

Development of Databases on NTP Studies for Public Access via the Web

The National Toxicology Program (NTP) generates and receives information and results on a wide variety of studies on environmental agents. Agents are nominated to the NTP for study because there is a potential for human exposure and because the available toxicity data are not adequate to determine whether the substance could impact human health. Currently, hundreds of agents have been studied and information from these studies is routinely shared with federal regulators, industry and the public for their use to evaluate human risk.

One recommendation from the 1992 review of the Program was to expand communications between the NTP and the public, and to make information about NTP activities more accessible. At the time of that review, NTP information was provided by mail, fax and telephone, and, typically, the NTP received more than 5,000 outside requests for information each year. Approximately half of these requests were for printed NTP documents, such as copies of the NTP Technical Reports, the Management Status Report and the NTP Annual Plan. In addition, the Management Status Report was mailed out quarterly to a standing list of more than 4,000 people.

One approach to expanding communication with the public was to take advantage of the Internet, which was becoming an important medium for readily sharing information. Much of the world's scientific, academic and industrial communities were beginning to use computers linked through electronic networks to share and move vast amounts of information.

In the fall of 1993, the NTP established a web site to provide information electronically. Some of the first available documents were the "NTP Annual Plan," "The Annual Report on Carcinogens," abstracts of "NTP Technical Reports", and the report, "Status of All NTP Studies."

Since that time, hardware and software to access the web have improved, thus, allowing the NTP to add additional information to its web site. Public response to this increased outreach has been overwhelmingly positive as evidenced by the continuous increase in the number of "hits" to the web pages, and by the increase in the diversity of people and groups, both nationally and internationally, who are accessing the information.

One goal for the program is to increase public access to detailed data from NTP studies, including individual animal data. This is now achievable because of the availability of more advanced web and database technologies. However, to accomplish this goal, the NTP must develop common searchable databases and create the programs that will allow this web access. This task is not simple for several reasons:

- NTP toxicology and carcinogenesis studies are conducted using a range of protocols.
- For these studies a diversity of endpoints is evaluated. Although some studies address generalized toxic effects on animal species, others focus on specific endpoints, such as the immune, reproductive and neurological systems.
- Most NTP studies are conducted by contract laboratories. Data from general toxicity or carcinogenesis studies are collected at the various laboratories and transmitted to a central database at NIEHS. However, until recently, system-specific studies such as those on reproductive or immunotoxicology end points have not been included in the database.

To address these issues, the NTP is in the process of moving the data from studies being conducted in contract labs to an on-site single database, for storage. This data will be web accessible and will allow users to query data across the different study types. Also, the NTP is developing applications that will allow interested users greater flexibility in accessing the NTP data, including the ability to 1) query the data via a web interface, 2) display tables of queried results, 3) use various options for graphical representation of the data, 4) conduct simple statistical manipulations of the data and 5) export the queried results to files that can be saved on their own desktop computers.

To date, the NTP has designed Oracle database schema and has begun loading data from the NTP studies onto this database. Many of the applications have been written to provide web access to retrieve and display data from the database, and to download the data to a desktop computer. Web access to all pathology data from the NTP two-year bioassay studies have been developed as has access to clinical observations and clinical pathology measurements collected on most of the studies conducted since 1983. Data from genetic toxicology studies conducted by the NTP are also available. Study data from developmental, continuous breeding and immunology toxicity studies are loaded into the database as they are received. The goal is to provide web access to data from all study types by Spring 2004. We hope to demonstrate this new tool and the web pages at the BSC meeting.

The Pathway to get to this new search capability is as follows:

NTP Homepage

<http://ntp-server.niehs.nih.gov/>

NTP Study Information

http://ntp-server.niehs.nih.gov/main_pages/NTP_ALL_STDY_PG.html

Search the NTP Studies Database

http://ntp-server.niehs.nih.gov/Main_Pages/SearchData.html

Search to Retrieve All measurements

http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm

Examples of screenshots are depicted in subsequent pages.