



1995 Toxicology Outreach Panel Report

▶ [EnHIOP](#) ▶ [Reports](#) ▶ [Report Archives](#) ▶ [1995 TIOP Panel Report](#)

- [Agenda](#)
- [Opening Remarks](#)
- [Closing Remarks](#)
- [Discussion and Conclusion](#)
- [Introduction](#)
- [Meeting Topics](#)
- [HBCU Updates](#)
- [Disclaimer](#)

5th Annual Meeting of the Toxicology Information Outreach Panel

June 12, 1995

National Library of Medicine

Agenda

Call to Order and Introductions	Dr. Bailus Walker, Jr.
Welcome from the NLM Director	Dr. Donald Lindberg
Presentation	Dr. Henry Lewis III
NLM Access Model	Dr. John James
Visible Human Project	Ms. Cynthia Gaines
Toxicology Courseware and Demonstration	Ms. Miriam Perkins
HBCU Connections	Dr. Norbert Page
HBCU Update	Dr. Michael Hubbard

Introduction

The fifth annual meeting of the Toxicology Information Outreach Panel was held June 12, 1995 at the National Library of Medicine (NLM) in Bethesda, Maryland. Attended by nine member representatives from Historically Black Colleges and Universities (HBCUs), one representative from the Agency for Toxic Substances and Disease Registry (ATSDR)/Centers for Disease Control and Prevention (CDC), one representative from the National Institute for Occupational Safety and Health, two consultants, and distinguished staff from the NLM, the meeting focused on progress made since the previous meeting, updates on relevant projects at the NLM, and a report on the HBCU training from the Oak Ridge Institute for Science and Education (ORISE).

Four special presentations were made during the one-day meeting. Dr. Lawrence Kingsland, Assistant Director for Applied Informatics, NLM, demonstrated the access model prototype for a new generation of Internet-based information delivery: "Internet Grateful Med." Dr. Michael J. Ackerman, Assistant Director for High Performance Computing and Communications, NLM, gave participants an overview of the "Visible Human Project," NLM's first entry into the world of visual imaging and the creation of a visual image library. The presentation included slides showing how the "visible human" was created. Ms. Miriam Perkins and Dr. Norbert Page, Division of Specialized Information Services, NLM, demonstrated "The Toxicology Tutor," a microcomputer-based toxicology courseware

program for introductory level college students. Mr. Michael Hubbard, ORISE, discussed the training and outreach support to NLM for HBCUs and showed a prototype of an Internet home page as a way to disseminate information about the work that is being conducted in this area.

Panel members were pleased to have a representative from ATSDR in attendance, Ms. Sandee Coulberson, who discussed the environmental information outreach project being conducted in the Mississippi Delta region and the integration of that project with the NLM's HBCU outreach program.

The latter part of the meeting focused on reports from the participating HBCUs relating to new activities begun and existing projects expanded since the last meeting.

In closing, Dr. Bailus Walker, Chairman, noted that all reports indicate that substantial progress has been and continues to be made at all institutions represented on the panel. He expressed the panel's gratitude to Dr. Melvin Spann, Associate Director, Division of Specialized Information Services at the NLM and Dr. Donald A. B. Lindberg, Director, NLM, for their continued support and leadership through the National Library of Medicine. Dr. Harold Schoolman, Deputy Director for Research and Education, NLM, expressed his delight at the progress made and the contribution that the NLM can make through member institutions in the important work of disseminating health science information to the public.

Opening Remarks

Dr. Melvin Spann, Associate Director, Division of Specialized Information Services, NLM, introduced Dr. Donald A. B. Lindberg, Director of the NLM, who opened the meeting by welcoming all panel members and guests and commending the panel for the work they had accomplished under Dr. Spann's and Dr. Bailus Walker's excellent leadership. Dr. Spann's recent promotion to Associate Director places him in an even better position to continue to lead the important work the panel is undertaking, he said. Lindberg added that Dr. Walker, as Chairman of the panel and a member of the long-range planning committee, is fully cognizant of the NLM's aspirations and limitations. The first two presentations on the agenda--the NLM Access Model and the Visible Human Project--were designed to update the panel on new developments at the NLM, Lindberg said. Each project is the result of three to five years of solid work, and they are very representative of the major changes that even a year can bring in the medical field. Dr. Lindberg commented on the parallels between the outreach project in the Lower Mississippi Delta Region (LMDR) and a White House project he had recently completed that involved 12 government agencies working together for the same purpose. The LMDR project could have a similar impact and fit very well with the global scientific aims being discussed by the panel, he said. Lindberg recommended that federal funding be sought to the extent possible for two reasons: (1) every dollar gathered that way can be multiplied five or six times through community and industry, and (2) it lends legal authorization to the NLM's work. He wished the panel continued success and a good day. Dr. Henry Lewis, Dean of Pharmacy at Florida A&M University and President of the Minority Health Professions Foundation, expressed his gratitude on behalf of the Historically Black Colleges and Universities (HBCUs) that make up the Toxicology Information Outreach Panel to Dr. Lindberg and the NLM for their significant contributions and support to HBCUs in their medical research and the education of their pharmacy and veterinary medicine students. Dr. Lewis presented Dr. Lindberg a plaque with the following commendation:

For Outstanding Vision and Leadership in Strengthening the Capacity of Hbcus to Train Medical and Other Health Professionals in the use of Toxicological, Environmental, and Occupational Information Resources Developed by the National Library of Medicine.

The commendation is signed by Dr. Reed Tuckson, President, Charles Drew Medical School, and President of the Association of Minority Health Professions Schools, and Dr. Lewis as President of the Minority Health Professions Foundation. Dr. Lindberg expressed his appreciation. Before turning the meeting over to Dr. Bailus Walker, Chairman, Dr. Spann pointed out a few changes in the panel since the previous meeting:

- Ms. Sandee Coulberson replaces Max Lum (who now is with NIOSH) as the representative from ATSDR.
- Dr. Mohamed Bayorh replaces Dr. Walter Sullivan as the representative from Morehouse School of Medicine.
- Dr. Ted Bates replaces Dr. Henry Lewis as the representative from Texas Southern University.
- Delbert Flowers has retired.

Dr. Walker welcomed the panel members and commended the minority health professions group for its recognition of the outstanding contribution that Dr. Lindberg has made, saying that the presentation this morning was just a token of the appreciation felt for his outstanding work. "We're all pleased with the progress that has been made," he said. All the panel members have been very effective in translating concepts and ideas into programs and services to people, and he added that the initial impetus given this effort by Dr. Lindberg and Dr. Spann and all the people at the NLM has certainly blossomed into major activities and major accomplishments. Walker again thanked all the panel members for their active participation, especially Dr. Spann, who has been very, very effective in ensuring that this program meets its basic goals and objectives.

[▶ Return to top](#)

Meeting Topics

NLM Access Model

Dr. Lawrence Kingsland, Assistant Director for Applied Informatics, NLM, began his presentation by thanking the panel for the opportunity to speak. He described the access model project as one component of a four part systems reinvention initiative. The access model will be a new generation system applying assisted searching techniques for Internet-based delivery of information--Internet Grateful Med.

According to Kingsland, the objective of the project is to provide users with intelligent, interactive retrieval for multiple information resources as the NLM's major systems and databases evolve. "The key to this process is to build a flexible but well-defined gateway environment essentially designed from the beginning to cope with the fact that system resources on the back end are going to change," he said. "But we believe that in creating a proper architecture we have due latitude in improving user services while we're coping with the changes inside the latest system."

Kingsland explained that an intelligent applications gateway at the NLM will handle multiple incoming access streams accommodating different user access methods. Grateful Med. allows access to about 40 NLM databases--with MEDLINE being the best known--and 95% of all the searching of the NLM's on-line databases is done in MEDLINE. He added that there are many others with useful information, including the toxicology databases, and that the conceptual architecture is a fine fit for the worldwide web paradigm.

Kingsland discussed several assumptions regarding access and searching:

- Users should be insulated from the specifics.
- There will be a need for some form of dial-up access indefinitely.
- User access methods may include everything from simple terminals through workstations and include user-written software.
- Users may not know which of the NLM databases to search.
- Users may not know which terms to use in searching--they may not know how to improve a suboptimal search if they've gotten something they don't understand or it's the wrong information.
- Some users will know exactly what they want and will need direct access searching methods to go straight to it. Those users are usually librarians and trained personnel who can communicate directly with the back end system.

- Many users want the appearance of interactive searching whether or not connections are actually maintained through a search session.

Kingsland also listed the components of the access model system, which include:

- A client
- A request manager
- A library of intelligent search aids
- The Unified Medical Language System, Metathesaurus, and other knowledge sources
- A series of database interfaces tied together by an access protocol

When the worldwide web came along there was an opportunity to build something that looks like this, Kingsland explained, with the hard part being the gateway in the middle.

We have full text databases, Kingsland said, and an image database of 60,000 images from the History of Medicine Division. We have partly done an interface to a different back end retrieval system that is an exploration running the AIDS-related databases.

Kingsland said that the worldwide web implementation is very much a two-edged sword. It facilitates a clean, clear graphical user interface and is inherently multi-platform. The prototype currently runs on PCs, Macintoshes, and UNIX workstations. He explained that there is a client written at the University of Kansas that allows character load access to almost all of the same intelligent search assistance for those who have just a terminal or something that can emulate a terminal but doesn't have full graphical user interface capabilities

The real problem, Kingsland said, is that the worldwide web paradigm is a stateless one. The whole idea of the worldwide web is that a client program issues a request for something from a server--it might be text, it might be an image, it might be a video clip or an audio clip. The server serves that request, ships it back out to the client, and then the server forgets about it. At that point the client program--whether it's Mosaic or Netscape or whatever--is responsible for displaying what it received from the server.

Kingsland said that the problem occurs when another similar request is made, but it can't be done because the server doesn't remember what was done last time. He added that the key is to have a piece in the middle that does the remembering. "We call it an Expert State Engine because this is a state engine piece of software that is maintaining status--remembering who we are, what we did last time, and the status of the interaction with the back end system," Kingsland said.

The crucial component here is the state engine, which has been written for speed and particularly for scalability, he added. Kingsland said they've been looking for a situation that can handle hundreds or thousands of simultaneous users and that they have deliberately built a system that they believe will be able to handle that kind of load. "The current version has two major parts: a listener talks to your web client and the expert state maintainer remembers what you did and has rules for mapping terms and creating and defining searches," he said.

Kingsland explained that the Internet Grateful Med prototype and the current functions of the system help a user create, submit, and refine a search in MEDLINE. It searches by keyword, by text word and title or by author name. We can limit a search by language, publication type, study group, age group, and go back to 1966, he said. He added that the system also offers direct links to the full text of the clinical practice guidelines created by the Agency for Health Care Policy and Research, and it offers direct links to almost 60,000 on-line images from the History of Medicine Division at the NLM.

Kingsland described two sets of assisted MEDLINE search functions. One is a "just do it" set that happens

automatically in the background and involves passing terms against the medical subject heading vocabulary and searching by mesh heading when appropriate. It explodes terms that are explodable, Kingsland said, which means it includes the child terms under the more specific terms. He said that it has mappings for entry combinations and that there are almost 5,000 mappings for associated expressions, stop words, occupations, etc. The map from an old set of terms which no longer exists--a new batch heading has been created now.

Kingsland then discussed the second set of MEDLINE assisted search functions, those that are user invoked. He described it as like walking a tightrope--trying to provide a lot of assistance without being in the user's face all the time. When it's appropriate to just quietly do the right thing, we do it, and when there's an ambiguous situation and we need to ask the user, "What you just entered could mean this or it could mean this--which did you have in mind?" the program will do that, he said. The user-invoked assistant functions give the user an opportunity to say, "Bring me only Articles in which this topic is a central concept," and then we offer subheading qualifiers to help users focus a search. We can offer many thousands of related terms, Kingsland added, and we can ask to clarify mappings for ambiguous synonyms of qualifiers. There are a lot of specific areas in which we can help by remembering things so the user doesn't have to, he said.

Kingsland explained that this prototype offers access to the entire Unified Medical Language System Metathesaurus. "The Metathesaurus browser explicitly uses the diversity of the links and relationships in there," he said. Kingsland discussed how it can help users map the same concept in some other vocabulary. He presented an example of a user searching under "bed sores" and the system instantly matching it to another term that is a more appropriate way to search for it. The browser presents a rank concept "hit list" of definitions, and notes, and lets users browse and navigate in the tree hierarchies, which can be a useful way of finding broader terms, narrower terms, or terms that are directly related to the ones the user started with, he said.

The system presents co-occurring concepts, Kingsland said. Wherever possible, a single button click lets users choose something--or even more than one thing--and pull it back into the search template and then make the search. He said that they have just concluded an alpha testing phase with colleagues inside the NLM and a few outside individuals, and that they will be adding the Loansome Doc capability, which some may have used in Grateful Med for document delivery through interlibrary loan. Plans are to go on to beta testing early this summer, he said.

Kingsland explained that multiple enhancements are coming, including searching other databases, and he mentioned the AIDS-related set as an example. Assuming successful testing we'll go with widespread distribution this fall, he said. Kingsland then moved on to the demonstration portion of his presentation. It featured an ex-windows version of Mosaic from the National Center for Supercomputing Applications running on a sun workstation talking to a worldwide web server in the other building. He explained that the prototype was running on a desktop workstation and would be much faster when it's running on a big server. He began the search demonstration and mentioned searching by keyword, title, author, etc. There were also choices on the menu for applying limits such as English only, publication types, study groups, or age groups. Another series of actions began with the default of beginning a MEDLINE search.

Kingsland said that the front screen is designed to be reminiscent of Grateful Med in that the part where queries are entered is on the top, the part where you apply limits is next (English language only, etc.), and then there is a place where it says to pick something and do it.

Kingsland conducted demonstrations in the following areas:

- Mapping to a term that is more appropriate than what the user entered.
- A search by username . A shift to the Metathesaurus looking for related terms
- The "Analyze Query Terms" function.
- Examples of what is in the Metathesaurus.

- A toxicological example using the Metathesaurus.

Kingsland concluded the demonstration portion of his presentation by saying that these are the kinds of things that can be done when there is a gateway system in the middle that has a series of large-scale knowledge resources it can draw on to improve searches and that goes to multiple different back end systems. "This prototype shows that we can accomplish what we set out to do, and we're looking forward to the beta testing and the production release in the fall," he said. He added that they are looking forward to adding other databases to the system. "With an intelligent gateway in the middle we will be able to do that," he said.

After taking comments and questions from the audience, Kingsland concluded his presentation.

Visible Human Project

Dr. Michael J. Ackerman, Assistant Director for High Performance Computing and Communications, NLM, began his presentation with a review of the history of the Visible Human Project, which is the NLM's first entry into the world of visual imaging and a visual image library. In a nutshell, he said, the "visible human" is a CAT scan of the human body--one male and one female--anatomically sectioned from head to toe with submillimeter resolution, with the ability to reconstruct that cadaver in three dimensions after the fact. The project began in 1987. A CBS news clip was shown, highlighting the first ever three-dimensional computerized cadaver that medical students can use to learn anatomy and to practice simulated surgery.

Dr. Ackerman then moved into discussing how the NLM got involved in such a project, saying that libraries are typically reactive, not proactive. In this case the NLM generated the data, he said, rather than just collecting it. Back at the NLM, Ackerman talked to Dr. Schoolman who remembered that in the 1986 long-range plan, the Board of Regents wrote that the NLM should thoroughly and systematically invest the technical requirements and feasibility for biomedical images libraries. They had the vision that maybe this new technology was a way of capturing images and moving it around so that they didn't have to put it in a book with all the associated expenses. And therefore--with knowledge in pictures and new technologies--perhaps it was time for the NLM to think about being a picture archive.

In 1988 Ackerman said they called together eight medical schools to provide an overview of what they were doing, the state of the art, and to develop what the NLM's role should be. Ackerman said they asked, "If we had these image libraries, what would be done with them?" The schools pointed out that they could be used in patient education and presurgical counseling, enlisting patients in the healing process and showing them how they will be helped. Other areas were mentioned as well, such as treatment planning for practitioners, surgical planning, radiation therapy planning, trauma modeling, and prosthesis design.

Reference normal growth and development was also mentioned, Ackerman said, where there are a series of digital cadavers, from conception to old age, where not only could you see each in three dimensions but you could tag a particular organ or area and watch it grow and mature through time. "This also presupposes a whole series of digital images libraries," he added.

"We took that and went to the Board of Regents in 1989, and they said it sounded like something they might be interested in--it's in the long range plan," Ackerman said. The Board of Regents gave their OK, but said we'd better have a planning panel, Ackerman said. The panel got together and discussed the research in education and health care, state of the art imaging, what the opportunities are, what the impediments are, and what the NLM's role should be in developing image libraries. It was published as an addendum to the long-range plan on electronic imaging. In that plan, the Board of Regents recommended that the NLM should undertake a first project building digital image libraries of volumetric data representing a normal adult human male and female. The visible human project would include photographic images of anatomy, computerized thermography, and MRI.

Ackerman said the question then came up regarding who or what should be the visible human--size, shape, and race. There's no such thing as "average" or "normal," he said, "there are only individuals." The decision was not to

worry about it, to just do it and make it a success. If it's a success, we can go back and work out the range of diversity of humankind, he said.

As a library that had no experience in imaging or cadavers, Ackerman explained that their next step was to put out a request for proposals. A contract was signed on August 25, 1991, with the University of Colorado at Denver. Dr. Spitzer and Dr. Witlock represented a consortia that dealt with the state of Maryland, the state of Texas, and the state of Colorado.

They looked for a cadaver less than six feet tall, 20 inches wide (side to side), and 14 inches deep (front to back), Ackerman said, because that was the limit of what the equipment they had could handle. The critical area was the medical history: the individual could have had no dangerous infectious diseases, no major surgeries, no metastatic cancers, no transplants/ implants, or major prostheses. They were looking for somebody who lived and then died suddenly, he said.

Ackerman said that once a cadaver was nominated the medical records were searched, and if it looked like something that could be used, the MRI or CAT scan was done on site where it was found or shipped to Colorado. We ultimately had about a dozen male cadavers and about half a dozen female cadavers, Ackerman said.

Ackerman then described how a cadaver is prepared for imaging. "The cadaver is frozen in a blue gel to -60 degrees so that it's so cold and so hard that there is no difference between hard and soft tissue," he said. "It is then passed under a mill and it shaves off a millimeter and then a picture is taken of what's left. This is repeated, destroying it as you go," he added. Ackerman then showed a videotape of how the visible human was actually cut and scanned.

Ackerman said that the project took about four months to complete. A video of the data from the visible man was shown.

Ackerman then turned his discussion to where this vision of image libraries is going. "We're talking about national image databases, something we can have not only at the NLM, but over the networks that can be available at any location, at any physician's desk, and at any bedside to do the things the original committee envisioned they could do," he said. As a start, we've put images from the visible human up on the HyperDoc, the NLM's Home Page; using Mosaic or Netscape, you can go to HyperDoc, find the visible human project, see some of the images and, clicking on them, bring up whole images, he said.

Ackerman stated that the total cost over the four years (including the female, which will be out in November) is 1.4 million dollars--\$350,000 per year. "We're proud of that," he added.

"Look how far we've come since 1985," Ackerman said. "You've got to have a vision. This whole project is based on the vision that if we get the data out, the computer industry will get there, but we should get there at the same time--not 10 years later. Keep the faith; 10 years and it'll be on your desk," he added.

Ackerman then discussed the first Visual Man CD-ROM, which was put out by Data Express. The entire visible anatomy is on that disk, he said, as well as a browser to see it, and the list price is \$39.95. He explained that it takes no space on a PC disk except what it takes to build a tiny icon in windows, which is a plus for schools that don't have the big giant hard disks.

Ackerman then opened the floor for questions. A question was raised about labeling, to which Ackerman said he understood that there's another CD-ROM put out by Research Systems in Boulder, Colorado that has it labeled. He also said he has seen prototype programs that are not out yet. "As these things come out we will announce them on the home page in the Visible Human so that you'll be able to look there and know what's available," he said. "We'll

give you the list price but I suspect the discounts will be there--especially the educational discounts."

A second question was related to the diversity issue--how would it be addressed? Ackerman said the diversity issue (the concept of "normal") was a problem right from the beginning and was in the Board of Regents' report. The attempt is going to be made to "objectize" the cadaver. We think we at least have an approach to it, he said, which is to define what we want, objectize it, and substitute it within the framework we've got. We think that's a much more efficient way to go.

A third question also focused on the diversity issue. Ackerman said that it would be impossible to get a cadaver for every pathology known. "But if you objectize it and you build a library of those objects, you can interchange them and develop the same requirement in a lot less space with a lot less time and effort," he added. "So that's the second reason for the objectizing--to be able to go on to the pathology."

Toxicology Courseware Project

Ms. Miriam Perkins and Dr. Norbert Page, representing Specialized Information Services, NLM, discussed and demonstrated a new toxicology courseware that is being developed for introductory level college students. A project initiated in the late fall of 1994, the toxicology tutor is a microcomputer-based toxicology courseware program. The goal of this convenient, inexpensive, and easily accessible method of self-instruction is to provide basic training in the principles and terminology of toxicology so that users may more effectively search the NLM's databases. By increasing the understanding of the material, it is hoped that the databases will be used more frequently.

The program was developed under ToolBook and runs under a Windows environment. A 486 PC is recommended; it requires 10-15 MB of hard disk space. A Super VGA monitor and a mouse are also needed, and an audio board is recommended but not required. The user goes through the program with control buttons.

Ms. Perkins highlighted the main features of the program, which includes a glossary, section summaries, and practice tests. The glossary is accessible from any point in the program and allows the user to look up any terms with which he/she is unfamiliar. The section summaries may be printed to serve as portable pocket card references to toxicology. The tests following each subsection allow the user to see what they have learned and areas they may need to review. The tests provide diagnostic feedback and an answer analysis, as was seen when Ms. Perkins showed three sections of the program.

Dr. Page then discussed the main chapters of the program. The information is based on a course he teaches at the University of Maryland on the Essentials of Toxicology. He noted that the material is kept very basic, as the target audience is undergraduate students. Each computer frame only contains a few ideas, and tables and figures are included as appropriate for easier learning. The chapters are as follows:

- **Basic Principles:** includes sections on dose and dose response; dose estimates of toxic effects; toxic effects; and toxicity testing methods, which includes sections on human testing and animal self-testing.
- **ToxicoKinetics:** focuses on exposure, absorption, distribution, and excretion.
- **Metabolism:** focuses on phase 1 and phase 2 biotransformation processes and modifiers of metabolism.
- **Biochemical Effects:** covers topics such as intermediate reaction compounds, free radicals, cellular effects, and immune system effects.

Dr. Page concluded by saying that the basic principles chapters are undergoing internal review, and if all goes according to plan, they hope to have the project completed in the winter of 1995-1996. Questions preceding the demonstration focused on whether there would be an advanced course of toxicology and would the program be pilot tested before being sent out. Dr. Page said that the possibility existed to expand this basic program in the future and there are plans for peer review and pilot testing. He also responded to a question about distribution, saying that because of the size of the program, CD-ROM will be the best medium.

Dr. Page then demonstrated the program, showing the participants the various chapters and the different features of the program. Suggestions provided throughout the demonstration included the following:

- Include in the glossary either reference pages or frame numbers where more information could be obtained within the program
- Add examples of chemicals that may cause a certain type of effect to occur
- Have an "X" appear for incorrect answers in the test rather than a checkmark
- Have subheads with distinctly different names than the main heading titles
- Ensure that the exam encourages learning while still being somewhat challenging

There was also some discussion on whether to include the LD-50; Dr. Page responded that because the concept of LD-50 is so ingrained in the literature, they felt it needed to be included.

Following the demonstration, Dr. Page mentioned that if any of the participants or their students would be interested in participating in the pilot testing, to let him or Dr. Spann know.

HBCU Connections

Representing the Oak Ridge Institute for Science and Education (ORISE), Mr. Michael Hubbard, Project Manager in the Environment, Safety, and Health Programs (ES&HP) of the Training and Management Systems Division (TMSD), updated the panel on ORISE activities in support of the NLM as well as demonstrated the newest TMSD Internet resource.

Hubbard opened by giving a little background on ORISE. ORISE is managed and operated for the Department of Energy (DOE) by Oak Ridge Associated Universities (ORAU), which is also a multiuniversity consortium. Created in 1946 with only 14 members, ORAU now has 88 member universities, of which eight are HBCUs.

Hubbard stated that his project's main emphasis is supporting Dr. Spann and the NLM, but noted that his group also worked with the Agency for Toxic Substances and Disease Registry and the Environmental Protection Agency through the NLM. He then gave a demonstration of how the Internet can be used to communicate NLM issues and priorities to the public.

In order to create the TMSD/ES&HP site, which features NLM information and links, Hubbard's group used the existing ORAU/ORISE Home Page on the Internet, which can be reached through the address: <http://www.orau.gov>. Noting that the TMSD section is still under construction, Hubbard demonstrated the information currently available. The site uses photographs and graphs to illustrate some of the many uses of NLM resources.

Ultimately, Hubbard said he would like to see all of the schools involved with NLM projects linked to TMSD's site so that users could go directly to the schools' home pages for more information. The site boasts an NLM training fact sheet that gives a history of ORAU's involvement with the NLM as well as information on and the status of each project. Each time an agency is listed, Hubbard said it can be accessed through a hyperlink so that the user can go to that site if desired.

A different section of the site included a list of contacts and phone numbers at each institution involved with the NLM; another featured a short bibliography of Articles published in the ORAU newsletter and the local Oak Ridge, Tennessee, newspaper.

A comment was made by a panel member that stressed the importance of keeping ORISE updated on each institution's activities so that they can be included on the site. An example of the site's use: When Dr. Copeland was going up for tenure, an Article written for the Oak Ridge paper, which could be accessed and downloaded from the

site, was used to demonstrate his involvement with important issues on the national level.

In conclusion, Hubbard said that ORISE and the NLM have been working together to look for different ways to communicate information to the public and that this is only one of many ways to achieve this goal. He called for the institutions to supply information on their activities and projects so that people will become more educated as to the mission of the NLM and the work they are doing with HBCUs.

 [Return to top](#)

Howard University

Dr. Robert Taylor expressed Howard University's pleasure at working with the NLM and said the relationship was an excellent example of how a single idea can grow into a series of opportunities for departments and universities. He then introduced Dr. Robert Copeland, who gave a synopsis of Howard's involvement with the NLM.

Copeland referred to five different activities in the Department of Pharmacology that have come about due to Howard's involvement with the NLM program. One effort involves the use of multimedia presentations in courses, including electronic syllabi, which limits the use of paper. Another activity involves the creation of a Pharmacology Home Page on the Internet, a resource that includes information relating to the department, research facilities, the university, course numbers for medical students and graduate students, etc. Links were also established directly to NLM resources, as well as a variety of other sites on the World Wide Web.

Copeland also spoke of a course he teaches on medical informatics for medical students. The course which lasts more than 13 weeks, expands upon NLM-sponsored database training taught in three- and five-day courses. This expansion, he said, allows the students to investigate each complicated database thoroughly so that they understand what information is available in each. The elective course, which is available to second- and fourth-year students, has become so popular, Copeland has had to turn people away. He stated that the university is investigating offering a similar course to first-year students so that they will learn how to use the NLM databases before they get into a lot of the clinical areas.

Also available is a course in medical informatics for pharmacology graduate students. While required in the pharmacology department, it is an elective option for other graduate programs in physiology, biochemistry, and microbiology, and Copeland said the students in these areas have gotten a great deal from the course. In the works is a Ph.D. program in medical informatics, and the department is also working toward having monthly seminars/brown bags on informatics issues. While the Ph.D. program is still in the developmental stages, Copeland said the program will probably be a multidisciplinary effort between computer sciences, engineering, and pharmacology. Copeland went on to say that the medical informatics effort permeates the entire health complex at the university.

Morehouse School of Medicine

Dr. Mohamed Bayorh of the Morehouse School of Medicine, being a very recent replacement to the panel, had nothing to update at the meeting, so he chose to give an overall outline of the school's activities. In his eleventh year at Morehouse, Bayorh, who received his Ph.D. from Howard University's Department of Pharmacology in 1980 is an associate professor and is concerned for countries lacking minority toxicologists. Morehouse has strong, active support in terms of computer networking--it receives extensive support from the Research Center for Minority Institutions (RCMI) program, which is funded by the NIH--and there is an interconnected computer laboratory for students. Many faculty members have extensive computer training.

Bayorh sees the future of Morehouse regarding the use of the NLM databases and encouraging minority representation in these areas to be similar to that of the programs and activities of Howard University. He cited the training Howard received in the use of TOXNET, accessing NLM resources, etc., stating that he would like to see Morehouse use this type of information to help student and faculty development.

Xavier University

Dr. Ann Barbre was proud to show panel members publications featuring Xavier's new library, which features a fifth floor dedicated to computer applications and information retrieval. This floor is not yet complete, but other computer stations, which provide access to NLM databases, are operational. There are two workstations dedicated to NLM access; one on the first floor intended for undergraduates, and one on the fourth floor intended for pharmacy students. Barbre said that students from many different disciplines such as sociology (environmental justice), anesthesiology, and philosophy (health ethics) use the databases.

The Drug Information Center (DIC) continues to be a big user of the system. The center responds to drug information inquiries. As anticipated, Barbre reported that a large number of pharmacists request information as well as a large number of physicians, but the center is receiving more and more requests from dentists, registered nurses, medical students, and members of the lay public. While it was not the center's intention to provide information to the lay public, free access to the NLM system enables it to provide this service. Inquiries are also received from drug wholesalers in the area, who sometimes try to match information about drugs about which they have had inquiries. Student use is also high. In the past year, 17 students took specialized rotations in drug information as part of their clinical training.

Xavier is affiliated with hospitals such as the Medical Center of Louisiana at New Orleans, the Veterans Administration Hospital, and Tulane University Medical Center. The faculty of Xavier serves the pharmacy and therapeutics committees for Tulane and Louisiana State University, and they use the NLM system in preparing drug evaluation monographs and other pharmacy issues. Clinical faculty in the medical center use the DIC system almost exclusively.

This year, 90 pharmacy students completed training on the system for a course in drug information, and 87 students received further training at the DIC as part of their case work for clinical rotations. Students taking required courses seminar also use the NLM bibliographic retrieval system, and a number of elective courses have been developed in which students are required to do bibliographic retrieval. A new course, Issues in Pharmaceutical Care, will require a weekly presentation that will involve frequent use of the system. By introducing the students early on to the usefulness of the NLM resources, they are able to understand how large the scope of information is and how to access it.

Texas Southern University

Dr. Theodore Bates, Texas Southern University, updated the progress of the university's new Ph.D. program in environmental toxicology, a joint program between the College of Pharmacy, the chemistry department, and the biology department. The program, which started in September 1994, currently has six candidates. Bates has already done a preliminary training session for the candidates on the NLM databases, which, he said, are extremely important to the program.

The NLM databases play an integral part in other programs at the university. Bates conducts training for personnel and graduate students involved with the Minority Center for Toxicological Research, a center created through a corporate interagency agreement with the ATSDR. College of Pharmacy doctoral candidates take part in four training sessions, with three being conducted in the first year prior to beginning the research component.

The university encourages undergraduates to pursue advanced degrees; this enthusiasm has led to the winning of grants, especially through the Department of Education, to train minority students in research and encourage them to pursue degrees beyond the bachelor's. The university has also added to the Bridges Program, which helps to bridge the gap between students at community colleges and regular universities; both programs utilize the NLM databases. Community outreach programs relating to education on topics such as hypertension and diabetes also use the databases. Bates also mentioned a new drug information systems course for undergraduates that is under development.

Florida A&M University

Dr. Henry Lewis III discussed the newest Ph.D. track available in the pharmacy school at Florida A&M University--environmental toxicology. The initiative recently graduated its first Ph.D. and has nine students currently in the program; Lewis said that they have hired two new toxicologists. He stated that the NLM effort begun at the university is indeed paying off; all of the pharmacy school's graduate programs use the databases extensively. Access and use should increase university-wide due to the new fiber optic backbone donated and installed by Sprint Cellular, and that will allow the university to expand its video, audio, telecommunications, and teleconferencing capabilities.

The university library recently underwent total renovation--it now boasts an additional 700 square feet of space and 10 new workstations, which will increase accessibility to the data systems and databases. In the planning stages is a new pharmacy building that will feature a state-of-art library that focuses less on paper and more on technological resources.

Lewis spoke about the university's intention to create the Institute of Public Health within the pharmacy school. Planning is now focused on the long-range goal of the university to develop a school of public health, and the proposed institute would be a stepping mechanism toward the school concept. Initial plans include the creation of a national advisory council or panel that would advise the university on the direction and scope and what kinds of programs should be offered in the school of public health.

Also discussed was the university's affiliation with the Minority Health Professions Foundation, the conduit through which the Mississippi Delta project is conducted.

Lewis reported on the projects through a cooperative agreement with the ATSDR/CDC, including toxic profiles the university is doing for substance-specific research. He mentioned three schools that are involved in the Delta program through the university's cooperative agreement: Howard University College of Nursing, which is conducting nursing education program within the Delta Region; Texas Southern University College of Pharmacy, which is conducting environmental information training for pharmacists in the region; and the Morehouse School of Medicine, which has a piece for teaching physicians toxicological information in conjunction with the National and Regional National Medical Association meetings.

Tuskegee University

Dr. James Webster reported that a number of projects involving the NLM are under way at Tuskegee University. TOXNET is available in the library of the School of Veterinary Medicine and is accessible from 8:00 a.m. to 5:00 p. m. daily, with the exception of Sundays. Two staff members are trained to execute the system or to assist the students in finding information. Each year, approximately 50 to 55 students are trained in using TOXNET as part of a toxicology course. The university also offers an undergraduate degree in environmental sciences that utilizes TOXNET, and the chemistry department uses the databases as well.

Other efforts include the implementation of electronic syllabi and the development of a poisonous plant program that features digital images of harmful vegetation with accompanying text to outline toxicity, clinical signs, etc.

The university was also pleased to announce that it will hire its first graduate with a Ph.D. in environmental toxicology to assist in the environmental veterinary medicine program. Webster also announced that the ATSDR's project to create an environmental toxicology laboratory is temporarily on hold, but the university is currently using an animal support system, which allows for the study of multigenerational effects caused by various toxins.

Webster also spoke about the fiber optic backbone throughout the Tuskegee campus. The campus also has Internet, and Mosaic software enables the campus to be a beta test site for the programs outlined above.

Meharry Medical College

Dr. Maurice Knuckles from Meharry Medical College opened by saying that NLM usage at Meharry can be categorized in three ways: (1) the college uses it for training purposes, (2) all incoming students (currently 80 medical students, 60 dental, and about 50 graduate students) are required to go through a preliminary orientation to the NLM databases, and (3) the databases are utilized in various courses, such as environmental science, toxicology, and the animal use and experimentation course.

In addition, the databases are also used in the campus health and safety program; the college now boasts an industrial hygienist who handles all inquiries and uses the databases to answer questions. The databases also serve to aid in community requests and questions. Knuckles said that requests in this area from members of the Tennessee Environmental Council, lawyers seeking help on case research, and in-service training for physicians and nurses, have almost reached an unmanageable level because the college doesn't have enough staff to handle all requests.

Another way the college uses the databases is for research, and one of its big undertakings is the Mississippi Delta project. The college uses the TRI database primarily for locating ongoing waste emitted in the Delta. The ATSDR's HazDat database is also used to determine chemicals in the other hazardous waste sites as well. In addition, Meharry uses the databases to aid in grant writing; Knuckles said that much of the basic data regarding chemicals, etc., comes directly from the databases.

Knuckles then went on to give examples of how NLM support has aided the college. Approximately two years ago, Meharry began a substance-specific research program with the ATSDR. Working closely with the Research Center for Minority Institutions (RCMI) and with support from the NLM, the college started the environmental health and toxicology unit within the department of family preventive medicine. In October 1994, the unit became the Division of Environmental Health at Meharry Medical College. The college is also working to develop a Ph.D. program in toxicology, and the Division of Environmental Health is also developing a master's program in public health focusing on environmental health at the practitioner level. Knuckles credits the NLM program and others with aiding the development of this infrastructure so that the college can: (1) train more people in this field, and (2) reach out to the community and communicate the issues, particularly as they relate to hazardous waste and chemicals.

Drew University of Medicine and Science

Dr. Isaac Reese reported that the Drew University of Medicine and Science training program is still operational; medical students undergo an introductory training as well as individual training as part of their Computers in Science course. The university has increased its number of computers; there are now 11 computers in the resource center and two of them are hooked up by telephone. In addition, the university is investigating Internet connection both at the hospital and the school. In the meantime, there is a pilot effort of 11 people who have dial-in Internet access.

Reese referred again to the university's work with high school students. The summer program, which is sponsored by the National Science Foundation, invited him back this past summer to talk with the students. Word of mouth has led to more inquiries in using the databases. Recent requests have come from a new pathologist, who wanted to present some cases, and the pharmacy staff, which now has full access via modem lines. Reese said that use is growing and people are finding it very helpful. He said he has also convinced his department to buy a LCD projector so that next summer when he has a group he can show the computer screen on the projector.

University of Arkansas at Pine Bluff

Mr. Edward Fontenette reported that the University of Arkansas at Pine Bluff had received a federal grant to initiate a degree program in regulatory sciences. In addition, the university is training students in information retrieval and using Grateful Med to introduce them to the toxic information available in the NLM's databases.

Fontenette himself recently participated in the NLM's training at Howard University. Citing increasing regulatory pressure from the Environmental Protection Agency and others, he spoke about the need for the new university

program to further expand to suit student needs and provide them with more in-depth training in the regulatory sciences. To meet stringent regulatory guidelines, local industry and state and local government has expressed interest in students trained in this area, and Fontenette said that the university hopes to broaden its pool of experts, through both faculty and students, to meet this need.

The university has also implemented the use of fiber optics in the Delta region in the hopes of being able to provide more access to research staff in the area. He stressed the intention to ensure that professionals in areas like AIDS-related social work, nursing, and other areas related to public health have immediate access to toxic information through this system.

Closing Remarks

During the panel meeting, Dr. Spann introduced Ms. Sandee Coulberson, Executive Secretary of the Lower Mississippi Delta Region project. He noted that the project has been in existence at the Agency for Toxic Substances and Disease Registry (ATSDR) for several years. When Dr. Charles Walker spent some time at the NLM, he expressed interest in integrating the HBCU outreach program with a Lower Mississippi Delta effort; this project has evolved from a set of nine schools to about 59 HBCUs and other minority institutions that have received training in the use of the NLM toxicology, environmental, and hazardous waste databases. He then introduced Coulberson.

Coulberson began by recognizing panel members that are also on the LMDR project's steering group, Dr. Lewis and Dr. Knuckles. The goal of the Mississippi Delta project is to identify the environmental hazards as well as the barriers to identifying the environmental hazards that exist in that region, a seven-state, 219-county area along the Mississippi Delta.

The first phase of the project is to conduct a needs assessment and gather data to identify the environmental hazards in the area. This phase will be conducted by Meharry Medical College through a cooperative agreement with the Minority Health Professions Foundation, and Dr. Knuckles will be conducting four profiles. Coulberson said they expect to have an idea of what will be in the initial profiles by the end of the fiscal year, and then they plan to have a workshop to communicate the initial findings to the public. Phase two, which consists of demonstration projects, will involve one or two activities in the region. Phase three will include more activities in the region.

Coulberson then went on to discuss the steering group, which consists of representatives of one HBCU from each state in the seven states--Kentucky, Illinois, Missouri, Mississippi, Tennessee, Arkansas, and Louisiana. Other steering group members include representatives from the state health departments or their environmental components, the ATSDR/CDC, the National Institutes of Health, NLM, and community representatives. There are four work groups that are working on other activities for the project. One is the membership work group; they are helping to identify groups that need to be involved in this effort. Other groups include the executive work group, the project structure work group, and the assessment work group, which will be working closely with Dr. Knuckles in developing the four profiles.

She then went on to discuss the ATSDR's effort to create a home page for the project, saying that one of her staff has been investigating putting the entire Mississippi Delta prospectus on the web. ATSDR has done one newsletter to date and plans to include that type of information as well.

Spann then closed the discussion, saying that just as this outreach project has led to the training of other HBCUs and minority institutions, it was also a model and platform for AIDS education training at HBCUs. In fact, he said, Oak Ridge is assisting the NLM in developing this training. He finished by introducing some of the NLM staff to the panel.

Discussion and Conclusion

In an open discussion session, a suggestion was brought to the floor by one of the panel members to investigate the possibilities of working together to benefit both an individual program, in this case the poisonous plant program at Tuskegee University, and the NLM's TOXLINE database.

Dr. Bailus Walker, Chair, then challenged the panel members to investigate public education efforts in the area of risk assessment, citing increasing federal scrutiny as well as the affected community's right and need to know. Discussion then led to the Mississippi Delta Project and how the program at Meharry Medical College would like to implement community education programs in the region provided there is adequate funding.

One panel member stated that it was now the role of Historically Black Colleges and Universities (HBCUs) to train the citizens in terms of exposure, consequences, etc. Another added that an additional way to address the problem of community education is to employ the support of existing environmental organizations in the affected communities.

Sandee Coulberson, ATSDR, spoke about how much more accessible the databases are due to Internet access at libraries. She suggested the possibility of having a mini training session for local librarians as they are expert in accessing computer information and conducting searches. Citizens could then be trained through the librarians. In addition, she spoke about the increasing access available to high school students and suggested that high school librarians be considered in an effort to reach students that will ultimately attend panel members' undergraduate institutions.

The conversation then turned to use of the LEARNs (the NLM's microcomputer-based tutorials). Coulberson found during an evaluation that there were not many sites using the LEARNs, but those that did indicated that they were helpful and the programs required less training time. She mentioned the addition of a new LEARN program and asked the NLM to investigate and try to overcome the barriers of universities so that more students would benefit from the LEARNs.

When asking about the Environmental Protection Agency's Toxic Release Inventory, panel members said they used it extensively.

Dr. Proctor expressed his appreciation for the panel as well as the support of the NLM and Dr. Melvin Spann. He then called upon Dr. Harold Schoolman to offer his comments on the development offered by the panel and its vendors. Dr. Schoolman, Deputy Director for Research and Education, stated that he was delighted at the progress made by the institutions. He noted the increasing pressure to deliver more information to the public but a decreasing federal focus to achieve it. That, he said, puts the library in a peculiar position of being a staunch advocate of the dissemination of health science information, but being unable to afford to take on a leadership role in this area. He stressed that institutions need to continue to expand their roles in the communities.

In closing, Dr. Walker summarized that the information shared around the table was clear evidence that substantial progress is being made in all of the institutions. He stated that the NLM and the SIS division could be very proud of the accomplishments that have been made thus far in this overall effort, but that this was just the beginning. He then stressed that, in order for continuing success and NLM support, each institution involved must continue to make progress and ensure that it reaches all segments of the surrounding community. He then thanked the NLM and Dr. Spann "for really moving this forward and ensuring that we meet the goals and objectives that were set when the program was established."

Disclaimer: Reference to an external Internet resource on this Server does not constitute a recommendation or

endorsement by the National Library of Medicine of the services or views described in that resource.

[▶ Return to top](#)

[U.S. National Library of Medicine](#), 8600 Rockville Pike, Bethesda, MD 20894,
[National Institutes of Health](#), [Department of Health & Human Services](#)
[Copyright and Privacy Policy](#), [Freedom of Information Act](#), [Accessibility](#)

Customer Service: tehip@tehl.nlm.nih.gov.

Last modified on March 10, 2005