The American College of Medical Informatics is an honorary society established to recognize those who have made sustained contributions to the field. Since its founding in 1984, 170 fellows have been elected to the College. Its highest award, for lifetime achievement and contributions to the discipline of medical informatics, is the Morris F. Collen, MD, award. Dr. Collen’s own efforts as a pioneer in the field stand as the embodiment of creativity, intellectual rigor, perseverance, and personal integrity. And so it is that the College gives its highest recognition to those whose attainments have, throughout their careers, substantially advanced the science and art of medical informatics. The College is proud to announce that the 1997 recipient of the Collen award is Dr. Donald A. B. Lindberg.

Born of Swedish–American parents in 1933, Don Lindberg grew up in Brooklyn, New York. An honors graduate of the Polytechnic Prep School in Brooklyn, he attended Amherst College, where he majored in applied mathematics and graduated magna cum laude in 1954. He returned to New York to attend the College of Physicians and Surgeons of Columbia University, and received his Doctor of Medicine degree in 1958.

After an internship and residency in pathology at Columbia Presbyterian Medical Center, he joined the pathology department faculty of the University of Missouri School of Medicine in Columbia, Missouri, in 1960. With the support of Dr. Vern Wilson, Dean of the School of Medicine, young Dr. Lindberg was soon engaged in the unprecedented activity of computerizing the clinical pathology laboratory services for the medical center. He developed applications to improve the speed, quality, and consistency of laboratory results reporting. He developed expert systems to assist in pathologic diagnosis and began publishing articles in the field that would become known as Medical Informatics. By the mid-1960s, he had garnered an international reputation as an expert in the use of computers in medicine.

The establishment of the federal Regional Medical Programs (RMP) initiative in the 1960s provided Dr. Lindberg and the University of Missouri RMP coordinator, Dr. Arthur Rickli, the opportunity and the resources to develop a number of innovative computer applications. Among these were an Automated Patient History Acquisition System that enabled patients to directly enter current symptoms into a computer terminal, employing graphics to reduce language barriers between patients and their physicians.

The RMP center in Columbia provided information services to regional affiliates via “FACTBank,” an acronym for Fast Access to Current Text, using electro-mechanical access to stored microfiche of page images, searchable by Medical Subject Headings. It represented the state-of-the-art in electronic document storage and retrieval, providing access to any of thousands of microfilmed pages within 15 seconds. The Missouri RMP was also one of the first to operationalize the automated interpretation of electrocardiograms acquired via telemetry over phone lines.

Dr. Lindberg’s application of expert systems algorithms led to the development of CONSIDER, an early differential diagnostic program, and later the criteria table form of knowledge representation and reasoning upon which AI/Rheum—a diagnostic expert system in Rheumatology—was built. AI/Rheum is particularly notable for its ability to educate its clinician users...
to make the proper observations via a rich variety of textual and image-based reference information.

Dr. Lindberg rose through the academic ranks during a 24-year career at the University of Missouri, becoming Professor of Pathology and Director of the Information Science Group. As his international reputation in the field of medical information systems grew, Dr. Lindberg was appointed to review groups and advisory committees of the National Institutes of Health, including the Board of Scientific Counselors of the National Library of Medicine. Thus, in 1984, the NIH in its nationwide search for a scholar and administrator chose Dr. Lindberg to be the Director of the National Library of Medicine.

When Don Lindberg arrived at NLM, the institution had a 148-year history of steady service to health professionals. Medline was primarily a medical librarian’s tool, available during regular business hours, Eastern time, five days a week. The new director began his relentless pursuit of increased availability, ease of use, and broader constituencies for NLM’s online information services. Within a few months, Medline was available seven days a week, essentially 24 hours a day. To make the searching of NLM databases more user friendly, he introduced Grateful Med, a forms-based searching program for microcomputers, which marked the beginning of an era of new products notable for technical innovation and whimsical names.

He sought best guidance for the future directions of the Library, and convened more than 120 experts in libraries, medical informatics, and health professions education to create a 20-year long-range plan for the NLM as a world resource. From the dozens of recommendations of the long-range planning committees, several emerged as top priorities for the institution.

The information systems support for modern molecular biology and the nascent Human Genome Project were recognized by Dr. Lindberg as essential tools for the coming era of molecular medicine, and he led the Library in creating a National Center for Biotechnology Information. NCBI is now home to GenBank, the national DNA sequence databank, and has developed a spectacularly successful set of search tools and algorithms in use worldwide.

Recognizing the potential provided by modern computing and communications technologies for representation of biologic structure, Dr. Lindberg endorsed the idea of a national reference dataset of three-dimensional anatomic data, the Visible Human project, which has become the focal point for development of interactive tools for education, research, and health care delivery. The project has captured the eye and imagination of public media and presages an increasing number of services for the lay public as well as for health professionals.

These visible advances of modern information systems are built on an invisible but essential infrastructure, and infrastructure figures prominently in the Lindberg-directed National Library of Medicine. There is infrastructure support for academic medical centers to weave their information resources into a seamless fabric, via IAIMS, the Integrated Advanced Information and Management Systems grant program. Dr. Lindberg’s personal vision for improving the infrastructure for representing medical meaning and coding is the goal of a decade-long investment in the Unified Medical Language System (UMLS). The UMLS provides an electronic rosetta stone in the form of a Metathesaurus linking a growing array of computerized naming and coding systems, and a variety of tools to build systems that recognize the common medical meanings behind hundreds of thousands of words, terms, and codes.

In 1991 the White House selected Dr. Lindberg to be the first director of the national High Performance Computing and Communications program—a federal research and development initiative to build the next generation of computing devices, high speed digital networks to connect them, new software technologies
to take advantage of their capabilities, and education and training in their use. Under Lindberg’s direction, the program grew to more than a billion dollars and involved nearly a dozen different federal agencies. Importantly, this new initiative provided expanded funding for investigator-initiated medical informatics research in areas such as telemedicine and electronic patient records. Dr. Lindberg made sure that the national investment in advanced technologies for defense, aerospace, and the physical sciences was complemented by an investment in technologies for improving the nation’s health.

To garner the resources for the expanded national agenda of medical informatics research and development, Dr. Lindberg has been a persuasive proponent for health informatics in the U.S. Congress. The success of his efforts is reflected in a National Library of Medicine budget that has nearly quadrupled in size, from 43 million in 1983 to 160 million dollars annually.

For many years Dr. Lindberg was the U.S. national representative to IMIA, the International Medical Informatics Association. He was a central figure in the creation of the American Medical Informatics Association and was named its first President in 1991.

Emerson wrote: “The scholar is that man who must take up into himself all the ability of the time, all the contributions of the past, all the hopes of the future.” But scholarship alone does not explain the outstanding achievements of a professional career spanning nearly 40 years. For sustained success, scholarship must be guided by other qualities. Those who know Don Lindberg best reflect on the qualities which have made his career so rich with accomplishment.

Joyce Mitchell, Associate Dean, University of Missouri School of Medicine: “At Missouri he’s considered to be 30 years ahead of his time, and people who knew him when he was at Missouri still say that. What he was envisioning 30 years ago is just now taking place in terms of the use of computers in clinical care. One thing that he did while he was there that was just remarkable was to build the first clinical laboratory system in the whole world. And he did that because he saw there was a need to take care of patients better and to distribute data to the folks who needed the data to take care of patients. If you look now, it is a common part of our lives: everybody in the entire world has a lab system. He could envision that and create it, make it a reality as the first person in the world.

“He can do that with other things as well. When he first started talking about the UMLS, he could see how that was a rate-limiting step in how you handle clinical information, and get started on the first steps, and pull the people around him to make that a reality, even though he knew that it was going to be at least a 20-year quest.”

Mary Lindberg: “Perhaps his childhood, his upbringing, and his Swedish heritage have had something to do with that. He’s very tolerant. He accepts people as they are, for the qualities they have, and has managed to surround himself with people of various talents and persuasions. I think it’s been part of the secret of what he’s done. And he never forgets, whether he is in a department of pathology or in an administrative position, or now as Director of the National Library, that the patient is important. That struck me about him when I met him as a medical student; his concern was for the patient. He did go into an academic field and has not been clinically involved in the sense of being a hands-on physician, but he is first and foremost a physician and his concern is for the patient. And when he collects the medical literature of the world, he’s doing it with the idea of helping the physicians who are directly aiding and helping the patient.

G. Octo Barnett, 1996 Morris F. Collen Award winner: “Since the early 1960s it has been my pleasure to work with Don in a variety of organizational activities—in AMIA, in the NIH, and in the National Library of Medicine, particularly in the development of electronic medical record systems and the UMLS. I’ve always been impressed by the imagination and ingenuity he has demonstrated in identifying exciting technologic initiatives, by the graciousness with which he led committee activities, by his willingness to change his position after such discussions, and by the candor he demonstrates in identifying certain positions as nonsense. In the last decade Don has played a very important part, demonstrating political savvy and very strong leadership in guiding a very important and enormously influential National Library of Medicine.

“Don is a very warm and generous friend whose support and collaboration have been very important to me over these past 30 years. I am delighted that ACMI has chosen to honor him with this award.”

Burton J. Hendrick wrote that: “The great glory of modern medicine is that it regards nothing as essential but the truth.” In pursuit of that truth, and the means to make it ever more widely available to others, the contributions of Donald Lindberg to the field of medical informatics and to all humanity make him a fitting recipient of the 1997 Collen Award for lifetime achievement.