

NATIONAL INSTITUTES OF HEALTH

NATIONAL LIBRARY OF MEDICINE

Division of Specialized Information Services

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The Toxicology Information Program, now known as the Toxicology and Environmental Health Information Program (TEHIP), was established at NLM more than 30 years ago as the Division of Specialized Information Services (SIS). Over the years TEHIP's evolution has kept pace with the increasing need for toxicological and environmental health information by taking advantage of new computer and communication technologies. Such mechanisms have enabled us to provide more rapid access to a wider audience. Our development of novel search capabilities means that users need not have extensive search knowledge and thus allows data to be relayed to them more efficiently. Finally, we are moving beyond the bounds of the physical Library, exploring ways to point and link users to relevant sources of toxicological and environmental health information wherever these sources may reside. This is being accomplished primarily through the TEHIP and AIDS web sites developed and maintained by SIS. Currently, refinements and additions are being made to allow easy access to a range of information collected by this Division. Most significantly, we took the first steps in making all our toxicology data free over the Internet. Access to NLM's AIDS/HIV information resources is already free.

In FY 1998 SIS reexamined the scope and coverage of its current programs, proposed new opportunities to enhance information services, and investigated emerging areas, including the application of new multimedia technology in the delivery of information services. This examination was initiated using the mechanism of an Institute of Medicine (IOM) evaluation of the TEHIP Program, and a report from this study, *Toxicology and Environmental Health Information resources: The Role of the National Library of Medicine*, was released in the spring of 1997. Another IOM committee was convened in FY 1998 to prepare a follow-on report on Internet access to the toxicology-related resources of NLM.

Resource Building

The wide range of resources related to toxicology and environmental health information and AIDS/HIV information include many databases that are created or acquired as well as other services and projects.

The **Hazardous Substances Data Bank (HSDB)** continues to be a highly used resource, averaging over 6,000 searches each month. Increased emphasis was placed on providing more data on human toxicology and clinical medicine within HSDB, in keeping with earlier recommendations of the Board of Regents Subcommittee on TEHIP. Changes to the composition of the Scientific Review Panel (SRP) were made to accommodate the shift in content emphasis. Newer sources of relevant data are being examined for incorporation into new and existing data fields within the current 4,533 HSDB records. Because of increased staff efforts, more records are being processed through special enhancements, including source updates from various peer-reviewed files. These enhancements are being made possible by a customized Windows-based PC workstation with enhanced file-building features.

CHEMID (Chemical Identification File) is an NLM online chemical dictionary containing over 344,000 records, primarily describing chemicals of biomedical and regulatory importance. It also contains an important set of regulatory data, collectively known as Supersets. Over 13,000 records are augmented with the name and an indication of source for chemicals mentioned in one or more of 31 lists, e.g., the Department of Transportation Hazardous Materials List, and the Priority List of the Agency for Toxic Substances and Disease Registry (ATSDR). These data allow users to determine if a chemical is mentioned on a given list and under what name, as well as to search for chemical classes on these lists. During FY 1998, an extensive quality control effort was made on data in this file and new nomenclature data was added to enrich the file content.

CHEMLINE (Chemical Dictionary Online) an online chemical dictionary and directory file that was primarily supplied by the Chemical Abstracts Service (CAS) and required extensive royalty payments was dropped as an NLM database in January 1998 as part of the move to provide free access to all NLM databases.

TOXLINE (Toxicology Information Online) is an NLM online bibliographic retrieval service produced by merging “toxicology” subsets from some eighteen secondary sources. TOXLINE and its backfile, **TOXLINE65**, contain data from sources that do not require royalty charges based on usage. Additional information from the Chemical Abstracts Service requiring usage royalties was contained in two separate online bibliographic files, **TOXLIT** and **TOXLIT65**, which were discontinued in January 1998 as part of the move towards free access to NLM databases. At the end of FY 1998 TOXLINE and its backfile contained over two and one half millions citations.

This decision to no longer carry the TOXLIT files and the move to free access has prompted us to explore alternative ways to acquire and build and organize toxicology bibliographic information.

DIRLINE (Directory of Information Resources Online) is NLM’s online directory of resources including organizations, databases, bulletin boards, as well as projects and programs with special biomedical subject focus. These resources provide information to users that may not be available from one of the other NLM bibliographic or factual databases.

The availability of DIRLINE via the Internet through NLM’s Locator and on the web continues to result in a high level of use of the database and a higher level of recognition of its utility by biomedical librarians, health professionals, and the public. Increased funding for database maintenance has made it possible to improve the quality and timeliness of the content of the database and improve collaboration with other subfile producers. An online version of *Health Hotlines*, NLM’s popular publication listing toll-free telephone numbers for health-related sources, is now available on the Web.

The **Toxic Chemical Release Inventory (TRI)** series of files now includes 10 online files, TRI87 through TRI96. These files remain an important resource for environmental release data and continue to attract new users. Mandated by the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986), these EPA-sponsored databases contain data on environmental release data to air, water, and soil for over 600 EPA-specified chemicals. The TRI95 file, released in May 1997, included over 300 additional chemicals, as well as required submissions from federal facilities and military installations.

TRIFACTS, a companion file to the TRI series, supplies users with information related to health and ecological effects and the safety and handling of the initial TRI chemicals. These records are supplied by EPA, who in FY98 continued to also fund the management and maintenance of the TRI files on TOXNET.

The **Chemical Carcinogenesis Research Information System (CCRIS)** continues to be built, maintained, and made publicly accessible by NLM. This data bank is supported by the National Cancer Institute (NCI) and has grown to 7,786 records. The chemical-specific data covers the areas of carcinogenesis, mutagenesis, tumor promotion and tumor inhibition.

The **Integrated Risk Information System (IRIS)**, EPA’s official health risk assessment file, continues to experience high usage and be very popular with the user community. EPA has had a version of IRIS on the Agency’s web page since 1996, and as we move to web access we will consider how best to integrate our web service with what EPA provides. IRIS now contains 535 chemicals.

The **GENE-TOX** file continues to be built and updated directly on TOXNET by EPA scientific staff. This file contains peer-reviewed genetic toxicology (mutagenicity) studies for about 3,200 chemicals. GENE-TOX receives a high level of interest among users in other countries.

The **Registry of Toxic Effects of Chemical Substances (RTECS)** is a data bank based upon a National Institute of Occupational Safety and Health (NIOSH) file by the same name which NLM has restructured and made available for online searching. SIS continues to add new data to this file as NIOSH makes them available. Now that NIOSH no longer prints the full RTECS, online access via NLM to this widely used resource including over 142,000 chemical records has become even more important.

The **Developmental and Reproductive Toxicology** (DART) database now contains over 34,000 citations from literature published since 1989 on agents that may cause birth defects. Records from DART are also added to TOXLINE on a quarterly basis. DART is a continuation of the Environmental Teratology Information Center backfile (ETICBACK) database, which contains almost 50,000 citations to literature published from 1950-1989. ETICBACK citations are also found in TOXLINE. DART is funded by NLM, the Environmental Protection Agency, the National Institute of Environmental Health Sciences and the FDA's National Center for Toxicological Research and is managed by NLM.

The **Environmental Mutagen Information Center** (EMIC) database contains over 20,000 citations to literature on agents that have been tested for genotoxic activity. A backfile for EMIC (EMICBACK) contains over 75,000 citations to the literature published from 1950 to 1991. Records from EMICBACK are included in TOXLINE. Plans are under way to add the records from the new EMIC database to TOXLINE as well. EMIC is funded by the Environmental Protection Agency and the National Institute of Environmental Health Sciences and managed by NLM.

Resource Access

The SIS web server provides a central point of access for the varied programs, activities, and services of the Division. Through this server (<http://sis.nlm.nih.gov>) users can access interactive retrieval services in toxicology and environmental health or AIDS/HIV information, find program descriptions and documentation, or be connected to outside related resources.

Toxicology Data Network (TOXNET)

The **Toxicology Data Network (TOXNET)**, NLM's computer system providing access to the majority of its toxicology files, has moved from a networked microprocessor environment to a UNIX-based platform (Solaris Version 2.6) on a SUN Enterprise 3000 computer. Concurrent with this transition to improved hardware and software was the announcement that TOXNET access would be free of charge via an easy-to-use World Wide Web interface (<http://toxnet.nlm.nih.gov>). The files have been logically organized for searching into three groups: toxicology data, toxicology literature, and toxic releases. Many options are available for searching and displaying results, which can also be e-mailed or FTP'd to users. In addition, TOXNET's web interface includes links to PubMed and Internet Grateful Med, the latter now offering free access to TOXLINE and ChemID. Work is proceeding on further refining and enhancing the interface through a more intuitive search engine, ranked relevancy listings, improved navigational features, and cross-file capabilities. Consideration is also being given to consolidating access to TOXLINE and ChemID into the TOXNET system.

Internet Grateful Med (IGM)

Near the end of FY 1998 access to TOXLINE and ChemID was added to **IGM**, where access to DIRLINE, the AIDS/HIV databases, MEDLINE, and many other NLM databases was already being provided. This route of access (<http://igm.nlm.nih.gov>) is free to all users.

Chemical Structure Server

The Chemical Structure Server has evolved from a mechanism to provide structure searching for chemicals covered by SIS databases to a system for integrating chemical dictionary record building and structure searching. This system uses special molecular searching programs and includes a prototype database for construction of ChemID records. It is expected to evolve into the primary chemical dictionary for users of the SIS databases.

AIDS Information Services

The recommendations from the 1993 NIH HIV/AIDS Information Services Conference remain the guide for NLM's HIV/AIDS information programs and services. In 1996 NLM initiated a World Wide Web homepage for AIDS (<http://sis.nlm.nih.gov/aids/>). This distribution mechanism has enhanced NLM's ability to get important information to the people who need it. In addition to links with NLM's online databases, fact sheets and publications, links to other NIH components are available as part of an

new online version of the *Guide to NIH HIV/AIDS Information Services*. New databases of abstracts presented at important AIDS conferences have also been made available through this mechanism prior to their addition to AIDSLINE.

Two collaborative projects with other PHS agencies, the AIDS Clinical Trials Information Service (ACTIS) and the HIV/AIDS Treatment Information Service (ATIS) continue to be very successful. Many other information providers are downloading data from AIDSTRIALS and AIDSDRUGS and adding it to their services. A number of World Wide Web sites are providing the data to their users in a number of formats and the data have also been distributed internationally through this mechanism. In addition, in 1997 AIDSTRIALS and AIDSDRUGS became available for searching via Internet Grateful Med and via a Web interface at ACTIS.

NLM initiated a fifth round of AIDS Outreach Purchase Orders in FY 1998 and made awards to 19 community-based organizations and libraries. Seven previously funded projects that had shown evidence of success received funding to continue or expand their activities.

NLM has continued to work with the Health Information Center at the Wheaton Regional Library (Md.) to complete the collaborative project in AIDS and toxicology information. Outreach was expanded through satellite centers at three other regional libraries. Wheaton Library staff developed and conducted training for the public in the use of the World Wide Web for information retrieval. Training and outreach to the Historically Black Colleges and Universities has resulted in the development of training materials with culturally specific content. A number of training sessions were held during the year with very positive feedback from the trainees.

Outreach/User Support

SIS continues its support of the Toxicology Information Outreach Project. The objective of this initiative is to strengthen the capacity of Historically Black Colleges and Universities (HBCUs) to train medical and other health professionals in the use of NLM's toxicological, environmental, occupational health and hazardous wastes information resources. In addition to providing workstations, training, and free online access to nine HBCUs participating in a pilot training development project, NLM has collaborated with the Agency for Toxic Substances and Disease Registry (ATSDR) to train representatives from 61 additional schools in the use of NLM's valuable online resources. One of the training classes, hosted by Texas Southern University, included HBCUs and community-based organizations from the Lower Mississippi Delta. This class was jointly sponsored by ATSDR, NLM, and the Environmental Justice Office of the Environmental Protection Agency in support of the Mississippi Delta Project. Other classes with specific user group focus have been conducted in addition to our usual NLM-based training. In addition, a bibliography on environmental justice was compiled and is available on SIS's WWW server, along with other bibliographies and written user resources.

User Support Computer-Based Activities

In FY 1998, SIS developed TOXICOLOGY TUTOR II, second in a series of introductory level computer-based toxicology courses. It takes advantage of Windows' graphical user interface incorporating color graphics, photography, animation, and audio. The TOXICOLOGY TUTOR *series* is designed for the Internet, and is available on the SIS web server.

Additionally, SIS has developed a computer-based demo for the Internet illustrating the TEHIP databases, ChemID, TOXLINE, RTECS, HSDB, CCRIS, IRIS, TRI, TRIFACTS, GENETOX, EMIC, and DART. It was updated in FY 1998, along with an Internet version of the TEHIP slide overview.

Alternatives to Animal Testing

SIS continued to compile and publish references from the MEDLARS files that were identified as relevant to methods or procedures which could be used to reduce, refine, or replace animals in biomedical research and toxicological testing. Requests for these quarterly bibliographies have increased, as has the number of articles deemed relevant to the field. Bibliographies issued during the past four years are available on the Internet through the SIS WWW server.