Presentation of the 2009 Morris F Collen Award to Betsy L Humphreys, with remarks from the recipient

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ABSTRACT

The American College of Medical Informatics is an honorary society established to recognize those who have made sustained contributions to the field. Its highest award, for lifetime achievement and contributions to the discipline of medical informatics, is the Morris F Collen Award. Dr Collen’s own efforts as a pioneer in the field stand out as the embodiment of creativity, intellectual rigor, perseverance, and personal integrity. The Collen Award, given once a year, honors an individual whose attainments have, throughout a whole career, substantially advanced the science and art of biomedical informatics. In 2009, the college was proud to present the Collen Award to Betsy Humphreys, MLS, deputy director of the National Library of Medicine. Ms Humphreys has dedicated her career to enabling more effective integration and exchange of electronic information. Her work has involved new knowledge sources and innovative strategies for advancing health data standards to accomplish these goals. Ms Humphreys becomes the first librarian to receive the Collen Award. Dr Collen, on the occasion of his 96th birthday, personally presented the award to Ms Humphreys.

Betsy graduated from Smith College in 1969 with a bachelor’s degree in history and lots of practice in thinking and writing. By then married to a naval officer recently returned from Southeast Asia, Betsy Humphreys spent the next two years in Antigua in the British West Indies. When her husband completed his military service in 1971, she relocated to the Washington, DC, area and began graduate studies at the University of Maryland’s School of Library and Information Service. As she was finishing a master’s degree, one of her professors, who had previous ties to the National Library of Medicine (NLM), was asked by a former colleague to recommend some recent library school graduates to work on special short-term projects. Betsy was hired for a 4-month appointment at NLM in 1973 and has been there ever since.

LIBRARY AUTOMATION

Within days of her arrival at NLM, Betsy was assigned to help fast-track the development of an online database of approximately 6000 major medical serial titles (primarily journals), including locator information to indicate which of approximately 120 US academic medical libraries owned each title. The database was being built and edited using Inquire, a large and flexible database management system (DBMS) that ran on IBM

Figure 1 Betsy L Humphreys.
mainframe computers. The plan was to maintain what was to be called the SERLINE (SERials-on-LINE) file in the DBMS and export a copy of it monthly to NLM’s ELHILL retrieval system for searching by the library community. Betsy’s first job was to review and edit the entries online using the Inquire DBMS and a Texas Instrument terminal with thermal paper. The NLM was thus the first organization to use Inquire for bibliographic data storage and retrieval and to exercise its very new online editing capabilities. This made NLM quite possibly the first library to use any general-purpose DBMS to automate library functions.

‘The first project I was put on essentially turned me into what we might now call a super-user of the IBM 360 and a large database management system.’

Betsy Humphreys

This experience led Betsy to think that the DBMS would be a good tool for automating the acquisition and management of NLM’s entire collection of some 20,000 active serial publications, which was then totally manual. Working with a systems analyst who was one of her early mentors, she developed the design, implementation plan, and cost estimates for a master serials system1 and in 1975 presented the proposal to NLM’s director, Martin Cummings, who approved it. Inquire was not a relational DBMS, but it had a then innovative multilevel capability that allowed flexible connection and integrated output of data stored in different physical files. This was well-suited to the different types of data NLM needed to manage—acquisition, indexing, document delivery, binding, and microfilming of serial titles.

Within three years of arriving at NLM, Betsy was leading a major data conversion and system development effort, with associated contracts, process redesign, and major staff retaining.

‘I thought NLM was the greatest place to work in the world. I had all these fascinating things to do, and I got to work with great people.’

Betsy Humphreys

By 1977, a greatly expanded public SERLINE file was being generated as a by-product of NLM’s new internal master serials system, which also became the source of journal title information in the MEDLINE database and of several print publications.

As support for interlibrary document delivery throughout the National Network of Libraries of Medicine, the public SERLINE file, with its location symbols for approximately 120 major academic medical libraries, was a poor alternative to the many existing regional and local serials holdings lists, which included more detailed holdings information for a much larger number of libraries. In the late 1970s, NLM was contemplating the development of an automated document request and routing system to streamline document delivery throughout the network. To distribute requests efficiently to institutions that owned specific journals, such a system would need access to a national repository of more detailed and standardized electronic holdings data for large and small health sciences libraries.

Betsy Humphreys developed the plan and initiated the creation of this national serials holdings database.2 The effort involved preliminary studies to scope the problem; the development of a standard format for serials holdings data that could be used in an automated routing algorithm; a one-time project involving automated lexical matching to insert standard NLM identifiers for journal titles in more than 20 existing holdings databases so that data from these sources could be correctly merged; and mobilization of the Regional Medical Libraries to encourage more than 2000 health sciences libraries to create new electronic holdings data in the standard format and with the standard identifier.

‘This was a formidable task, not because of the technology which she had mastered easily but because of the passion that the medical librarians had for the detail in their very accurate holdings lists. However, Betsy was able to use her considerable political skills, skills that she still has to use today, to convince medical librarians of the importance of this project.’

Julie J McGowan, PhD, Indiana University

Whether they know it or not, most US and Canadian hospital-based clinicians, faculty in health professions schools, and biomedical researchers have indirectly used DOCLINE, NLM’s automated document request and routing system that uses this national holdings database. DOCLINE has been employed by thousands of health sciences libraries to obtain copies of many millions of journal articles not contained in their local collections since first implemented in 1985.

UNIFIED MEDICAL LANGUAGE SYSTEM

In 1984, Donald AB Lindberg was appointed director of the National Library of Medicine. He saw the potential in Betsy’s decade-plus of experience in database design, development, and management and her skill in forging interpersonal and interorganizational alliances to get things done.

‘I had not been so directly involved with the actual biomedical content… nor how NLM’s products and services might be used in the arena of patient records, or as we would say now, electronic health records… it was Don’s coming to NLM and starting the unified medical language system that really got me into that arena… obviously a fantastic opportunity for me.’

Betsy Humphreys

‘Without her we would not have gotten through those years of UMLS work… where… I think the weapon that she applied, again, was sort of grace and intelligence but also a good bit of patience.’

Don Lindberg

While continuing as NLM’s deputy associate director for library operations, Betsy helped to define the initial scope of the unified medical language system (UMLS) project and then served as project officer on the initial UMLS research and development contracts awarded in 1986.3 The principal investigators were a virtual who’s who of the giants in the field of biomedical informatics and, coincidentally, most of them were longtime friends of Don Lindberg.

‘The… rules and requirements around contracts are a little different, they weren’t used to them… I thought to myself… I am going to have to make this work for us and for them… I am going to have to insulate them from as much “mickey mouse” as possible because I’m not too interested in having them… calling Don about all of this rigamarole that I am putting them through. To their credit they never did such a thing.’

Betsy Humphreys

Betsy’s personal contributions to defining the purpose, content, and formats of the UMLS knowledge sources4 were principally focused on the UMLS metathesaurus (figure 2). In a pattern that has repeated throughout her career, she also played a role in promoting broader dissemination of the
outstanding work of her NLM colleagues—in this case, the SPECIALIST lexicon and associated lexical tools developed under the direction of Alexa McCray.

‘... somehow the SPECIALIST lexicon that Alexa developed came up in our discussion and I think I was going on and on about what a wonderful resource it was and how rich it was in linguistic detail and how valuable it would be for natural language processing... and right away you said, “Oh I’m going to see if I can make it available for you and for the community”... and in a short time you actually made it available and not only the SPECIALIST lexicon but you also made available all the tools—the wonderful tools—that went along with it.’

Carol Friedman, PhD, Columbia University

PUBLIC HEALTH INFORMATICS
The combination of the success of the UMLS project, the knowledge of clinical and administrative coding systems, classifications, terminologies and thesauri gained in managing it; and additional responsibilities assumed as NLM’s first assistant director for health services research information led to assignments to represent the NLM and the National Institutes of Health on various Department of Health and Human Services data policy committees, focused on public health as well as administrative and clinical data, in the early 1990s.

‘Betsy was a clear voice not only about how we could develop the UMLS but also how that could apply and so she really has been a stalwart in moving forward the concept of public health informatics...’

John Lumpkin, MD, MPH, Robert Wood Johnson Foundation

In cooperation with the Office of Assistant Secretary for Health, Health and Human Services, and the Centers for Disease Control and Prevention, Betsy organized what turned out to be a seminal meeting of the public health, medical informatics, and health sciences library communities.5 She then directly influenced considerable expansion of NLM’s programs in public health and public health informatics, in line with recommendations arising from the meeting.6 For example, as project officer for the NLM R&D contract that supported the development of the Indianapolis Patient Care Network, she initiated the extension that established connections to public health departments to test electronic notifiable disease reporting.

Betsy also played a role in increasing the American Medical Informatics Association’s (AMIA) attention to public health. She chaired the first AMIA meeting in which public health was a major theme in 1996 and helped to organize the 2001 meeting that proposed an agenda for public health informatics.7

HEALTH DATA POLICY AND STANDARDS
Don Lindberg’s interest in engaging the national academies to examine issues important to the effective use of electronic health data led to Betsy’s involvement in defining and commissioning a number of influential studies by the Computer Sciences and Telecommunications Board, including ‘For the record: protecting electronic health data’8 ‘Networking health: prescriptions for the internet’,9 and ‘Computational technology for effective health care: immediate steps and strategic directions’.10

Knowledge gained from the UMLS project and work on health data policy convinced Betsy that it was critical for the USA to designate specific terminologies as target standards for clinical systems, to make these standards broadly available for testing and use in real systems, and to ensure that they had the support necessary for ongoing maintenance in response to developments in scientific knowledge and feedback from users. Her involvement with the implementation of the standards provisions of the Health Insurance Portability and Accountability Act of 1996 opened an avenue for pursuing this agenda, which eventually led to NLM’s support for free US-wide access to the key terminology standards that are now targets for meaningful use of electronic health records.

‘Patient, persistent, always calm, continues to work on it and gradually, gradually, gradually it all comes together... so she’s just been spectacular in her influence on vocabulary.’

Clem McDonald, MD, National Library of Medicine

‘Who but Betsy would have the patience and the persistence to negotiate a global license to SNOMED terminology.’

Bill Stead, MD, Vanderbilt University

Having concluded negotiations for a US-wide license for SNOMED CT with the College of American Pathologists in 2003, Betsy was inevitably involved in ensuring that US interests were well-served when the College of American Pathologists decided to transfer its intellectual property to a new international organization formed for that purpose. The NLM is the US member of the International Health Terminology Standards Development Organization. Betsy serves as the first chair of its general assembly. She continues to oversee NLM’s extensive activities related to clinical terminology standards and to work closely with the office of the national coordinator for health information technology.

Now NLM’s deputy director, Betsy has a broad portfolio, including other data and information policy issues, such as clinical trials registration and results reporting and public access to the results of government-funded research.11
PERSONAL LIFE
Having grown up in an active, athletic family, Betsy finds relaxation and rejuvenation in hiking, an activity she has enjoyed around the world (figure 3). Having met on the trail in 1979 and married in 1982, Betsy and her second husband, Glenn Palatini, share strong interests in hiking (figure 4) and in opera. They live near Glenn’s daughter from a previous marriage, Shereen, their son-in-law, Mario Sorto, and grand-daughters, Gabriela and Olivia (figure 5). Now more than 90, Betsy’s mother still plays tennis. Her sister Fay, brother-in-law David Hannon, brother Peter, and his partner Marla Bodi were present in San Francisco when Betsy received the Collen Award. Fay is an artist whose work is on display in Betsy’s office, and Peter is a musician who supplied some of the music for the sound track on the award video.

PROFESSIONAL ACTIVITIES AND HONORS
Betsy has held offices, served on committees, helped to organize meetings, and supported recruitment and professional development opportunities for several professional associations including AMIA, the Medical Library Association, and the Association of Academic Health Sciences Libraries. She presents and publishes widely and has been an associate editor of the *Journal of the American Medical Informatics Association* since 2000. Her many honors and awards include election to the Institute of Medicine in 1999, the inaugural Cornerstone Award presented by the Association of Academic Health Sciences Libraries in 2006, the 2007 Marcia C Noyes Award (figure 6), which is the Medical Library Association’s highest honor, and now the Morris F Collen Award.

‘Betsy your medical library colleagues from around the world congratulate you on this fantastic accomplishment.’

Julie McGowan

‘Betsy you’re the greatest… you’re absolutely deserving of this award and I’m so happy that you got it, it’s about time.’

Clem McDonald

‘Wonderful choice, couldn’t have been a better choice really. It’s great to see her being honored for the very hard work she’s been doing.’

John Lumpkin

‘Betsy I want to congratulate you on this richly deserved honor… whenever anything important happens in informatics, I know your fingers are in it somewhere.’

Bill Stead

‘... I think we ought to say a word or two about Morris Collen… we all love him and he’s a pioneer in the field... he didn’t have a Betsy… no telling how far or much he’d have accomplished if he’d had a Betsy.’

Don Lindberg

In accepting the award from Dr Collen and Joyce Mitchell, president of the college, Betsy Humphreys advised the audience to check with her husband and other relatives present for ‘a more balanced picture of Betsy’. She then made the following remarks:

‘I thank the college for the truly great honor of being on the same list with Morris Collen and the previous Collen Award winners. I have had the great privilege and pleasure of knowing all of them and working closely with many of them. In this case, familiarity breeds respect and admiration.

‘Richard Hamming, the inventor of error-correcting codes for computers, once said “if you don’t work on important problems, it’s unlikely that you’ll do important work.” So I am thankful to those who had a hand in bringing me to the National Library of Medicine 37 years ago. NLM’s mission—to improve access to biomedical information for the advancement of science, health care, and the public’s health—provides tremendous scope for attacking important problems.'
‘Of course, I will be forever indebted to Don Lindberg for giving me the opportunity—along with tremendous and unfailing support—to work on challenging and exciting problems for which my credentials are somewhat unusual, to say the least. It’s true that Don might have started me out on a slightly easier problem than the UMLS goal of making it possible for computers to understand biomedical meaning—but he certainly set me up for long-term employment.

‘Building scalable information infrastructure—which is one way of describing what I have been engaged in throughout my career—is definitely a multidisciplinary team sport. The main secret of my success is that I have worked exclusively with the informatics equivalent of “dream teams”—with incredible players from every part of NLM and from literally hundreds of institutions, agencies, and organizations across the country and around the world. So I thank all those who have worked with me on important problems and made the achievements that led to this award possible.

‘It is exciting to be working in our field today, at a point when years of work may yield widespread deployment of electronic health records. To quote Don Lindberg, “systems that get used get better”, so I encourage all of you to promote real use of—and feedback on—the health data standards that we are finally converging on. And if it should cross your mind to develop yet another biomedical vocabulary, please DON’T do it.’

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REFERENCES

Figure 6 Jean Shipman, Medical Library Association president, and Betsy Humphreys, 2007.