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# SPECIALIZED INFORMATION SERVICES

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The Division of Specialized Information Services (SIS), National Library of Medicine (NLM), creates information resources and services in toxicology, environmental health, chemistry, HIV/AIDS disaster health, and other specialized topics including minority health. SIS includes an Outreach and Special Populations Branch, which seeks to improve access to quality and accurate health information by underserved and other targeted populations. The Office for Disaster Information Management Research was established in SIS to manage the new NLM Disaster Information Management Research Center (DIMRC).

The Toxicology and Environmental Health Information Program (TEHIP), known originally as the Toxicology Information Program, was established more than 40 years ago within the National Library of Medicine in SIS. Over the years TEHIP has provided for the increasing need for toxicological and environmental health information by taking advantage of new computer and communication technologies to provide more rapid and effective access for a wider audience. We continue to move beyond the bounds of the physical National Library of Medicine, exploring ways to point and link users to relevant sources of toxicological and environmental health information wherever these sources may reside. Resources include chemical and environmental health databases and Web-based information resource collections. Development of HIV/AIDS information resources has been a focus of the Division for 20 years, and now includes several collaborative efforts in information resource development and deployment, including a focus on the information needs of other special populations. Our outreach program has continued to evolve and reach out to under-served communities through implementation of innovative information access-enabling approaches and dissemination of NLM's resources. This past year has seen the development of new disaster information resource activities as the new DIMRC has become more established.

The SIS Web site provides a view of the full range of the varied programs, activities, and services of the Division. Although users typically approach through one of the specific entry points for the topic of interest (TEHIP, HIV/AIDS, disaster information, or minority health), the Divisional Web site (<http://sis.nlm.nih.gov>), includes program descriptions and documentation. Continuous refinements and additions to our Web-based systems are made to allow easy access to the wide range of information collected by this Division. Our usage has continued to increase over the past year with access to all toxicology and HIV/AIDS data free over the Internet.

In FY2009 SIS continued to balance efforts to enhance existing information resources with efforts to provide new services in the growing area of disaster information. Highlights for 2009 include the addition of nanomaterials to HSDB, the release of a beta version of PillBox for the identification of prescription pills, research on disaster information tools such as the use of virtual worlds for training and radios for data transmission, program evaluation studies and updates to many existing products and projects. Two SIS resources – Tox Town and REMM - won awards for their quality.

## **Toxicology and Environmental Health Resources**

**TOXNET** (TOXicology Data NETwork) is a cluster of databases covering toxicology, hazardous chemicals, environmental health and related areas. These databases continue to be highly used Web resources, and in FY2009 customers continued to express their appreciation for the usefulness of these resources. In FY2009, many enhancements to TOXNET were based on user feedback/requests and routine upgrades/additions of data and capabilities. Databases in TOXNET include:

- ❑ **Drugs and Lactation (LactMed)**, which provides information on drugs and other chemicals to which breastfeeding mothers may be exposed. It includes information on the levels of such

substances in breast milk and infant blood, and the possible adverse effects in the nursing infant and includes links to other NLM databases.

- ❑ **HSDB®** (Hazardous Substances Data Bank), a peer-reviewed database focusing on the toxicology of over 5,000 potentially hazardous chemicals. This flagship database was enhanced in FY2009 with records on chemical compounds of interest in monitoring potential terrorist activities. This year, we celebrated the 75<sup>th</sup> meeting of the Scientific Review Panel of toxicologists that reviews this database. In preparation from this, we arranged for an outside analysis of HSDB's utility in risk assessment development. This led to a project just now underway for a re-engineering of the HSDB, including its content, creation, and review. Central to this project is the inclusion of new important areas of concern to toxicologists, such as the exposure to nanomaterials. Recent expanded scope areas for HSDB have included radioactive chemicals records and biological toxins.
- ❑ **IRIS** (Integrated Risk Information System), a database from the U.S. Environmental Protection Agency (EPA) containing carcinogenic and non-carcinogenic health risk information on over 542 chemicals.
- ❑ **ITER** (International Toxicity Estimates for Risk), a database containing data in support of human health risk assessments. It is compiled by Toxicology Excellence for Risk Assessment (TERA) and contains over 655 chemical records. These side-by-side comparisons of international risk assessments include links to source documentation.
- ❑ **CCRIS** (Chemical Carcinogenesis Research Information System), a scientifically evaluated and fully referenced data bank, developed by the National Cancer Institute (NCI) and now maintained by SIS, with over 9,000 chemical records with carcinogenicity, mutagenicity, tumor promotion, and tumor inhibition test results.
- ❑ **GENE-TOX** (Genetic Toxicology), a legacy toxicology database created by the U.S. Environmental Protection Agency (EPA) containing genetic toxicology test results on over 3,000 chemicals.
- ❑ **TOXLINE**, a bibliographic database providing comprehensive coverage of the biochemical, pharmacological, physiological, and toxicological effects of drugs and other chemicals from 1965 to the present. TOXLINE contains over 3.6 million citations, almost all with abstracts and/or index terms and CAS Registry Numbers.
- ❑ **DART/ETIC** (Development and Reproductive Toxicology/Environmental Teratology Information Center), a bibliographic database covering literature on reproductive and developmental toxicology. This database is no longer funded by the multi-agency group that created it, but it is still searchable as a distinct entity.
- ❑ **Toxics Release Inventory (TRI)**, a series of databases that describe the releases of toxic chemicals into the environment annually for the 1987-2007 reporting years.
- ❑ **ChemIDplus**, a database providing access to structure and nomenclature authority databases used for the identification of chemical substances cited in NLM databases. ChemIDplus contains over 388,000 chemical records, of which over 295,000 include chemical structures. ChemIDplus includes some toxicity data as well as locators to many important national and international listings of chemicals.
- ❑ **Household Products Database**, which provides information on the potential health effects of chemicals contained in more than 9,000 common household products used inside and around the home.
- ❑ **Haz-Map**, an occupational toxicology database designed primarily for health and safety professionals, but also for consumers seeking information about the health effects of exposure to chemicals and biologicals at work. It links jobs and hazardous tasks with occupational diseases and their symptoms. In collaboration with the Department of Labor, tasks and chemicals associated with work at the Department of Energy hazardous sites are now included in Haz-Map.

- ❑ **ALTBIB**, a bibliographic database on alternatives to the use of live vertebrates in biomedical research and testing, developed as part of NLM's participation in the Interagency Coordinating Committee to Validate Alternate Methods.
- ❑ Finally, we have continued to develop the **Dietary Supplements Labels Database**, enhancing it with additional labels from the many brands available in the marketplace, and working with the Office of Dietary Supplements as they developed their prototype label database intended primarily for researchers. Much of the search interface and design and infrastructure has been shared with the ODS group for their project.

In addition to the core TOXNET databases, SIS supports many other databases and resources:

- ❑ **TOXMAP**, a Geographic Information System (GIS) system that uses maps of the United States to help users visually view data about chemicals released into the environment and easily connect to related environmental health information. Enhancements released in FY2009 include updated mortality data, new features such as widget and toolbar, and a new interface for TOXMAP News.
- ❑ **Enviro-Health Link** pages continue to be useful to our users, especially the *Dietary Supplements* page with links to many sources of relevant information and the Pesticide *Exposure* page with links to Web sites about the acute and chronic exposure to pesticides.
- ❑ **Tox Town** was enhanced with new content (in English and Spanish) in the neighborhoods of Tox Town, Tox City, Tox Farm, Tox Port and a U.S. Mexico Border scene. A new information resource on cadmium and on chemicals that may act as endocrine disrupters were added this year. Tox Town received the 2009 MERLOT award in the health sciences category and was described as teaching "important concepts to a wide audience in an interesting fashion." Tox Town was demonstrated at several educational conferences and promoted for use by teachers. Tox Town now features changing highlights on its home page on new resources and special events related to environmental health, such as Earth Day and National Radon Month.
- ❑ **ToxSeek** is a meta-search tool that enables simultaneous searching of many different information resources and databases on the World Wide Web. The ToxSeek user interface allows selection of resources from a wide range of authoritative sources in environmental health and toxicology. It provides integrated search results from the selected resources and displays related concepts to use in refining searches. Based on user feedback and focus group evaluations, work has continued on enhancements for future releases.
- ❑ **ToxMystery**, an interactive Web site for children between the ages of 7-10, was released at the end of FY2006. It provides an animated game-like interface, which includes finding potential chemical hazards in a home and includes fun sound effects. During FY2009 the ToxMystery Kiosk at the Carnegie Science Center in Pittsburgh, PA was completed and installed near the hands-on Exploration Station for kids and the Building Green exhibit devoted to environmentally sound construction techniques. The kiosk has an adapted version of ToxMystery with all links to the Internet removed. Approximately 46,000 people played the game between March and September. Reports from the Carnegie Science Center show that most users give the kiosk 3 stars. In addition to the work with the museum, a new ToxMystery About page in Spanish and English was added. The About page includes clipart and colorful desktop wallpaper in three versions.
- ❑ **Drug Information Portal**, providing current drug information for over 150,000 drugs with links to many credible additional online resources. During FY2009, changes were made to the search interface to allow easier selection of drug name and searching by category of drug.
- ❑ At the end of FY2009, we released **Pillbox**, a new drug information resource that focuses on pill images as well as drug names and other physical characteristics information. IT development included creation of a cataloging and quality control system, as well as engagement of the user community during the development process, in part through the employment of social networking tools. This unique pill identification and image exploration application is also an integral part of the patient-safety initiative with the FDA. This division led the coordination of the NLM/FDA

patient safety initiative, and worked to engage the pharmaceutical industry in what has become a cooperative effort between government and private industry.

### **The Disaster Information Management Research Center**

In 2008, NLM officially created the Office of the Disaster Information Research Center (DIMRC) in SIS to serve as the coordinating office for disaster health information management activities across NLM, as called for in the NLM Long Range Plan 2006-2016. In FY2009, the DIMRC office focused efforts on identifying and providing access to disaster health information resources and conducting informatics research that will be directly beneficial to public health officials, healthcare providers, special populations, and the public.

#### *Disaster Information and Outreach*

The collection, organization, and dissemination of disaster health information began in FY2009 with DIMRC staff enhancing the DIMRC Web site with new topic pages, adding over 600 state-level disaster organizations to DIRLINE, and initiating the move of the Resource Guide for Public Health Preparedness (<http://phpreparedness.info>), a grey literature resource to disaster health information, to NLM.

The Disaster Information Specialist pilot program at four institutions continued at four institutions. Each institution has found unique ways in which librarians can assist emergency personnel from serving as informationists for researchers, health care professionals, and policy makers, to providing new resources and training, and serving on disaster preparedness committees at the local or regional level. DIMRC continued to maintain a listserv, now with over 325 librarians and information specialists interested in the disaster information specialist program and began discussions with the Medical Library Association to consider the development of a certification program in Disaster Health Information.

#### *Research and Development*

The DIMRC office initiated and coordinated a number of informatics and communications research and development and pilot projects on behalf of the Bethesda Hospitals' Emergency Preparedness Partnership (BHEPP). NLM joined in 2008 to help with common issues at hospitals during emergencies: communication, patient management, family reunification, and information access. NLM received approximately \$3.5 million to develop a series of prototypes in these areas. Three NLM divisions, SIS, OCCS, and LHCNBC, are working on these projects, coordinated by the DIMRC office.

DIMRC staff worked on several projects including development of a back-up digital communication system via the Military-Affiliated Radio System, development of a virtual world prototype for training hospital personnel in the nationally mandated Hospital Incident Command System, and the development of a research protocol for testing the electronic triage form and digital pen for mass casualty events.

#### *Tools for Emergency Responders*

Two new versions of the Wireless Information System for Emergency Responders (WISER), a system designed to assist first responders in hazardous materials incidents, were released this year. The new versions include updated data, an improved interface for the Windows version, the addition of images, and the ability to map the safe protective distance from a chemical.

The Radiation Event Medical Management (REMM) tool is a Web-based portal providing guidance to health care providers about the clinical diagnosis and treatment of radiological/nuclear events. This year, NLM, in collaboration with the HHS Office of the Assistant Secretary for Preparedness and Response (ASPR), continued to improve REMM by releasing Mobile REMM for PDAs, changing the Dose Estimator for Exposure algorithm, adding and editing content, images, and animations.

NLM, again in collaboration with HHS ASPR, began development of a new tool for mass casualty chemical incidents, the Chemical Hazards Event Medical Management (CHEMM). This Web-based portal based on the REMM concept, will provide just-in-time medical management guidance to health professionals, as well as assisting in planning and training.

### *Partnerships*

NLM continued to work with numerous agencies and organizations on identifying information needs and providing guidance and assistance, as needed. In addition to HHS ASPR, NLM worked with the NCI, CDC, the NIH Biodefense Research Coordinating Committee, the Institute of Medicine's Forum for Medical and Public Health Preparedness for Catastrophic Events and other agencies.

### **AIDS Information Services**

NLM is the project manager for the multi-agency AIDSinfo service ([aidsinfo.nih.gov](http://aidsinfo.nih.gov)). This service provides access to federal HIV/AIDS treatment guidelines, AIDS-related clinical trials information (through [Clinicaltrials.gov](http://Clinicaltrials.gov)), and prevention and research information. In April 2007, a Spanish language site called InfoSIDA was released.

The American Customer Satisfaction Index (ACSI), in both English and Spanish continues to be used to evaluate InfoSIDA. The site has scored an 81 on recent quarterly reports. In FY2009 the contract for support of AIDSinfo/InfoSIDA was recompleted and an award was made to a new contractor resulting in a complex, but seamless transition of databases, Web sites, telephone numbers, and staff.

The National Library of Medicine (NLM) has continued its HIV/AIDS- related outreach efforts to community-based organizations, patient advocacy groups, faith-based organizations, departments of health, and libraries. This program provides support to design local programs for improving information access for AIDS patients and the affected community as well as their caregivers. Emphasis is on providing information or access in a way meaningful to the target community. Projects must involve one or more of the following information access categories: information retrieval, skills development, Internet access, resource development, and document access. In FY2009 NLM made thirteen awards.

### **Evaluation Activities**

In FY2009, SIS conducted professional evaluation of a number of its Web products and outreach programs. Several of these were funded via the NIH Evaluation Set-Aside Program mechanism. Set-Aside Program funded activities include six focus groups assessing elementary and middle school teachers' needs in locating and using Web resources for teaching environmental health. The findings of these focus groups served to inform the development of new Envirohealth Kids Portal (currently under construction). Another Set-Aside funded activity involved developing a detailed evaluation plan for the NLM/UNCFSP-HBCU Access Project to promote disease prevention and wellness at Historically Black Colleges and Universities (HBCU). A non-Set Aside-funded evaluation activity, sponsored by the NLM Office of Planning and Evaluation, included a project developing innovative methodology for assessing performance, usage, usability and user feedback of e-government resources in virtual worlds. This project was conducted in the context of SIS-maintained ToxTown in Second Life. In FY2009, SIS also completed usability studies of four special population Web sites: Asian American Health Web portal, American Indian Health Web site and Refugee Health Information Network (RHIN). Feedback from these evaluation activities is used to identify improvements, new capabilities, and expanded content that would better serve SIS Web users.

### **Outreach Initiatives**

SIS outreach programs reach health professionals, public health workers and the general public especially about health issues that disproportionately impact minorities such as environmental exposures and AIDS. Highlights from FY2009 include:

*Outreach to Middle and High School Science Teachers:* SIS staff conducted outreach to teachers during a number of events attended by middle and high school science teachers. The events included National Association of Science Teachers, Maryland Association of Science Teachers and Montgomery County Back-to-School Fair. During these events, SIS staff delivered presentations and demonstrated SIS resources that could be used in science lessons, including ChemIDplus, Household Products Database, ToxTown and ToxMystery.

*United Negro College Fund Special Programs/NLM – HBCU Access Project*, one of NLM's major outreach projects with Historically Black Colleges and Universities, continued during the FY2009 and awarded 4 HBCUs small grants to develop and implement projects that help to increase the awareness and utilization of NLM resources on campuses and in their communities. The annual June workshop featured a keynote address by the Honorable Louis Sullivan, former Secretary of HHS and additional presentations by Clinton Davis, actor and educator, Las Vegas, NV, and Dr. Keith Norris, Acting President of Charles Drew University and Medicine and Science. This was the eighth year for the two day workshop held at NLM Lister Hill Center. In addition, on the following day, an NLM online database training session was conducted at the University of the District of Columbia (UDC), Washington, DC, for about 30 conference attendees.

Adopt-a-School program with Woodrow Wilson Senior High, Washington, D.C. encourages students to take an interest in consumer health and promotes interest in science. In addition to providing summer internships and field trips for Wilson students, this year NLM also had summer interns from Charles Flowers High School in Prince Georges County, MD. This summer, four students and two science/computer science teachers had internships at NLM.

The mission of the *Environmental Health Information Partnership (EnHIP)* is to enhance the capacity 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. The June 2009 meeting was hosted by the University of Texas at El Paso in El Paso, TX. Featured speakers included Chris Lopez, the executive editor of the El Paso Times and Martha Austin-Garrison, Diné College, who spoke on the Navajo Ethno-Medical Encyclopedia (NEME) she has been developing. Dr. and Mrs. Werner, who were instrumental in the initiation of the NEME were present at the meeting as well. EnHIOP meetings included representation from 14 HBCUs, 3 tribal colleges and 3 Hispanic-serving institutions.

*Chickasaw Health Information Center (CHIC)*, a project that was initiated by the Sacred Root Tribal Information Fellows from the Chickasaw Nation, is fully operational. It is located in the Carl Albert Indian Health Facility in Ada, Oklahoma. The room has two workstations and a printer along with brochures and other NLM and CHIC materials. It is staffed full-time by a trained tribal member. In addition, the CHIC has a mobile kiosk that is moved to various clinics for use there. CHIC has developed oversized prescription pads with links to MedlinePlus topics specific for 10 different clinics in the facility. The topics were chosen by the directors of those clinics. The CHIC manager has done outreach to senior centers and several of the remote clinics. NLM is considering a proposal for a pilot project to implement a CHIC workstation in one of the clinics.

SIS is a partner in the *Refugee Health Information Network (RHIN)*, which is a national collaborative partnership of several state Refugee Health offices, NLM, and the Center for Public Service Communication (CPSC). RHIN is committed to providing quality multilingual, multi-cultural health information resources for patients and those who provide care to resettled refugees and asylees. The partnership was expanded with the addition of the Association of Refugee Health Coordinators. A members-only section of the Web site was developed to support discussion of refugee issues and to review new materials. ARHC has been very active in using the members-only site to discuss issues of new population groups and to develop and review new materials which have been added to RHIN. In addition, they have focused extensively on H1N1 materials for refugees and their health providers.

SIS maintains several *special population Web resources* in collaboration with organizations that provide expertise about the particular population groups.

In FY2009, focus groups with health professionals and consumers were held to test the relevancy of the *Asian American Health Web site* for the targeted populations. Strengths of the site included the materials in Asian languages, ease of navigation, and variety of resources available.

Focus testing of the *American Indian Health Web site* identified the look and feel of the site, the "Our Stories" section and its presence as a resource for American Indian populations to be the most positive

factors of the site. One of the new additions to the site, "Our Stories," uses the storytelling tradition to convey personal experiences and health information from American Indians.

*Women's Health Resources*, a collaborative with the Office of Research of Women's Health, NIH, has grown significantly in the past year. The Coordinating Committee for Research on Women's Health at NIH, which has a representative from each of the NIH Institutes, Centers and Offices, provides input and resources to be added to the site. The portal was started as a two page listing of bibliographic online resources, and has since grown to a 10 page resource with several topic areas. Multimedia resources were added to the site including NIH YouTube videos, podcasts and seminars and symposia back to 2005 from the NIH videocast archives.

Paula Maez, currently a second year NLM Associate Fellow at the University of Texas Health Science Center at San Antonio, carried out a project on the *Arctic Health Web site*. The purpose of the project was to expand and enhance the health topics section and add resources that address health issues of cold climate and indigenous population in the Arctic region. This section has been greatly enhanced with over 400 new links, including many unique resources from groups that work with indigenous populations.

*Central American Network for Disaster and Health Information (CANDHI)*: NLM continued its long-term relationship with the Pan American Health Organization, the Regional Disaster Information Center for Latin America and the Caribbean, and six Central American countries to develop and enhance the Central American Network for Disaster and Health Information. CANDHI consists of centers in Honduras, Nicaragua, El Salvador, Guatemala, and Panama and Costa Rica. The CANDHI centers enable health professionals, government agencies, and others in their countries to access vital information previously unavailable. These libraries have acquired the knowledge, skills, and resources that promote delivery of reliable information. This year we completed projects to improve services or technical capabilities. In addition, several Web-based training sessions were held and the development of a Disaster Health Information Center Toolkit progressed.

### **Research and Development Initiatives**

The goal of the *Public Health Law Information Project (PHLIP)* is to create in the public domain a searchable database of public health law information that will be not only a guide for non specialists (e.g., concerned citizens, attorneys, public health practitioners, academics, legislators), but also an excellent technical resource for those who are specialists in the field. The pilot project with the state of Delaware, the Widener University School of Law and the Delaware Academy of Medicine was completed at the end of FY2009. A report is being prepared to enable others who wish to pursue this activity to build upon the accomplishments of the project.

NLM and the National Institute of Diabetes and Digestive and Kidney Diseases are developing a Web resource on drug- and herbal medication-induced liver disease. Tentatively named *LiverTox*, the pilot version was shown at a NIH international symposium of experts that was held at NLM on December 1-2, 2008. Feedback from that meeting has proven useful to the system developers. Medical experts, including participants in NIDDK's Drug-Induced Liver Injury Network, are currently being selected to review and evaluate the current pilot system. In the meantime, further content and information technology development is necessary before public release. NLM and NIDDK still anticipate releasing a fully operational system by early 2010.

SIS conducted several research and development projects in the domain of building advanced disaster information management tools for summarizing disaster literature and monitoring public sentiment on social networking Web sites. One such project involved adapting the Semantic Medline tool (developed by Dr. Tom Rindfleisch's group at the Lister Hill National Center for Biomedical Communications, NLM) for analyzing grey literature on preparedness and response to influenza epidemics. The work included developing disaster influenza terminologies and adapting the Semantic Medline search engine and natural language processing algorithm rules to the new domain. Another project, Semantic Twitter, involved using natural language processing to identify Twitter messages about the emergent H1N1 epidemic and using social science methodology to characterize sentiment displayed in these messages.



SIS also conducted research work identifying barriers to consumers' comprehension of health-related texts, identifying text characteristics that make comprehension easier, developing taxonomy of comprehension errors, and making recommendation regarding how librarians can help health consumers avoid these errors.