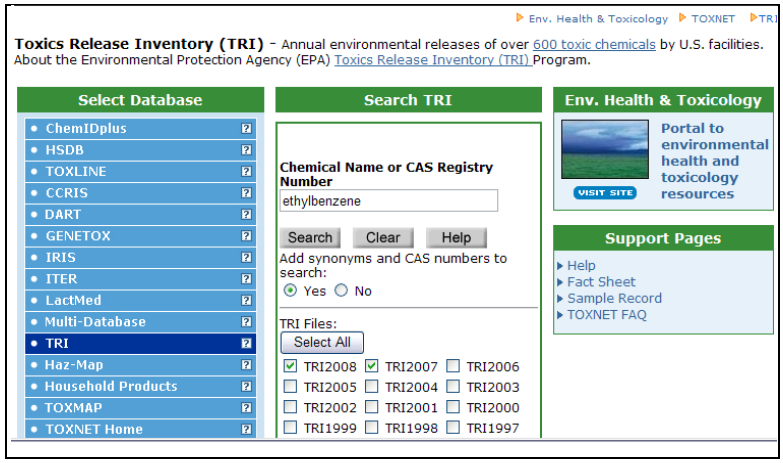
TOXNET / TRI	**TOXMAP**
You want full-reference, book-style information on TRI facilities or releases	You are interested in a health-related presentation of TRI data
You are using other TOXNET resources	You want to see TRI locations on a map
You want to benefit from chemical synonyms	You are interested 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 the release mediums for air, water, underground injection, and land	You want location data from the Federal Registry System (not self-reported locations)

TRI/TOXMAP Exercises

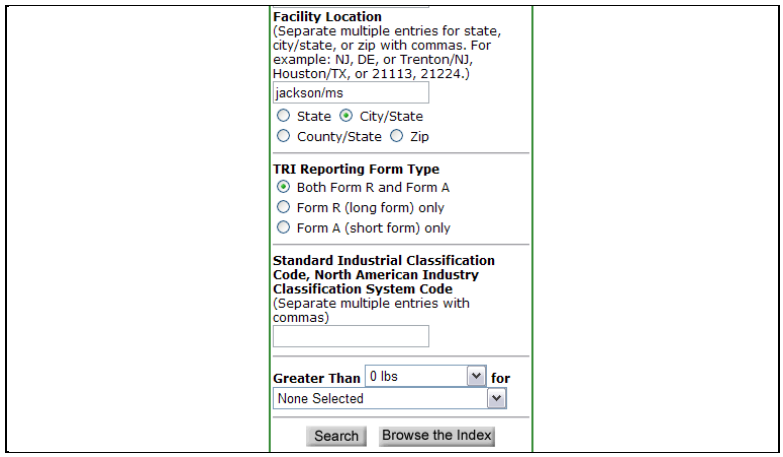
Search Example: How many pounds of *ethylbenzene* were released to the environment in Jackson Mississippi between 2007-2008? Map the releases in TOXMAP and view the environmental release information for the first facility.

Suggested Solution:

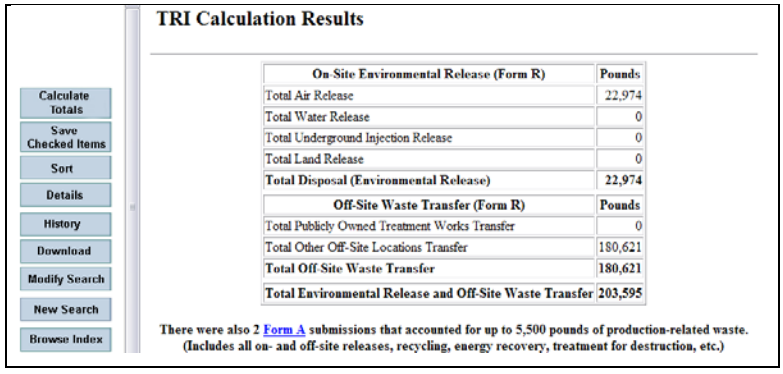
- Go to toxnet.nlm.nih.gov
- Select TRI from the column of databases
- Type **ethylbenzene** in the Chemical Name or CAS Registry Number search box
- Select the TRI years of 2007 and 2008
  - TRI2008 is selected by default



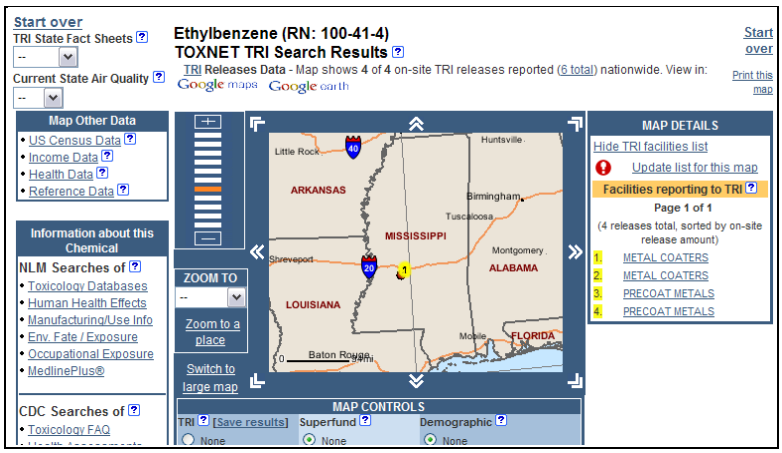
- Type **jackson/ms** in the Facility Location search box
- Select City/State under Facility Location search box
  - State is selected by default
- Click the **Search** button



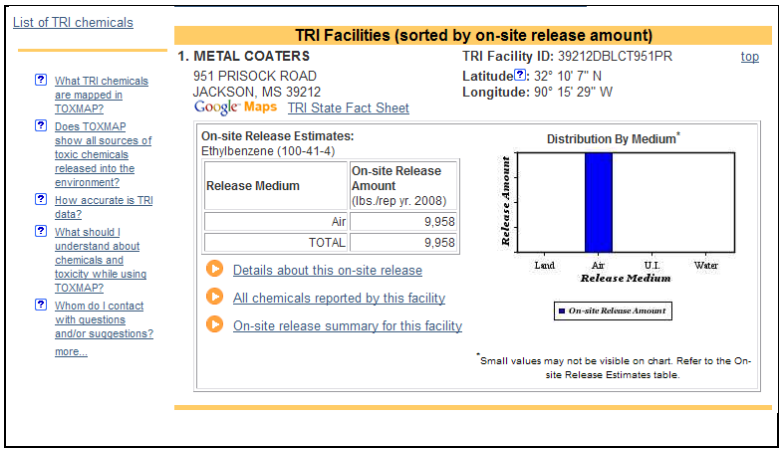
- Click the **Calculate Totals** button at the left of page
- Review the Environmental Release information for ethylbenzene
- Backspace to return to search results page



- Click the **Map it with TOXMAP** button
- Click MS from the **ZOOM TO** pull-down menu at the left of the map
- Click TRI on-site releases details at the right of the map below **MAP DETAILS**



- Click a facility name link under **Facilities reporting to TRI**
- Review the **Emissions Estimates and** All chemicals reported by this facility



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

Suggested Solution (continued from demonstration exercise)

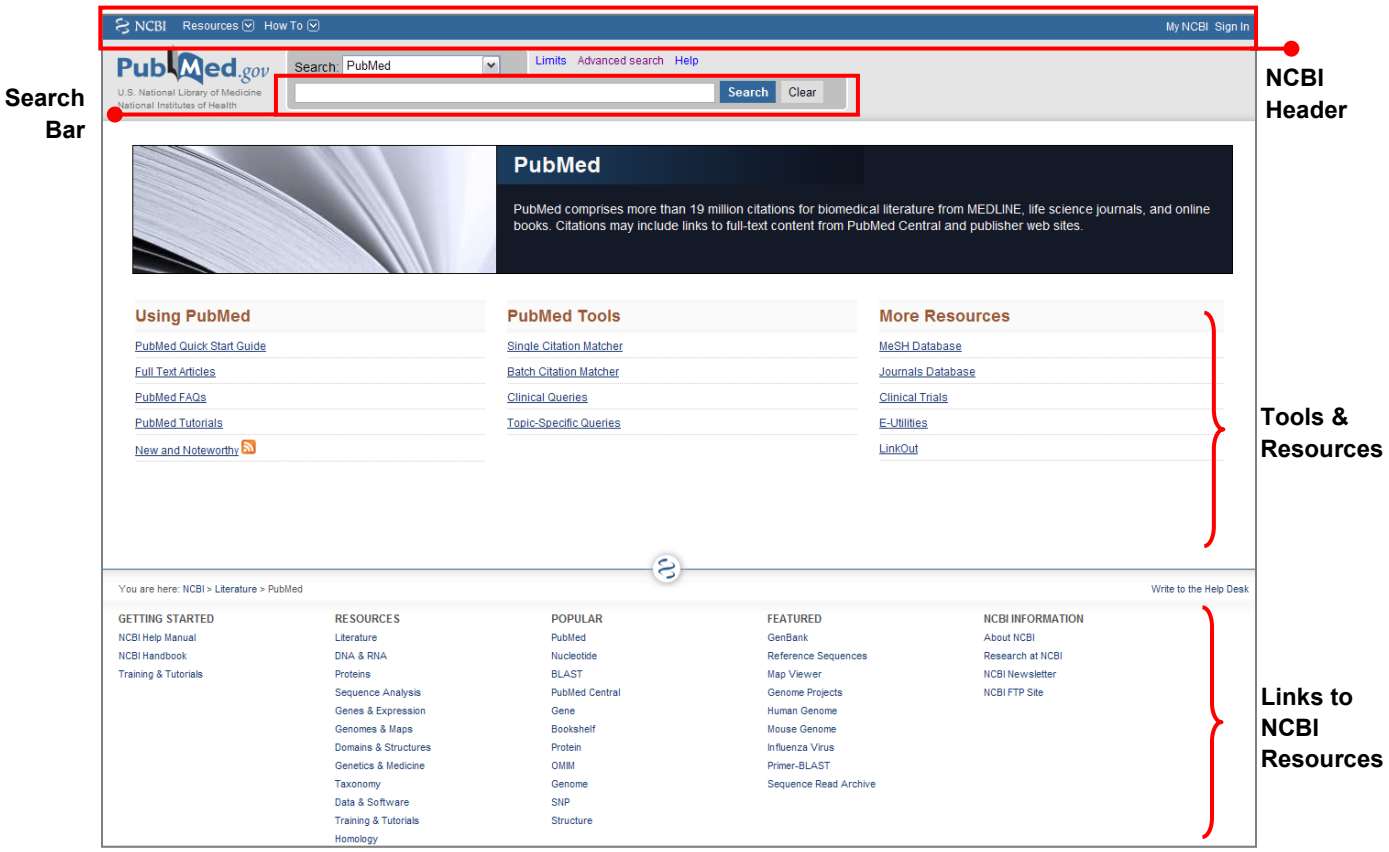
Scroll	to the top of the page and find Chemical Information section to the top left of the map
Click	Human Health Effects under **Information about this Chemical**
Review	the information in the HSDB Search Results window
Close	the HSDB window and return to the TOXMAP results page
Click	the **Home** tab
Click	the link to the Environmental Health and Toxicology Portal at the bottom of the page to prepare for the next session

5

MEDLINE/PubMed, TOXLINE, and DART

MEDLINE/PubMed

PubMed is a database developed by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine and is available free on the Web. PubMed provides access to **MEDLINE,** NLMs premier bibliographic database containing citations and author abstracts from approximately 5,400 biomedical journals published in the United States and worldwide. PubMed also provides access to citations for selected articles in life science journals not included in **MEDLINE** and additional relevant Web sites and links to molecular biology resources. The scope of PubMed includes such diverse topics as microbiology, delivery of health care, nutrition, pharmacology, and environmental health.



pubmed.gov

PubMed Home Page

The PubMed homepage includes a NCBI Header, Search Bar, and Footer that are common to all PubMed pages. The **NCBI Header** includes a NCBI Resources pull-down menu categorized by topic, a How To menu, and the Sign In for My NCBI. The **Search Bar** has the database selection menu, and includes a link to **Advanced search** and **Help**. Additional Search bar selections, RSS, and Save search, display after running a PubMed search. Popular tools and resources are under **PubMed Tools** (e.g., the Single Citation Matcher, Clinical Queries, and Topic-Specific Queries) and

More Resources (e.g., MeSH Database, Journals Database, and Clinical Trials). The **Footer** includes links to many NCBI resources.

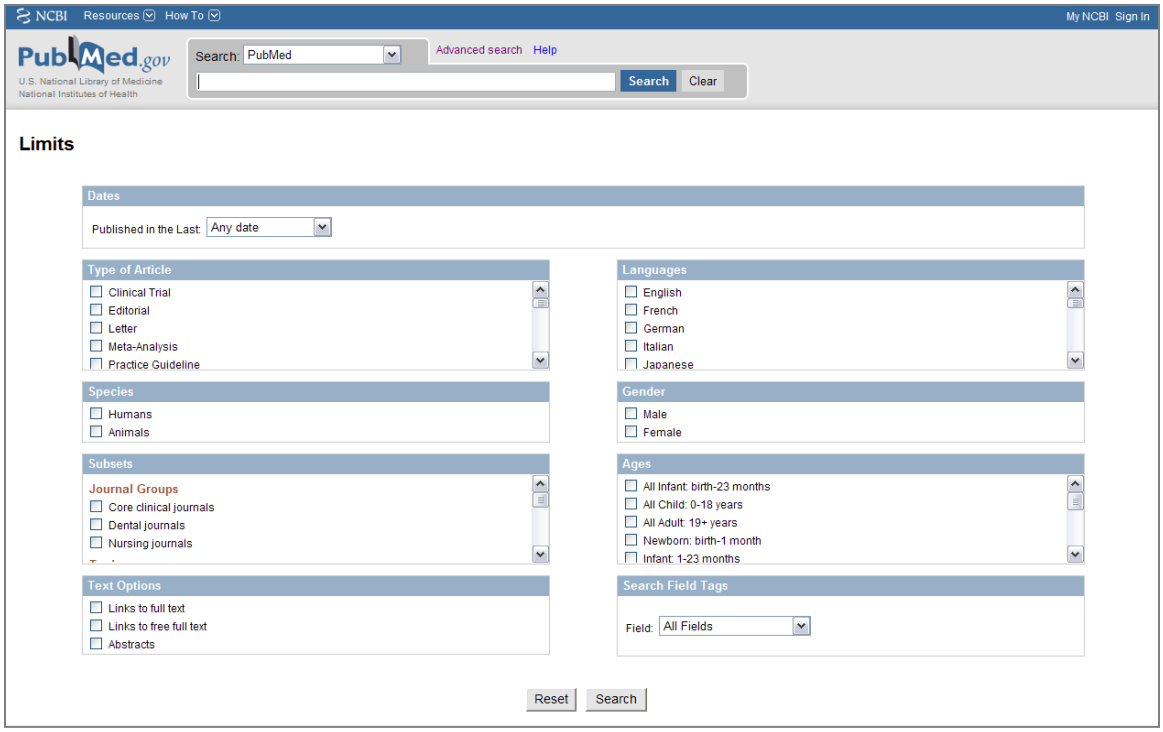
Searching PubMed

Enter your search term(s) into the search box and click the Search button for basic searching. To find an author, enter the author's last name, then first and second initials (e.g., smith ja). Other search options include the following:

- To search for a journal, use the Journals Database—allows searching by topic, journal title/abbreviation, ISSN, or browsing by subject terms.
- To build a search strategy with MeSH terms, use the MeSH Database—NLM's controlled Medical Subject Heading (MeSH) vocabulary provides a consistent way to retrieve information that may use different terminology for the same concepts.
- To search for specific types of references, use either Clinical Queries or Topic-Specific Queries.

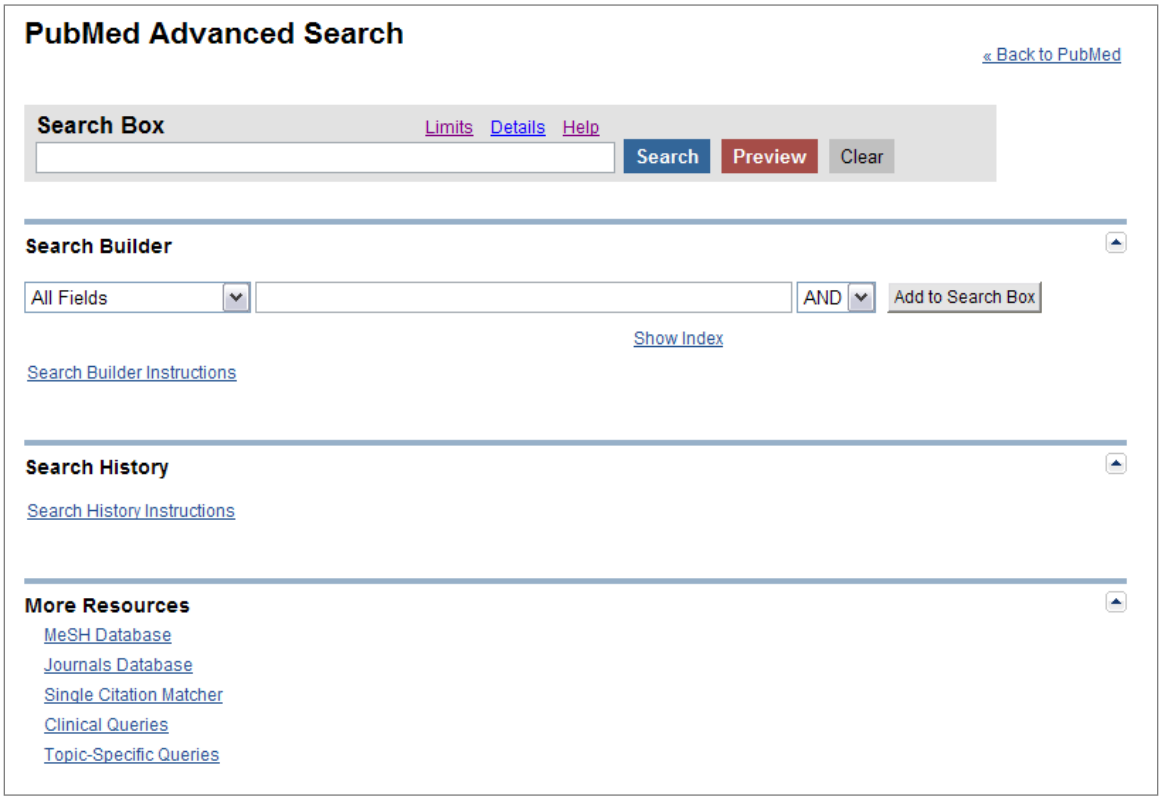
Limits

Refine and focus your search with the **Limits** option located above the search box. Checkboxes may be selected for Type of Article, Language, Subsets of journals or topics, Ages, Humans or Animals, Gender, and Dates. Restrict a search to items with links to full text, and make multiple choices within categories. A "Limits Activated" message will appear above the search results list. Limits remain in effect until removed.



Advanced Search

The Advanced Search link provides three options to refine and focus a search: **Search Builder**, **Search History**, and **More Resources**. Search Builder allows creation of a search using Boolean operators. Using the All Fields selection will run search terms through the Automatic Term Mapping process, or a specific field may be selected to apply to the term. Search History tracks search statements and numbers them as links. Clicking on the numbered link provides a menu allowing search statements to be combined into a new search with the AND, OR or NOT boolean operators, or to be run, deleted, examined in Details, or saved in My NCBI. More Resources provides links to the MeSH and Journals databases, Single citation Matcher, Clinical Queries, and Topic-Specific Queries.



Search Results

Search results initially display in a summary format in the order they were entered in PubMed as last in, first out. By default, the system displays 20 citations per page. Search results include the following:

- Links to related articles for all citations—click the Related Citations link below the citation
- Links to free full text articles, if available,—click Free article below the citation
- Links to free full text journal articles at Web sites of participating publishers—click Free Full Text under Filter your results

- Links to other NLM resources for additional information—see on the right side of your Search Results page, Titles with your search terms, Free Full-text articles in PubMed Central, Find Related Data and other related information

To display the abstract for a journal article, click the title link. Some citations do not have abstracts and will include the note “No abstract available.”

My NCBI

My NCBI is an easy way to save and update searches on topics of continuing interest. You can choose filters that group your search results. Search updates will automatically be e-mailed to you if selected. To use My NCBI, you must first register and your browser will need to allow pop-ups from the NCBI Web page. Click My NCBI on the right side of the NCBI header.

Ordering Documents

NLM’s Loansome Doc is an automated document ordering program that allows PubMed users to order the full text of an article from a participating library. Before an order can be placed, and before a user can register, all Loansome Doc users must first establish an agreement with a library that uses DOCLINE® (NLM's automated interlibrary loan request and referral system). Users who are unsure about which library to contact may obtain assistance from the Regional Medical Library (RML) in their area by calling 1-800-338-7657, Monday-Friday, 8:30 AM - 5:00 PM in all time zones. To register with Loansome Doc go to docline.gov/loansome/login.cfm. During the online registration process, you will create a user account with your name, address, e-mail, and ordering preference.

From PubMed registered Loansome Doc users can access Loansome Doc by performing a search, clicking the check box to the left of the articles they want to order, and selecting **Send to Order** from the pull down menu.

Additional Resources

For further information, we recommend these additional resources:

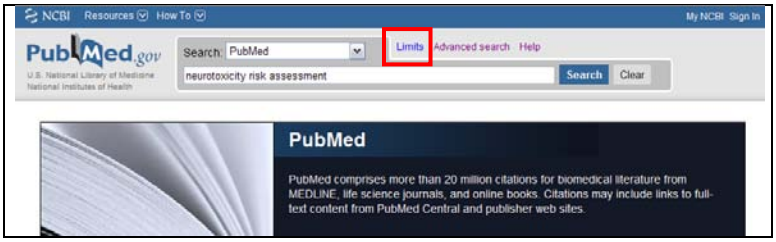
- PubMed Help (an online Help book)
  www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=helppubmed.chapter.pubmedhelp
- PubMed Quick Tour: Simple Subject Search
  www.nlm.nih.gov/bsd/viewlet/search/subject/subject.html
- PubMed Quick Tour: Search for an Author
  www.nlm.nih.gov/bsd/viewlet/search/author/author.html
- CAM (Complementary and Alternative Medicine) on PubMed
  nnlm.gov/training/consumer/cam/cam-pubmed.pdf
- Getting Started with LinkOut (National Network of Libraries of Medicine)
  nnlm.gov/training/linkout/

MEDLINE/PUBMED Search Exercises

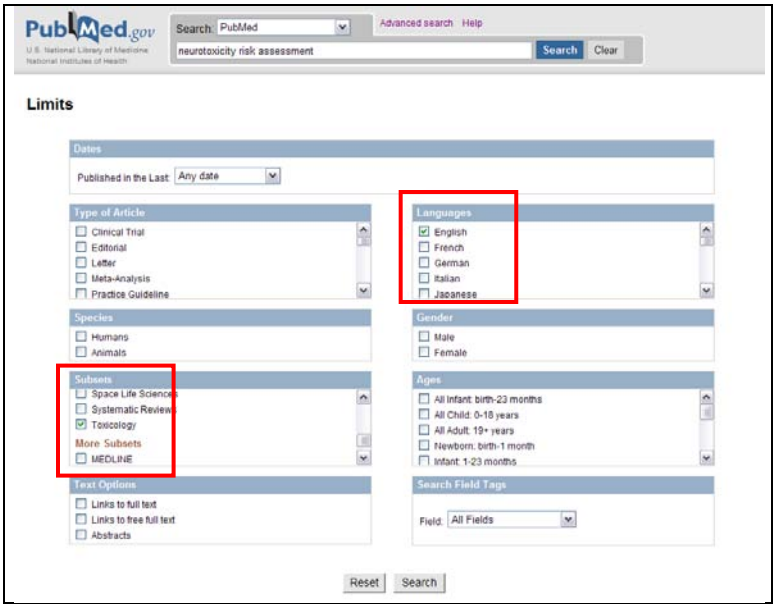
Search Example: Locate toxicological records that reference neurotoxicity risk assessment. Limit your retrieval to toxicology articles written in English.

Suggested Solution:

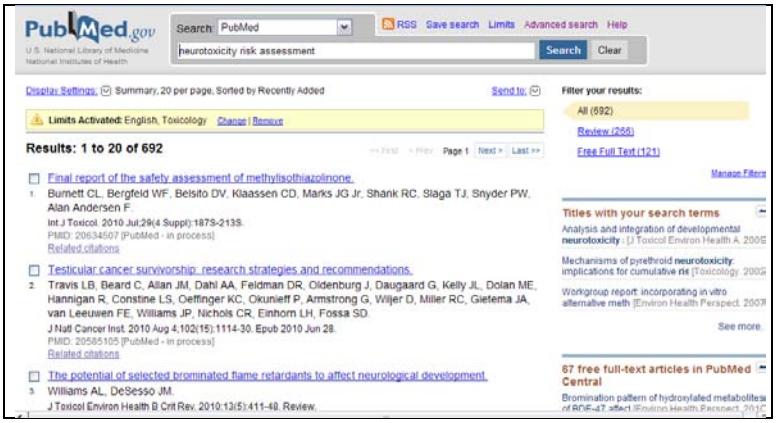
- Go to pubmed.gov
- Type **neurotoxicity risk assessment** in the search box
- Click **Limits**



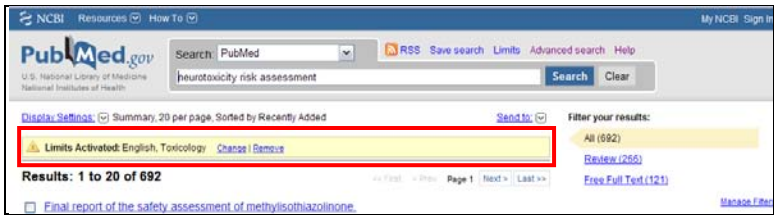
- Click the "English" checkbox under **Languages**
- Click the "Toxicology" checkbox under **Subsets**
- Click the **Search** button at the top of the page



- Click a record link of your choice



- Review the record retrieved
- Deselect the **Limits Activated** by clicking on the **Remove** button



Exercise 1: What research is available for the use of oral rehydration therapy for the treatment of diarrhea associated with cholera?

Suggested Solution:

Type	**oral rehydration therapy diarrhea cholera** in the search box
Click	the **Go** button
Review	the citation(s) and related articles
Click	the **Clear** button to the right of the search box to prepare for the next search.

Exercise 2: Locate articles that discuss population studies of colon cancer in Blacks and Whites.

Suggested Solution:

Type	**colon cancer blacks white** in the search box
Click	the **Go** button
Review	the citation(s) retrieved
Click	the **Clear** button to the right of the search box to prepare for the next search.

Exercise 3: Recently there has been an increase globally in dengue flu. What research has been published in the *American Journal of Tropical Medicine and Hygiene* within the past year?

Suggested Solution:

Type	**dengue fever** in the search box
Click	the **Limits** tab
Click	**Add Journal** to the right of Search by Journal
Type	**american journal of tropical medicine and hygiene** in the **Journal Name** search box
Select	1 year from the **Published in the Last** pull-down menu
Click	the **Go** button

Review	the citation(s)
Click	the **Clear** button to the right of the search box to prepare for the next search.

Exercise 4: Dr. Sungano Mharakurwa is a leading authority on the **genetic structure of malaria parasites. Find an article written by** Dr. Mharakurwa titled, "**PCR detection of Plasmodium falciparum in human urine and saliva samples".**

Suggested Solution:

Type	**PCR detection Plasmodium falciparum urine saliva** in the search box
	 Deselect the one year limit
Click	the **Limits** tab
Click	**Add Author** button to the right of Search by Author
Type	**sungano mharakurwa** in the **Author Name** search box
Click	the **Go** button
Review	the citation
	 You do not need to deselect Limits after an author search.
Click	the **Clear** button to the right of the search box to prepare for the next search.

Exercise 5: Research articles on the subject of health disparities in the United States. Next, e-mail the abstract of the first record to yourself in text format.

Suggested Solution:

Type	**US health disparities** in the search box
Click	the **Go** button
Click	the box to the left of your choice
Select	E-mail from the **Send to** pull-down menu
Click	the **Send to** button
Select	Abstract and Text from the Format pull-down menu and Text from the Format as menu
Type	your e-mail address in the e-mail address box
Click	the **Mail** button
Review	the e-mail confirmation message highlighted in pink above the abstract
Click	the TOXNET link under **Related Resources** in the blue sidebar to prepare for the next session

Exercise 6: Set up a My NCBI user account and conduct and save a search for journal articles on the prevalence of asthma in children.

Suggested Solution:

Click	My NCBI in the left sidebar under "PubMed Services"
Click	register for an account under "**Sign into My NCBI**"
	 Clicking the "Keep me signed in" checkbox will create a permanent cookie so that My NCBI will be indefinitely available on your computer without signing in again.
Type	**asthma prevalence children** in the search box
Click	the **Go** button
Click	**Save Search** at the top of the screen to the right of the search box
Click	the **Save** button
Complete	the Save Search Settings form (optional)
Click	Save
	 Your search (asthma prevalence children) will be listed

Saving and Printing Records in PubMed

The PubMed **Send to** Text function creates a text file of PubMed records, which you can save on your computer. The **Send to** button is available on screens with search results. You can save the entire results of a specific search or selected records. If you don't select specific records before clicking on the **Send to** button, you will create a file on your computer that will contain the entire search results, up to a maximum of 10,000 items.

You can also save records collected from multiple searches by using the **Send to** Clipboard feature. The Clipboard holds a maximum of 500 items. When you save a file, your browser will prompt you to specify where this file should be placed on your computer, and also give you the opportunity to rename the file.

Saving Entire Search Results

- Use the **Display** pull-down menu to select a format.
- Click **Send to** File and your items will be saved in the **Display** format as plain text.

The default for the File feature is to save the entire retrieval—up to 10,000 items—unless you specifically select citations. For example, if you use the Send to File selection on a screen displaying 1-20 items of 2,356, your saved file will contain all 2,356 citations.

Saving Selected Citations from a Single Search

- Use the **Display** pull-down menu to select a format.
- Click in the check boxes next to each citation you want to save. You can move to other pages within the search results to make additional selections.
- Click **Send to** File and your selected items will be saved in the **Display** format as plain text.

Saving a large retrieval may take several minutes. To save citations in html format, use the Save as... function of your browser and change the file extension to html. This will save only the citations displayed on the screen, so you may wish to use the **Show** function and **Send to** Text to adjust your display as needed.

Clipboard

To place an item in the Clipboard, click on the check box to the left of the citation, select Clipboard from the **Send to** pull-down menu, and then click the **Send to** button. Once you have added a citation to the Clipboard, the record number color will change to green.

If you select Clipboard from the **Send to** menu without selecting citations using the check box, PubMed will add all (up to 500 citations) of your search results to the Clipboard. The

Clipboard will be lost after one hour of inactivity on PubMed or any of the other Entrez databases.

- PubMed uses cookies to add your selections to the clipboard. In order for you to use this feature your Web browser must be set to accept cookies.

- Citations in the clipboard are represented by the search number #0, which may be used in Boolean search statements. For example, to limit the citations you have collected in the Clipboard to English language citations, use the following search:

  #0 AND english [1a]

- This does not affect or replace the Clipboard contents.

E-mail

To e-mail your results, click on specific citations and select E-mail from the **Send to** pull-down menu. You may e-mail up to 500 items. You may select the format, the sorting method, and HTML or text. In addition, you may enter a message that will be included with the PubMed search results in the e-mail message. The e-mail page reflects settings from the results page and can be modified.

After clicking the **Mail** button, the system returns you to your results page and displays a message confirming that the e-mail message was sent. Your PubMed results will be sent from the NCBI automatic mail server, Sent by Entrez [nobody@ncbi.nlm.nih.gov] with a "Subject" of PubMed Search Results. Do not reply to this message. This is not a functioning customer service e-mail address.

- If you choose HTML, your PubMed e-mail message displays as a PubMed results page and includes hyperlinks to Related Articles, LinkOut, and other PubMed features. The recipient's e-mail program must be set for HTML view in order to properly view in HTML format.

Order

The **Order** function allows you to order the full-text copy of an article from a library in your area using the **Order Documents** feature of PubMed.

- Prior to using this program, you must establish an agreement with a Loansome Doc participating library. During the registration process, you will have the opportunity to search for a Loansome Doc provider in your area (U.S. and International). Local fees may apply. To register, click Order Documents from the PubMed sidebar menu, then Loansome Doc under **Loansome Doc Options**, then **Sign up!** from the Loansome Doc screen.

- Once you have registered with Loansome Doc, you can order citations by clicking the check box to the left of each citation you want to order. When you have finished marking your selections (you may move to other pages within your results), select Order from the **Send to** menu, and click the **Send to** button. You may also use the Clipboard to collect items from multiple searches before ordering.

For some journals the full-text of articles are available via a PubMed link to the publisher's Web site. Publisher links for the full-text of the article are displayed on the Abstract or Citation display. You may also choose LinkOut from the Links pull-down menu to the right of each citation. LinkOut is a PubMed feature that links to outside sources for the full-text of the article, e.g., a publisher's Web site, as well as other resources such as biological databases and sequencing centers. User registration, a subscription fee, or some other type of fee may be required to access the full-text of articles in some journals.

Importing Citations into a Reference Manager Program

To import search results into a reference manager program, change the **Display** format to MEDLINE, select File from the **Send to** pull-down menu, then click **Send to**. This format includes the field tags needed for these programs.

Consider changing the .fcgi extension to .txt if you wish to open the file in a text editor, word processing, or reference manager program.

Print

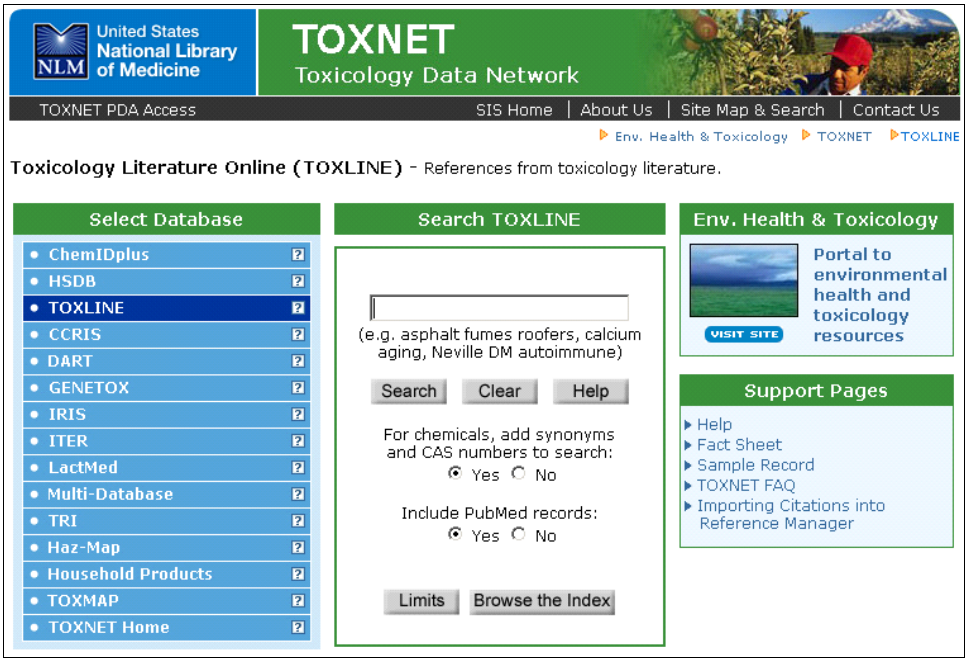
Use the print function of your Web browser to print all the information and citations displayed on your Web page. Before printing, consider using the Show (number of pages) Feature to increase the number of documents per page so that the total number of documents is displayed on one page (maximum: 500 per page). You can print only the citations from the displayed page.

You may also wish to display your citations as "Text" to strip the sidebar menu and toolbars prior to printing your results.

You may want to print selected items from one or more searches on a single page. You can do this by collecting them in PubMed's Clipboard.

TOXLINE

TOXLINE is NLM's bibliographic database for toxicology, providing information covering the biochemical, pharmacological, physiological, and toxicological effects of drugs and other chemicals. It contains over 4 million bibliographic citations from 1965 to the present, most with abstracts and/or indexing terms and Chemical Abstracts Service (CAS) Registry Numbers.



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**
  - MEDLINE/PubMed
- **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)

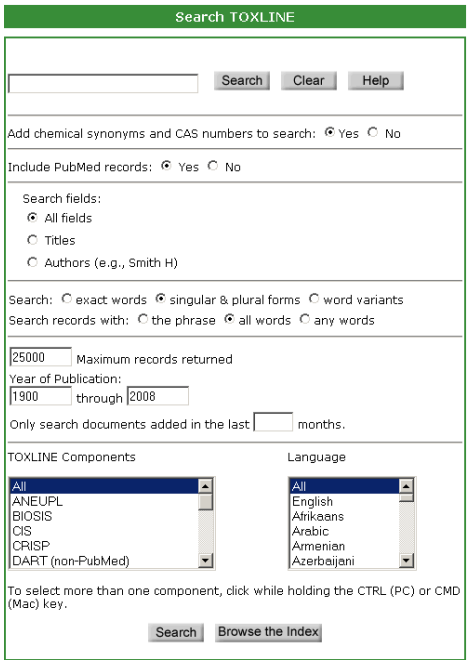
- Toxicology Research Projects (CRISP)

- **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 (HMTC)
  - 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.

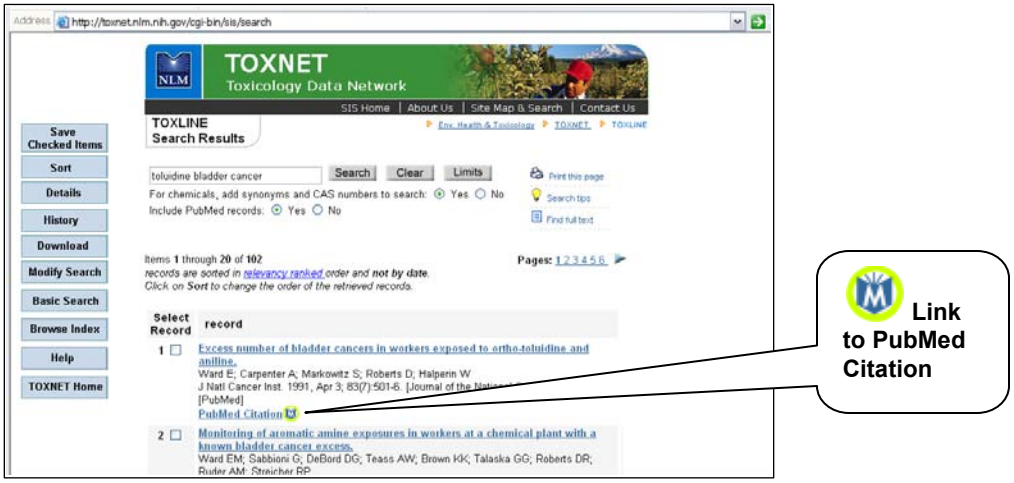


Limits may be applied to narrow your search to:

- 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

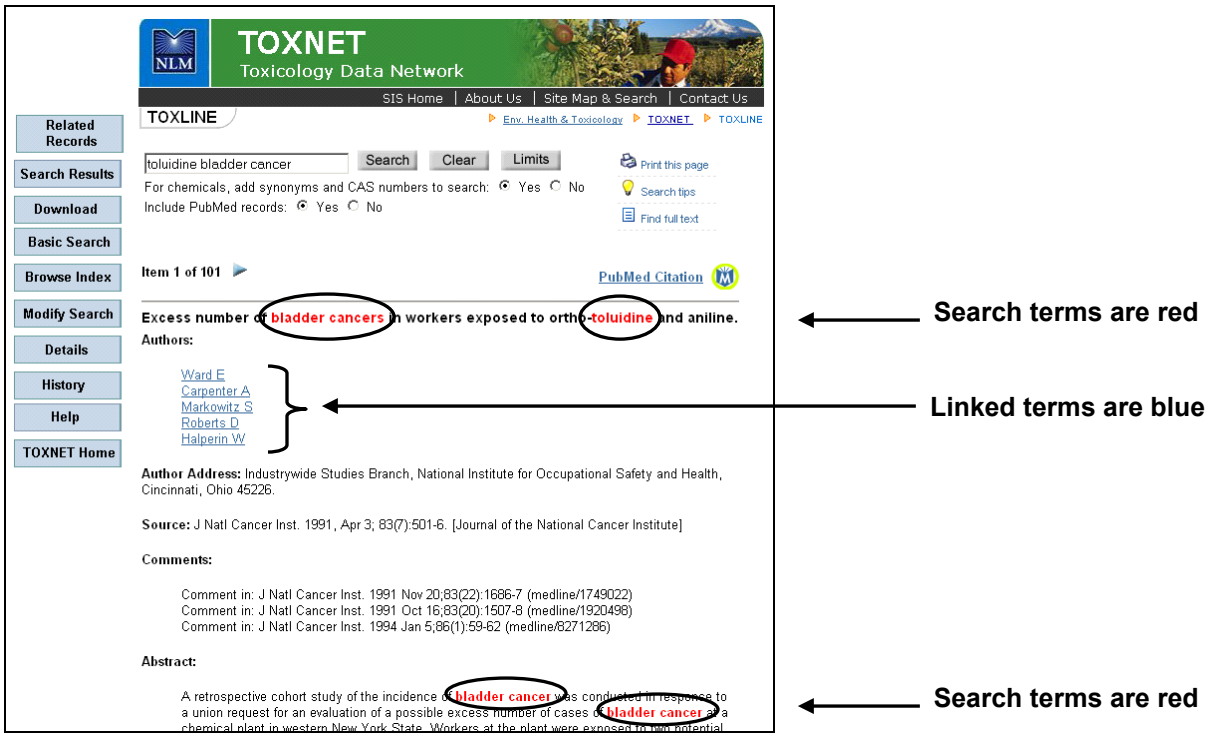
You may also specify the maximum number of records you would like retrieved.

Search Results



Your initial retrieval is displayed as a list—in relevancy ranked order—of bibliographic references with the titles in blue. Each reference is followed by the acronym [in brackets] of the component from which the article was retrieved. References coming from MEDLINE/PubMed will be marked PubMed citation with a green and blue M-encircled icon (Ⓜ) and 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.

Selected Record Screen



The record screen displays the complete record for the item you selected on the results screen. Your search terms are in red. Individual author names, MeSH headings, keywords, and CAS

Registry Numbers are in blue and linked to similar records in the database. Click an author link to find other articles by that author; Click a keyword to find other articles indexed with that keyword.

Other information appearing 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 component.

Additional Resources

For further information, we recommend these additional resources:

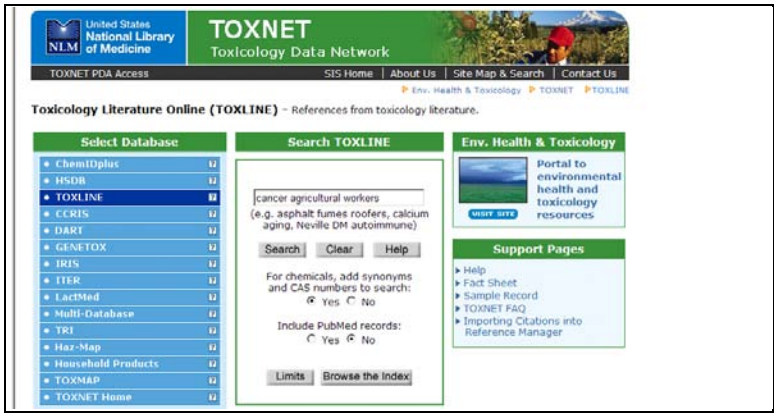
- PubMed
  pubmed.gov
- TOXLINE Fact Sheet
  www.nlm.nih.gov/pubs/factsheets/toxlinfs.html
- Importing Citations into Reference Manager
  sis.nlm.nih.gov/enviro/captivate/toxlinespecialimports.htm
- Free Full Text Health Science/Medical Journals
  sis.nlm.nih.gov/pdf/FreeFullTextListApril07.pdf

TOXLINE Search Exercises

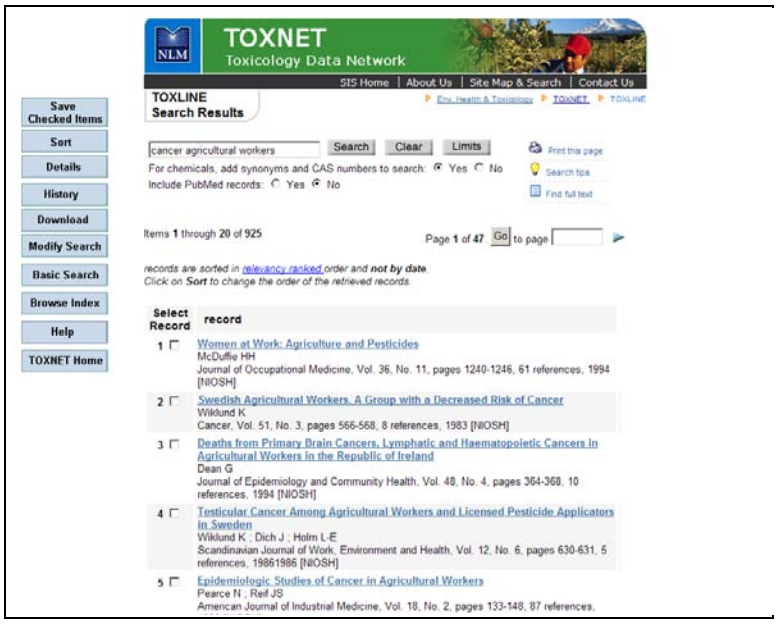
Search Example: Research records about cancer among agricultural workers. Do not include PubMed citations.

Suggested Solution:

- Go to toxnet.nlm.nih.gov
- Click **TOXLINE** in the **Select Database** column
- Type **cancer agricultural workers** in the search box
- Click the **No** button under Include PubMed records
- Click the **Search** button



- Review the citations
- Click the **Basic Search** button at the left of the page to prepare for the next search



Exercise 1: Locate recent articles focused on the effects of diet on breast cancer. Limit your search to articles published since 2007.

Suggested Solution:

Type	**diet breast cancer** in the search box
Click	the **Limits** button
Select	Titles under "Search fields."
Type	**2007** 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

Exercise 2: 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 AND 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

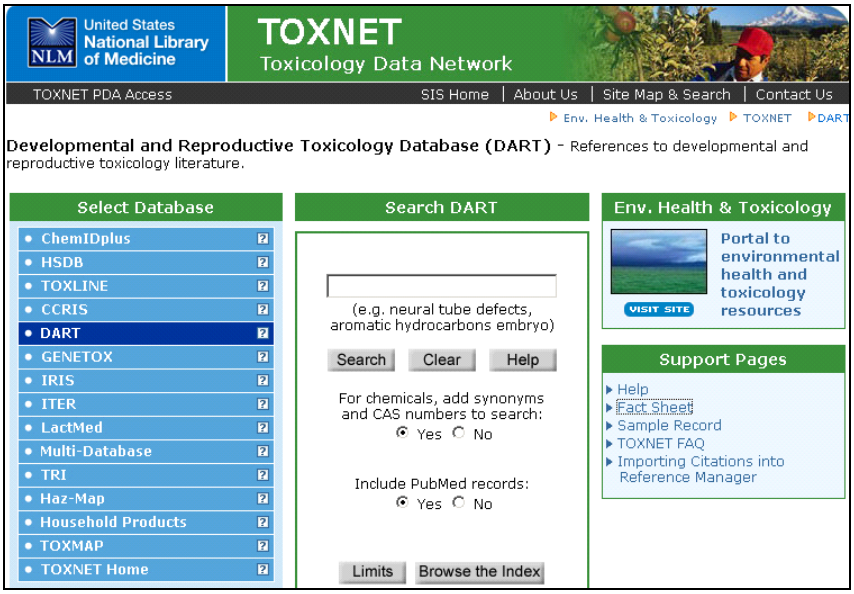
Exercise 3: Locate English citations on workers exposed to *caprolactam*

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

DART

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

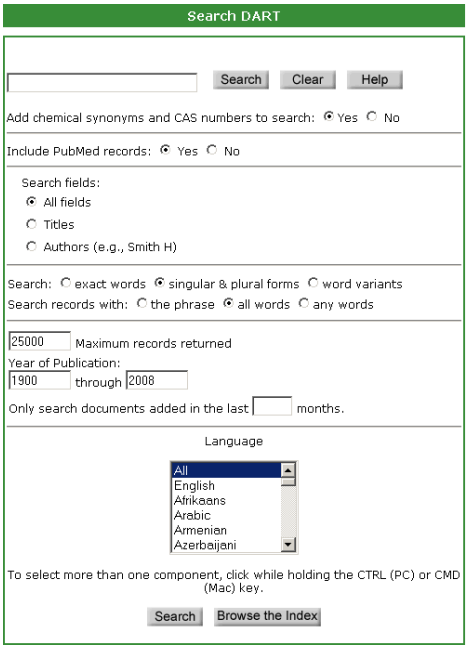


toxnet.nlm.nih.gov

DART has some of the same features as PubMed, including the following: MeSH searching; applying limits by field, publication type, age, gender, language, human or animal, etc.; MyNCBI to store and update search strategies; Related Records; LinkOut and Links to Books; and Interlibrary Loan (Loansome Doc).

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:

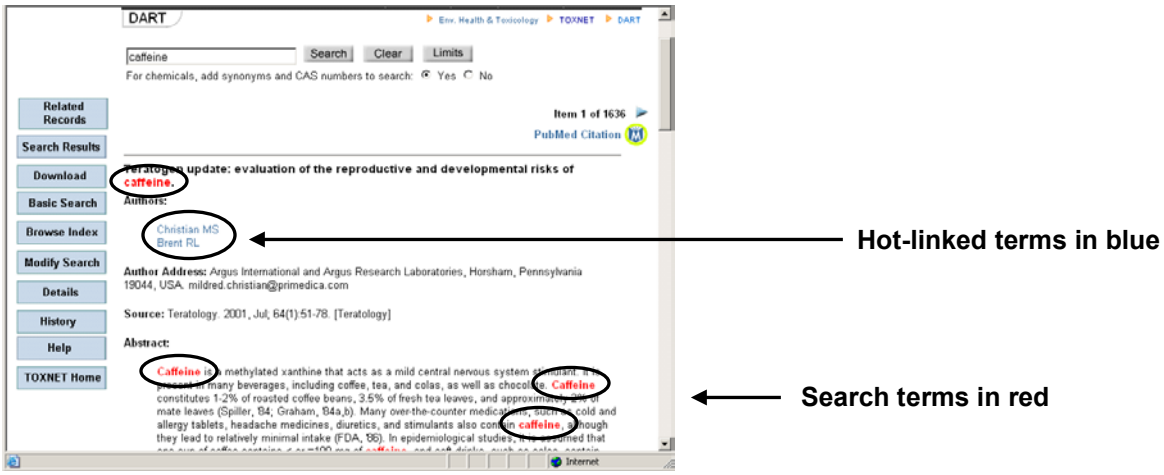
- Titles
- Authors
- Exact words or word variants
- Year of publication
- Documents added within a specified number of months
- Language

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

Search Results

Your initial retrieval is displayed as a list—in relevancy ranked order—of bibliographic references with the titles in blue. Each reference is followed by the mnemonic [in brackets] of the subfile from which the article was retrieved. References that come from MEDLINE/PubMed have TOXLINE [PubMed] following the bibliographic citation. They also have PubMed Citation in blue and a green and blue M-encircled icon. This icon is linked to the same citation as it appears in PubMed. Click this icon to go to PubMed where you can use any of the PubMed functions such as LinkOut and document ordering.

Selected Record Screen



This screen displays the complete record for the item you selected on the Results Screen. Your search terms are in red. Individual author names, MeSH headings, keywords, and CAS Registry Numbers are in blue and linked to related records in the database. Click an author link to find other articles by that author; Click a keyword to find other articles indexed with that keyword. Other information on the page 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 have the PubMed citation designation and the green-and-blue PubMed symbol ().

Additional Resources

For further information, we recommend these additional resources:

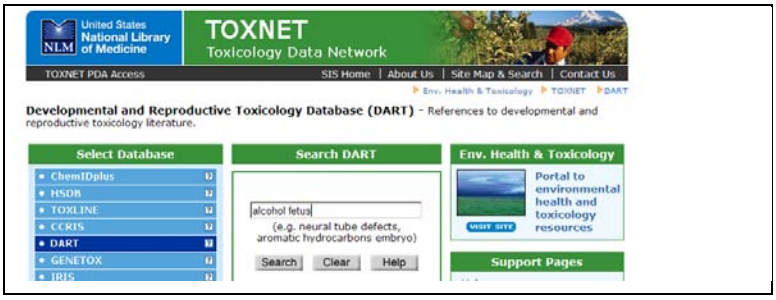
- DART Fact Sheet
  www.nlm.nih.gov/pubs/factsheets/dartfs.html
- PubMed
  pubmed.gov
- Importing citations into Reference Manager
  sis.nlm.nih.gov/enviro/captivate/toxlinespecialimports.htm

DART Search Exercises

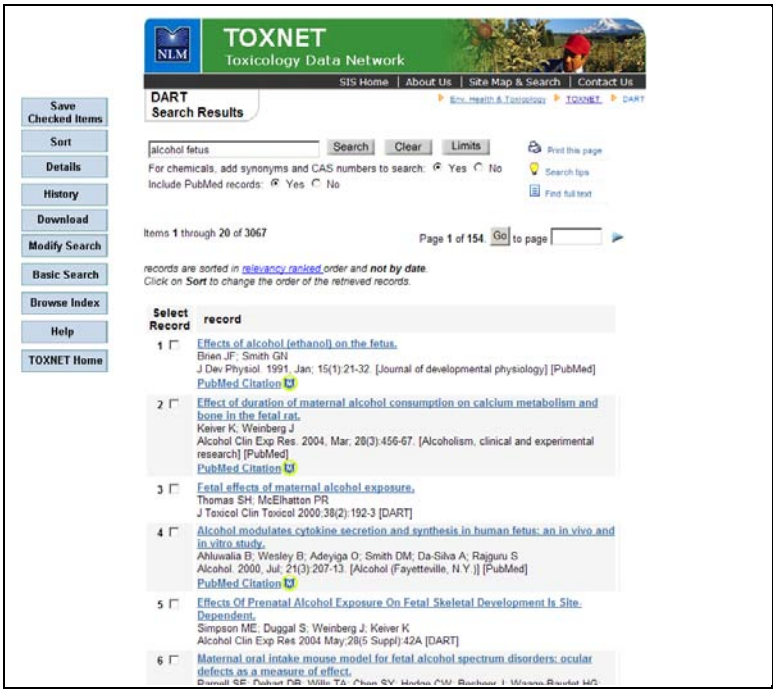
Search Example: Find information on the effects of alcohol on the fetus.

Suggested Solution:

- Go to toxnet.nlm.nih.gov
- Click **DART** in the **Select Database** column
- 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 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	**Sort**
Review	the citations
Click	the **Basic Search** button at the top of the page to prepare for the next session

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: Locate citations on the subject of eating fish while pregnant. Limit your search to English articles published in the years 2008-2010.

Suggested Solution:

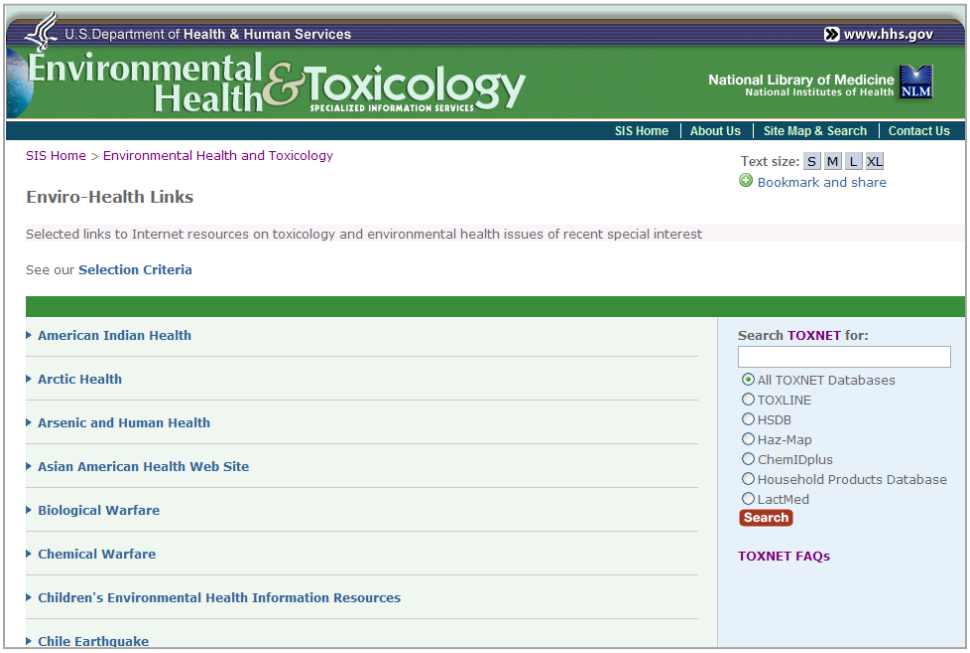
Type	**pregnancy fish consumption** in the search box
Click	the **Limits** button
Delete	1900 in the Year of Publication box and type 2008
Select	English in the Language menu
Click	the **Search** button
Review	the citation(s)
	The results will be in relevancy ranked order.
Click	The TOXNET Home button at the left of the page to prepare for a new session

6

More to Explore

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**.



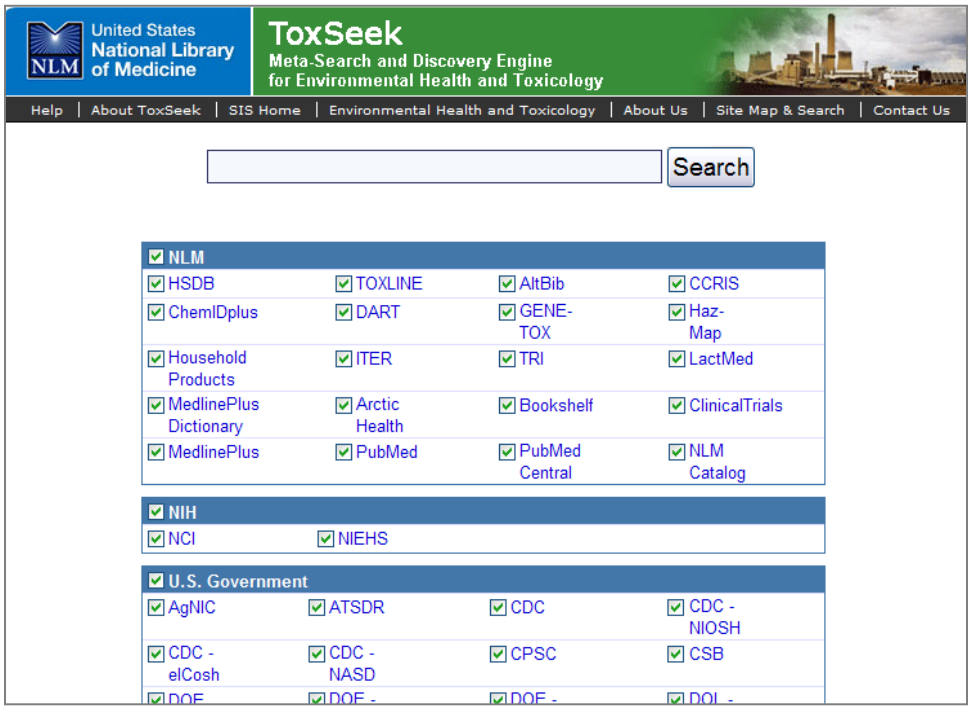
sis.nlm.nih.gov/enviro/envirohealthlinks.html

Links to information of special interest include:

- Arsenic and Human Health
- Biological Warfare
- California Wildfires
- Chemical Warfare
- Dietary Supplements
- Health Effects from the Collapse of the World Trade Center
- Environmental Justice Internet Guide
- Hurricanes: Links to Health Information
- 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

ToxSeek

ToxSeek® is a free meta-search engine developed by the Division of Specialized Information Services at the National Library of Medicine. ToxSeek enables users to search across diverse biomedical and environmental health resources and provides a method for efficiently locating information resources on topics related to toxicology and environmental health. ToxSeek uses natural language processing and artificial intelligence to retrieve, integrate, rank, and present search results as coherent and dynamic sets.



toxseek.nlm.nih.gov

ToxSeek allows users to search in a wide range of authoritative sources in these categories:

- **NLM TOXNET**—Databases on hazardous chemicals, toxic releases and environmental health from the National Library of Medicine (NLM)
- **Other NLM**—Additional selected resources from NLM, including PubMed
- **NIH**—Resources from other institutes of the National Institutes of Health (NIH)
- **U.S. Government**—Toxicology/environmental health information from other United States government agencies
- **International**—Other selected international resources, such as the World Health Organization (WHO)
- **Other Resources**—Other topic-specific information resources

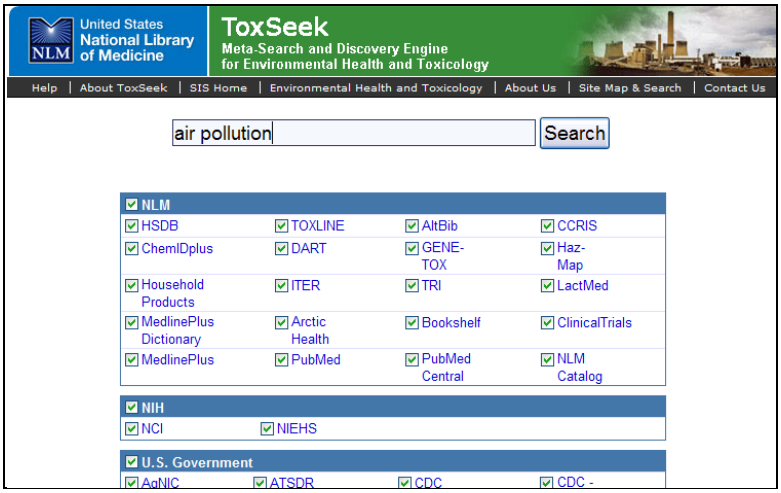
ToxSeek Search Exercise

Search Example: Locate information on hydrazine sulfate, an alternative treatment for cancer. Limit the search to TOXNET and other NLM resources. Review the HSDB records.

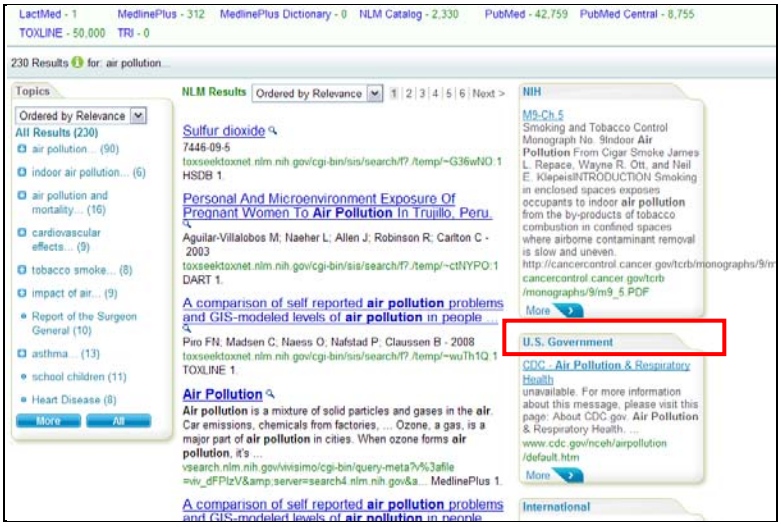
Suggested Solution:

- Go to toxseek.nlm.nih.gov
- Type **air pollution** in the search box

  By default all ToxSeek selected resources: NLM, NIH, U.S. Government, International, and Other Resources are selected
- Click the **Search** button

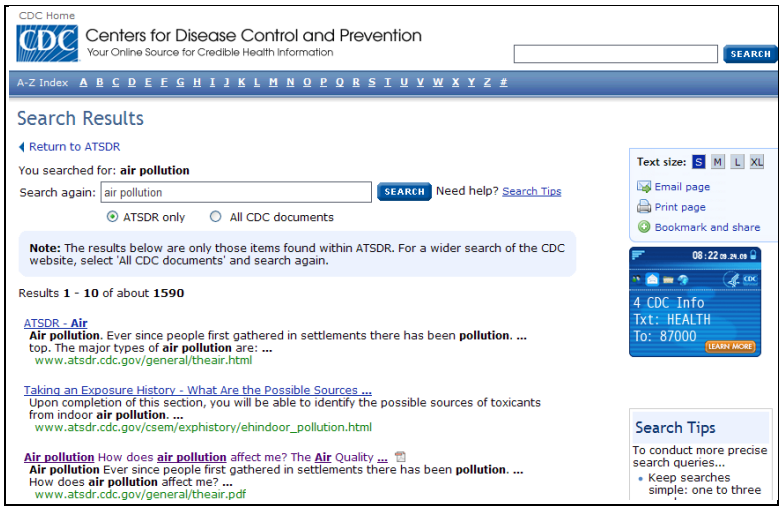


- Click U.S. Government



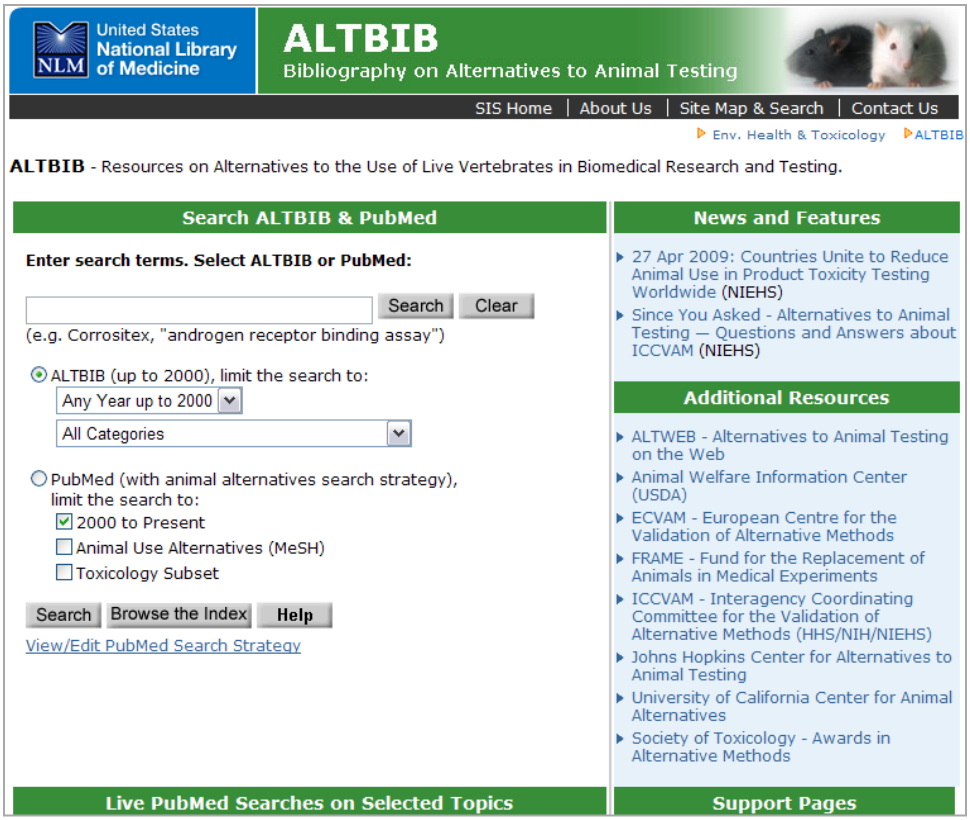
- Click ATSDR listed at the top of the page

- Review the records
- Close the pop-up window



ALTBIB

ALTBIB is a searchable bibliographic collection on alternatives to animal testing. It includes citations from published articles, books, book chapters, and technical reports from 1980 to 2000. Citations were selected manually after searching various National Library of Medicine (NLM) bibliographic databases. The bibliography features citations concerning methods, tests, assays, and procedures that may prove useful in establishing alternatives to the use of intact vertebrates. ALTBIB has not been updated since 2001 because new features were added to PubMed®/MEDLINE® to assist users in searching and retrieving directly from the file. Search strategies for some animal alternatives have been developed and incorporated in the ALTBIB search interface.



toxnet.nlm.nih.gov/altbib.html

Searching HSDB

Search ALTBIB (1980 to 2000) by term or by one of these 15 categories:

- General
- Carcinogenesis
- Cytotoxicity
- Dermal Toxicity

- Ecotoxicity
- Genotoxicity
- Hepatic and Renal Toxicity
- Immunotoxicity and immunology
- Neurotoxicity
- Ocular Toxicity
- Pharmacokinetic and Mechanistic Studies
- Pulmonary Toxicity
- Quantitative Structure Activity Relationships
- Reproductive and Developmental Toxicity
- Animal Welfare

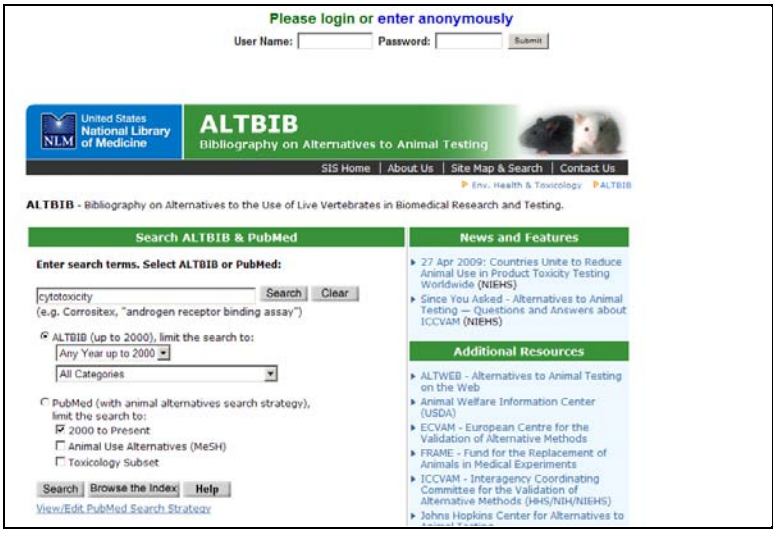
You can also search MEDLINE/PubMed from the ALTBIB page by selecting “PubMed (with animal alternative search strategy). The search can be limited by date (**2000 to Present**), **Animal Use Alternatives (MeSH)**, and **Toxicology Subset**. Search strategies incorporated in the ALTBIB search interface can be seen by clicking on the **Details** tab on the PubMed search results page.

ALTBIB Search Exercises

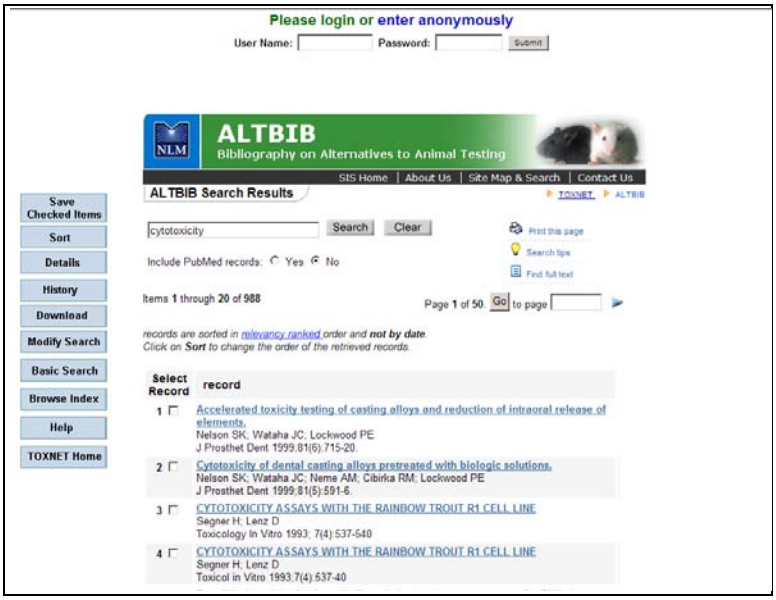
Search Example: Find bibliographic articles that emphasize alternative uses for cytotoxicity research.

Suggested Solution:

- Go to sis.nlm.nih.gov/enviro.html
- Click "ALTBIB" under **Other Professional Resources**
- Type **cytotoxicity** in the search box
- Click the **Search** button



- Review a record of your choice
- Click the **Basic Search** button at the left of the page to prepare for the next search



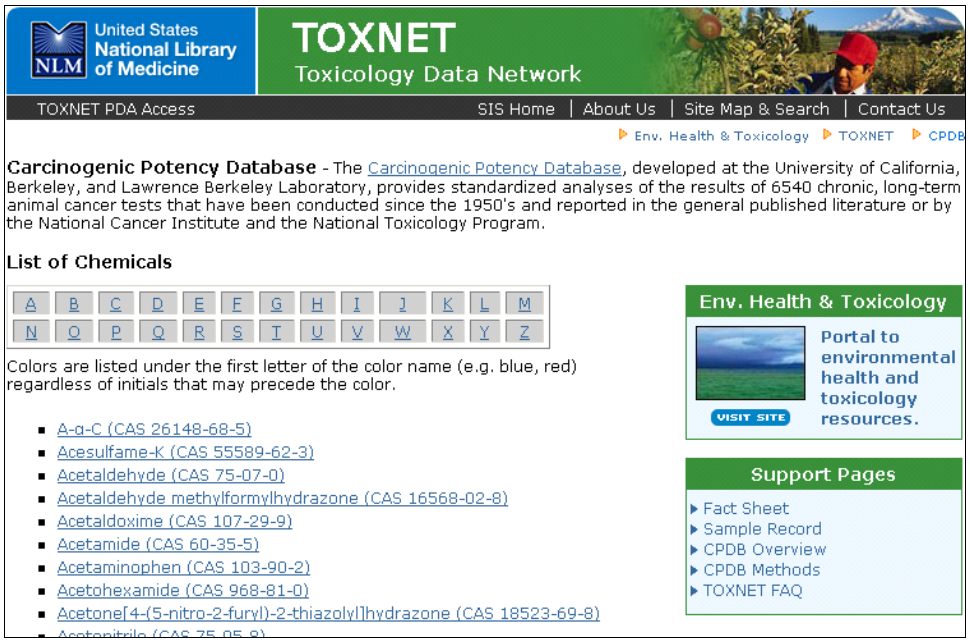
Exercise 1: Using the limit feature, locate an article on genotoxicity and mutagenesis dated 1998-2000.

Suggested Solution:

Type	**genotoxicity AND mutagenesis** in the search box
Select	**1998-2000** from the year pull-down menu under ALTBIB
Click	the **Search** button
Review	a record of your choice
Click	the **TOXNET Home** button to the left of the page to prepare for the next session

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.



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.

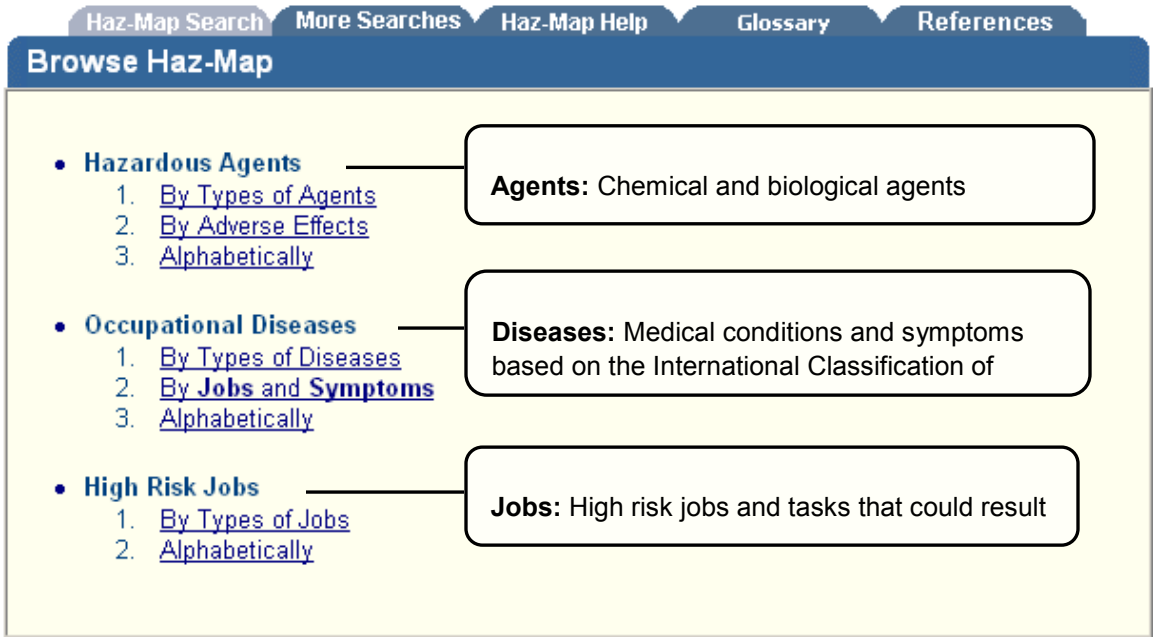
Additional Resource

For further information, we recommend this additional resource:

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

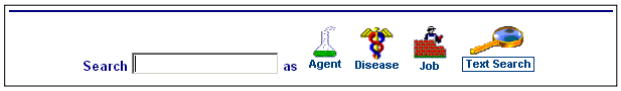
Haz-Map

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 3,200 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.



hazmap.nlm.nih.gov

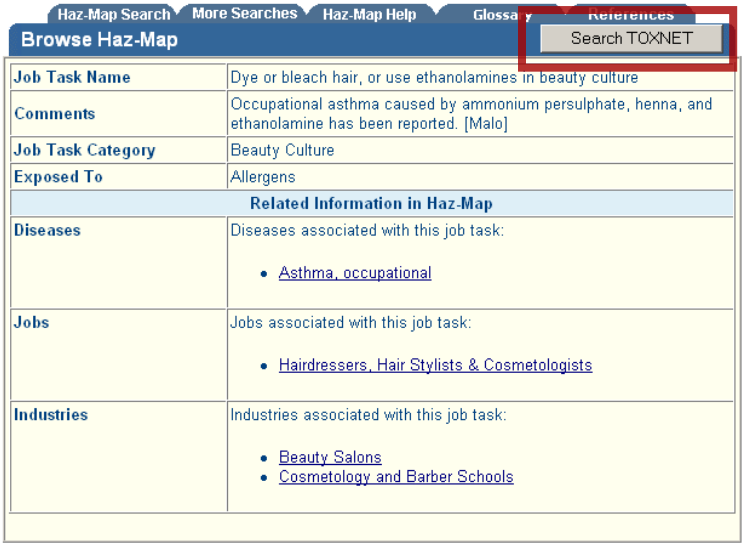
Searching Haz-Map



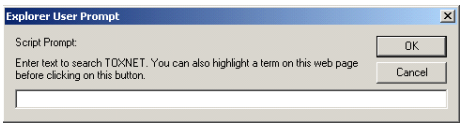
You can search Haz-Map by keyword, agent, disease, or job from almost any page of the site. Simply enter your query in the search box and click the appropriate button (**Agent**, **Disease**, **Job**, or **Text Search**) to the right of "as." You can also browse alphabetically in each category or by 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.



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



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

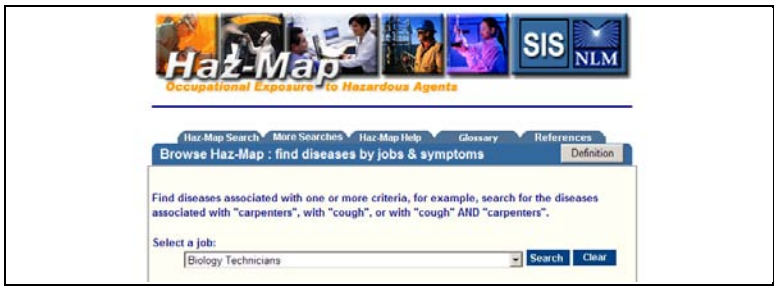
Haz-Map Search Exercises

Search Example: What are some of the occupational diseases associated with working as a biology technician?

Suggested Solution:

- Go to hazmap.nlm.nih.gov
- Click **By Jobs and Symptoms** under **Occupational Diseases**

- Select **biology technicians** from the **"Select a job"** pull-down menu
- Click the **Search** button



- Review the results
- Click the **Haz-Map Search** tab to conduct a new search

Exercise 1: What are some high risk tasks associated with chemical technicians?

Suggested Solution:

Click	Alphabetically under **High Risk Jobs**
Click	C
Click	Chemical Technicians
Click	the high risk job task of your choice
Review	the information
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 lung cancer? Perform a text search.

Suggested Solution:

Type	**lung cancer** in the search box
Click	**Text Search** to the right of the search box
	Results are sorted in relevancy ranked order.
Scroll	down the page and view the list of records under each category
	The categories are Agents, Diseases, Jobs, Findings, Activities, Job Tasks and Processes.
Click	the record of your choice under list of **Agents**
Review	the results
Click	the browser's **Back** button to return to the Search Results Page
	Repeats steps above to view lists of diseases and jobs.

Exercise 3: How can I find information on hazardous agents used in painting?

Suggested Solution:

Click	the **More Searches** tab
Click	By Types of Processes (under **Processes**)
Click	Paint
Click	Painting (Solvents)
Review	the record

Household Products Database

Household Products Database contains links for over 9,000 consumer brands of household products to health effects from Material Safety Data Sheets (MSDS) provided by the manufacturers.

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
  www.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)
  www.epa.gov/oppt/labeling/pubs/campaign.htm

- Household Hazardous Waste (EPA)
  www.epa.gov/epawaste/conserve/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

Search Example: What household products are associated with asthma?

Suggested Solution:

- Go to hpd.nlm.nih.gov
- Click the **Health Effects** tab

- Type **asthma** in the search box
- Click the **Search** button

- Click a product of your choice and review the information under **Health Effects**
- Click the **Home** tab at the top of the page to prepare for the next search

Exercise 1: How do I do a quick search to find information on herbicides?

Suggested Solution:

Type	**herbicide** in the search box
Click	the **Go** button
Review	record(s) of your choice
Click	the **Home** tab to prepare for the next search

Exercise 2: What home maintenance products contain *calcium sulfate*?

Suggested Solution:

Click	the **Ingredients** tab
Click	C
Click	calcium sulfate
Click	the brand name of your choice and review the record
Click	the **Home** tab to prepare for the next search

Exercise 3: How can I find information about specific brands of antibacterial hand soap, including their manufacturing information, ingredients, and health effects?

Suggested Solution:

Click	the **Personal Care** category
Click	Soap
Click	Antibacterial in the **Type** column
Click	a **Product Name** of your choice
Review	the information

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7

Additional Resources

Selected Resources in Environmental Health and Toxicology

Biostatistics and Epidemiology

Bureau of Labor Statistics (BLS) ..... stats.bls.gov
CDC Wonder ..... wonder.cdc.gov
Centers for Disease Control and Prevention (CDC) ..... cdc.gov
Comprehensive Epidemiologic Data Resource (CEDR) ..... https://www.orau.gov/cedr
Morbidity and Mortality Weekly Report (MMWR) ..... cdc.gov/mmwr/mmwr.html
National Center for Health Statistics (NCHS) ..... cdc.gov/nchs
World Health Organization (WHO) ..... who.int

Bioterrorism and Disaster Medicine

Institute for Biosecurity ..... bioterrorism.slu.edu
Radiation Emergency Medical Management (REMM) ..... remm.nlm.gov

Consumer Information

American Lung Association (ALA) ..... lungusa.org
Environmental Health Clearinghouse ..... infoventures.com
Federal Citizen Information Center (FCIC) ..... pueblo.gsa.gov
U.S. Consumer Product Safety Commission (CPSC) ..... cpsc.gov

Environmental Health

American Lung Association (ALA) ..... lungusa.org
American Public Health Association (APHA) ..... apha.org
American Public Works Association (APWA) ..... apwa.net
Comprehensive Epidemiologic Data Resource (CEDR) ..... https://www.orau.gov/cedr
Duke Occupational & Environmental Medicine ..... dukeoccmed.mc.duke.edu
Enviro-Net (Southeast U.S.) ..... enviro-net.com
Environmental Fate Databases & more (from Syracuse Research Corporation) ..... syrres.com/Esc/efdb.htm
Environmental Health Clearinghouse ..... infoventures.com
Environmental Protection Agency (EPA) ..... epa.gov
Environmental Protection Magazine Online ..... eponline.com

Free Full Text Health Science/Medical Journals (from the National Library of Medicine) sis.nlm.nih.gov/pdf/FreeFullTextListApril07.pdf

International Agency for Research on Cancer (IARC) ..... iarc.fr

National Center for Environmental Health (NCEH) ..... cdc.gov/nceh

National Environmental Data Index (NEDI) ..... nedi.gov

National Institute of Environmental Health Sciences (NIEHS) ..... niehs.nih.gov

NIH RePORTER (Research Portfolio online Reporting Tools) .. projectreporter.nih.gov/reporter.cfm

Office of Environmental Management (EM) ..... em.doe.gov

Organisation for Economic Co-operation and Development's (OECD's) Work on Environment, Health and Safety ..... oecd.org/ehs

Specialized Information Services (SIS), National Library of Medicine (NLM) ..... sis.nlm.nih.gov

United Nations Environment Programme (UNEP) ..... unep.org

Water Resources of the United States ..... water.usgs.gov

World Health Organization (WHO) ..... who.int

General Information

FedWorld (Federal government information locator from the National Technical Information Service [NTIS]) ..... fedworld.gov

The National Academies ..... nas.edu

National Agricultural Library (NAL) ..... nalusda.gov

National Institutes of Health (NIH) ..... nih.gov

National Library of Medicine (NLM) ..... nlm.nih.gov

U.S. Department of Energy (DOE) ..... energy.gov

U.S. Department of Health & Human Services (DHHS) ..... dhhs.gov

U.S. Department of Labor (DOL) ..... dol.gov

U.S. Department of Transportation (DOT) ..... dot.gov

World Health Organization (WHO) ..... who.int

Genetic Information

Genetics Home Reference ..... ghr.nlm.nih.gov

Human Genome Resources ..... ncbi.nlm.nih.gov/projects/genome/guide/human/

National Human Genome Research Institute genome.gov/11510197

Office of Rare Diseases (NIH) ..... rarediseases.info.nih.gov

Occupational Health and Safety

American Industrial Hygiene Association (AIHA) ..... aiha.org

Bureau of Labor Statistics (BLS) ..... stats.bls.gov

Canadian Centre for Occupational Health and Safety (CCOHS) ..... ccohs.ca

Duke Occupational & Environmental Medicine ..... dukeoccmed.mc.duke.edu

Finnish Institute of Occupational Health (FIOH) ..... ttl.fi/en

Health and Safety Executive (HSE) ..... hse.gov.uk

Injury Control Resource Information Network (ICRIN) ..... injurycontrol.com/icrin

International Occupational Safety and Health Information Centre (CIS) ..... ilo.org/public/english/protection/safework/cis/

International Programme for Chemical Safety (IPCS) INCHEM ..... inchem.org

Laboratory Chemical Safety Summaries (LCSS) ..... hhmi.org

Mine Safety and Health Administration (MSHA) ..... msha.gov

National Agricultural Library (NAL) ..... nalusda.gov

National Institute for Occupational Safety and Health (NIOSH) ..... cdc.gov/niosh

Occupational Safety and Health Administration (OSHA) ..... osha.gov

OshWeb (Occupational Safety & Health) ..... oshweb.com

Vermont Safety Information Resources, Inc. (SIRI) ..... hazard.com

Where to find Material Safety Data Sheets on the Internet ..... ilpi.com/msds

Research

International Agency for Research on Cancer (IARC) ..... iarc.fr

Laboratory Chemical Safety Summaries (LCSS) ..... hhmi.org

National Center for Toxicological Research (NCTR) ..... fda.gov/AboutFDA/CentersOffices/nctr/default.htm

National Institute of Environmental Health Sciences (NIEHS) ..... niehs.nih.gov

National Institutes of Health (NIH) ..... nih.gov

National Toxicology Program (NTP) ..... ntp-server.niehs.nih.gov

NIH RePORTER (Research Portfolio online Reporting Tools) ... projectreporter.nih.gov/reporter.cfm

Office of Human Radiation Experiments ..... hss.energy.gov/healthsafety/ohre/

Human Subjects Protection Program (Department of Energy) ..... humansubjects.energy.gov/

Standards

International Organization for Standardization (ISO) ..... iso.ch

National Standards System Network (NSSN) ..... nssn.org

Toxicology

Agency for Toxic Substances and Disease Registry (ATSDR) ..... atsdr.cdc.gov

Canadian Poisonous Plants Information System ..... cbif.gc.ca/pls/pp/poison

Carcinogenic Potency Project (CPDB) ..... potency.berkeley.edu/cpdb.html

Center for Food Safety and Applied Nutrition (CFSAN) ..... cfsan.fda.gov

Chemfinder ..... chembiofinder.cambridgesoft.com

Comprehensive Epidemiologic Data Resource (CEDR) ..... https://www.orau.gov/cedr

Food and Drug Administration (FDA) ..... fda.gov

Human Subjects Protection Program (Department of Energy) ..... humansubjects.energy.gov/

Injury Control Resource Information Network (ICRIN) ..... injurycontrol.com/icrin

International Agency for Research on Cancer (IARC) ..... iarc.fr

Laboratory Chemical Safety Summaries (LCSS) ..... hhmi.org

National Center for Toxicological Research (NCTR) ..... fda.gov/AboutFDA/CentersOffices/nctr/default.htm

National Toxicology Program (NTP) ..... ntp-server.niehs.nih.gov

NIH RePORTER (Research Portfolio online Reporting Tools) .. projectreporter.nih.gov/reporter.cfm

Office of Human Radiation Experiments ..... hss.energy.gov/healthsafety/ohre/

Organisation for Economic Co-operation and Development's (OECD's) Work on Environment, Health and Safety ..... oecd.org/ehs

Pesticide Action Network Pesticide Database (PAN) ..... pesticideinfo.org

Specialized Information Services (SIS), National Library of Medicine (NLM) ..... sis.nlm.nih.gov

United Nations Environment Programme (UNEP) ..... unep.org

U.S. Department of Transportation (DOT) ..... dot.gov

Vermont Safety Information Resources, Inc. (SIRI) ..... hazard.com

Selected Commercial Web Sites and Databases on Environmental Health and Toxicology-Related Information

Ariel WebInsight—3ecompany.com/products-services/decision-support-tools/ariel-webinsight/

A subscription–based online chemical regulatory compliance reference tool with an easy–to–use interface with robust search, query, reporting and analysis features. Ariel WebInsight provides access to current, accurate, comprehensive global regulatory data. Available on the 3E Online® platform. Ariel Research Corporation is now a part of the 3E Company. (http://www.3ecompany.com)

BIOSIS Previews—scientific.thomson.com/products/bp

Provided by Thomson Scientific, BIOSIS Previews is a comprehensive reference tool for finding life sciences references worldwide. Includes abstracts and indexes on information from more than 5,500 sources around the world.

Chemical Abstracts Service (CAS)—cas.org or http://stnweb.cas.org

The CAS, a division of the American Chemical Society, provides scientists online and Web access to chemistry-related research data. The **CAS Registry** is the largest and most current database of chemical substance information in the world. The Registry covers substances identified from the scientific literature from 1957 to the present, with additional substances going back to the early 1900s, and it now contains records for organic and inorganic substances and sequences.

CCINFOweb—ccinfoweb.ccohs.ca

The Canadian Centre for Occupational Health and Safety's Web Information Service provides one-step searching across all of their database collections. The service requires an annual subscription. However, additional resources on the site are free including IPCS INCHEM (publications on chemicals from United Nations agencies) and CHEMINDEX (access to various chemical names for a particular substance).

CIS Bibliographic Database (COSDOC/CISILO)—
ilo.org/public/english/protection/safework/cis/products/cisdoc.htm

From the International Labour Office, the CIS bibliographic database contains citations of documents that deal with occupational accidents and diseases as well as ways of preventing them. The types of documents are: laws and regulations, chemical safety data sheets, training material, articles from periodical publications, books and standards. Every record contains a detailed bibliographic description, a full abstract and indexing descriptors drawn from the CIS Thesaurus. The CISDOC database is updated on a continuous basis. Also searchable as a subfile in TOXLINE (http://toxnet.nlm.nih.gov).

EMBASE.com—embase.com

Provides users with content including the latest scientific developments in biomedical and pharmacological information. From Elsevier.

Dialog®—dialog.com

Content areas include government regulations, social sciences, food and agriculture, energy and environment, chemicals, pharmaceuticals, and medicine. See the Dialog Bluesheets for guides on every database in the Dialog service. Enviroline® specifically covers environmental information. (http://library.dialog.com/bluesheets/html/bl0040.html)

MICROMEDEX—micromedex.com

MICROMEDEX databases provide access to health care information; information on health, safety and environment in the corporate world; USP DI® updates; and P&T QUIK® reports.

ScienceDirect®—sciencedirect.com

ScienceDirect contains over 25% of the world's science, technology and medicine full text and bibliographic information with a journal collection of over 2,500 titles.

Cambridge Scientific Abstracts (CSA)—csa.com

CSA is a worldwide information company specializing in publishing and distributing—in print and electronically—bibliographic and full-text journals in the areas of natural sciences, social sciences, arts & humanities, and technology. The databases are searchable via CSA Illumina. Also offers Ulrich's Serials Analysis System.

Thomson Scientific—isinet.com

Formerly know as Thomson ISI. Their Web of Science® product provides access to current and retrospective multidisciplinary information from approximately 8,700 prestigious, high impact research journals from across the world and offers cited reference searching.

Environment Abstracts – CIS—lexisnexis.com

LexisNexis® is a leading provider of information and services solutions, including its flagship Web-based Lexis® and Nexis® research services, to a wide range of professionals in the legal, risk management, corporate, government, law enforcement, accounting and academic market**.**

Selected World Wide Web Resources Search Exercises

1. **Environmental Protection Agency (EPA)**

   epa.gov

   Explore the EPA's Web Site, particularly the **Databases and Software** section on the **Science and Technology** page (see link on top of page). Locate the following:
   - IRIS
   - ECOTOX
   - Toxics Release Inventory
   - Safe Drinking Water Information System

   Use the Advanced Search function to find documents with titles containing *radon*.

2. **Food and Drug Administration (FDA)**

   fda.gov

   Find recall information on products manufactured by Robert's American Gourmet.

3. **National Toxicology Program (NTP)**

   ntp-server.niehs.nih.gov/

   Is *Thorium Dioxide* on the list **Known to be Human Carcinogens** in the NTP's **Report of Carcinogens**?

4. **Agency for Toxic Substances and Disease Registry (ATSDR)**

   atsdr.cdc.gov

   Find the ATSDR's **TOXFAQ** profile on *iodine*.

5. **National Council for Science and the Environment (NCSE)**

   ncseonline.org

   Find recent Congressional Research Service reports on pesticides. Look in the **Earth Portal** section.

6. **Society of Toxicology (SOT)**

   toxicology.org

   Does Oregon State University offer a doctorate program in toxicology? Look in the SOT's *Resource Guide to Careers in Toxicology*.

7. ChemFinder

chemfinder.com

Explore the variety of data sources containing information on nitrous oxide.

8. Society of Environmental Toxicology and Chemistry (SETAC)

setac.org

Where and on what dates will the SETAC Europe 21st Annual Meeting be held?

9. Scorecard (from Environmental Defense)

scorecard.org

Which countries have the greatest number of high risk of lead toxics/lead hazards? Housing Units in the U.S.?

10. BIOLOG (from Syracuse Research Corporation's Environmental Fate Databases)

syrres.com/esc/efdb.htm

Use the BIOLOG file (one of Syracuse Research Corporation's Environmental Fate Data Bases –EFDB) to find references on p*etroleum* in soil.

Environmental Health & Toxicology Portal Decision Tree

The National Library of Medicine **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
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
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
Online tutorials on basic toxicology principles and concepts	Toxicology Tutorials
Interactive children's learning site about household chemical hazards	ToxMystery

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

Online Resources	
Online Training Manuals	www.nlm.nih.gov/pubs/web_based.htm (ClinicalTrials.gov, NLM Gateway, PubMed, TOXNET)
Tutorials	www.nlm.nih.gov/bsd/disted/pubmedtutorial/ (PubMed)
Fact Sheets	www.nlm.nih.gov/pubs/factsheets/factsheets.html
Frequently Asked Questions	www.nlm.nih.gov/services/faq.html
See also Help and FAQ links on each database home page.	

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