MEDINFO 2001
V. Patel et al. (Eds)
Amsterdam: IOS Press

UMIN – Key Information Infrastructure for the Japanese Medical Community

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Abstract

University hospital Medical Information Network (UMIN) was established in 1989 as a collaborative project of national university hospitals in Japan funded by the Ministry of Education, Science, Sports, and Culture, and it started its Internet-based service for medical professionals in 1995. Since then, many services including those for academic societies and research groups have been added. Currently, due to batch registration of the members of large academic societies, the number of registered users and Web accesses are rapidly increasing (about 87,000 registered users and 4,500,000 page views in November, 2000). More than one hundred homepages of academic societies and research groups (including forty- two member-only ones) and one thousand mailing lists are operated. More than one hundred thirty academic societies collect abstracts using the UMIN server. All the Internet-based clinical and epidemiological research projects in Japan are now under way using UMIN. The characteristics of UMIN are its large variety of services and large number of user accounts of medical professionals, which are beneficial to both users and information service providers. UMIN is now important for some medical specialties and will be so for further ones in the future. UMIN is, in fact, evolving into a collaborative project of the Japanese medical community and is considered as its key information infrastructure.

Keywords:

Internet; academic information; research support system

Introduction

UMIN (University hospital Medical Information Network) was established in 1989 as a network organization for forty-two national university hospitals in Japan funded by the Ministry of Education, Science, Sports, and Culture [1]. Its primary purpose is to increase the efficiency of management of national university hospitals by sharing information systems and databases, and by facilitating network-based communications and online electronic data exchanges. Its first network system (1989) was developed as a closed network using N1-protocol developed in Japan. In 1995, UMIN started Internet-based services and then made them available to all medical professionals. Today, many important information services are provided and the number of registered UMIN users is more than 87,000. In this paper, we review the current status and services of UMIN and discuss its role and significance for the Japanese medical community.

Organizations

The UMIN Center and other support staff

The UMIN Center is located in the University of Tokyo Hospital. The center staff is made up of one researcher (director), four computer operators, and two clerks. In addition, a few system engineers are usually engaged in software development. There is one UMIN local part-time clerk who is engaged in local user administration and support in all national university hospitals and some private university hospitals. Academic societies which have registered all their members with UMIN support their own members.

Committees

UMIN is managed by a Steering Committee made up of twenty-two members who represent the national university hospitals, and four members who represent medical professions, namely hospital administration staff, nurses, pharmacists, and laboratory technicians. Under the Steering Committee, there are seven subcommittees, namely the Hospital Management Subcommittee, Drug Information Subcommittee, Nursing Information Subcommittee, Laboratory Information Subcommittee, Network Technology Subcommittee, Dental Information Subcommittee, and Clinical Trial Subcommittee.

Usage Statistics

The number of total registered users in each month is shown in Fig.1. The current rapid user increase is due to batch registration of members of large academic societies such as the Japanese Society of Gastroenterology (27,000),

the Japanese Circulation Society (20,513) and the Japanese Neurosurgical Society (7,200)[2]. This means that all specialists in cardiology, gastroentelogy, and neurosuregery have UMIN accounts. The Japanese Society of Gastroenterolgocial Surgery (22,140), the Japanese Society of Nephrology (7,350), and the Japanese Association for Thoracic Surgery (9,113) are now preparing for batch registration. Before long more than one-third of Japanese medical doctors will have UMIN accounts (the number of medical doctors in Japan is about 280,000).

The number of web page accesses per month is shown in Fig.2. Currently 4.5 million pages are viewed per month and the number is rapidly increasing.

Overview of information services

Database services

Databases currently provided by UMIN are listed in Table 1. Some are open to the Intenet and the others are limited to UMIN registered users, national university users, etc. They can be classified into the following four categories:

1) Databases developed in national university hospitals

In national university hospitals, some databases have been developed for local use. We asked each hospital to donate such databases to UMIN. Thus, UMIN has promoted collaborative database sharing for mutual benefits.

2) Jointly purchased databases

National university hospitals have jointly purchased databases in order to obtain a discount on the purchase cost. UMIN offers such databases to users in national university hospitals using password-protected WWW servers. These databases can be also downloaded for local use. UMIN has contributed to increasing management efficiency in national university hospitals.

3) Databases developed in UMIN Center

The UMIN Center itself has prepared databases for its users. It asks academic societies and research funding organizations to offer their information to UMIN, and compiles an academic society database, an academic meeting database, a research funding organization database, and a research fund database. UMIN has contributed to promoting Internet-based, low cost delivery of research related information.

4) Databases developed by on-line data entry

These databases are mentioned under data collection support services.

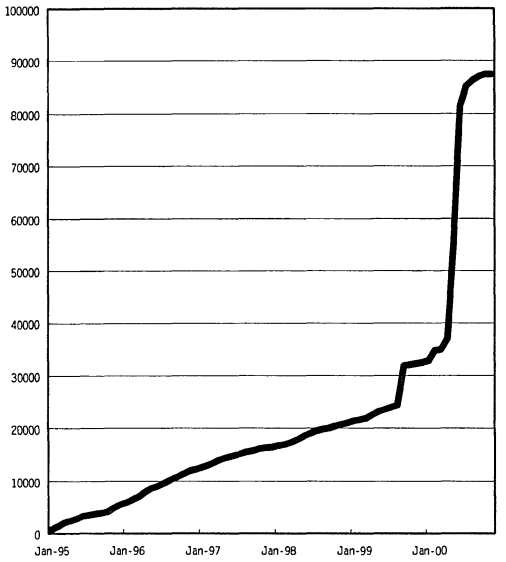

Figure 1. The number of registered users

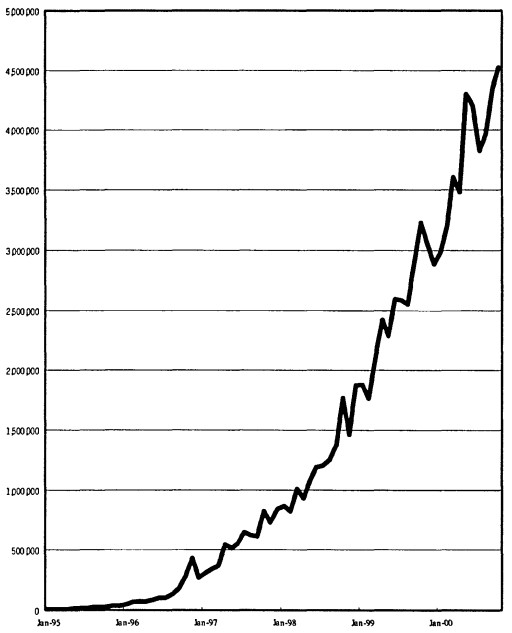

Figure 2. The number of total Web page accesses per month

Table 1. Databases provided by UMIN

Services	Data source etc.	Access
Clinical practice		
AIDS treatment manual full text database	Developed by Hokkaido University Hospital	Limited
Sarin intoxication treatment manual	Developed by St. Luka's International Hospital	Open
ICD-10 based disease nomenclature database	Jointly purchased by national university hospitals	Limited
Drug information full text database	Jointly purchased by national university hospitals	Limited
Drug adverse effect data base	Developed by the Ministry of Health and Welfare	Open
Drug information text database for patients	Developed by Hokkaido University Hospital	Limited
Drug information text database for pharmacists	Developed by Kanazawa University Hospital	Limited
Drug adverse effect reporting and retrieval system	Developed by online data entry	Limited
Intoxication database	Developed by Yamaguchi University Hospital	Open
Standardized nursing procedures database	Developed by Kagawa Medical School Hospital	Limited
Classification of intensity of nursing care	Developed by Kagoshima University Hospital	Open
Research related information		
Abstract and paper retrieval system	Developed by online data entry	Open/Limited
Medical researcher database	Developed by online data entry	Limited
Academic society database	Developed by the UMIN Center	Open
Academic meeting database	Developed by the UMIN Center	Open
Research funding organization database	Developed by the UMIN Center	Open
Research fund database	Developed by the UMIN Center	Open
Research hospital database	Developed by the UMIN Center	Open
Medical educational organization database	Developed by the UMIN Center	Open
Medical academic meeting database	Developed by the UMIN Center	Open
Visible human project data file archives	Developed by NLM, U.S.A.	Limited
Patient registry database		
Intracranial artery aneurysm case database	Developed by online data entry	Limited
Adult cardiovascular surgery database	Developed by online data entry	Limited
University hospital management		
Basic hospital statistics database	Developed by online data entry	Limited
Hospital management statistics database	Developed by online data entry	Limited
University hospital guides	Developed by online data entry	Open
Nursing practice survey statistics database	Developed by online data entry	Limited
Official documents database	Developed by online data entry	Limited
Medical supplies and materials database	Jointly purchased by national university hospitals	Limited
Master databases for patient fee calculation	Jointly purchased by national university hospitals	Limited
Medical term dictionary for hospital clerks	Developed by Hokkaido University Hospital	Limited
Mailing list and news archives		
JPMED articles database	Automatically compiled from submission	Limited
Mailing list article database	Automatically compiled from submission	Open/Limited

Rental homepage services

UMIN offers rental homepage services for academic societies and research groups. Currently, one hundred twenty homepages are provided using the services. Among them, twenty-four homepages are member-only ones protected by ID and password-based access authentication. Academic societies and research groups which have registered all or part of their members with UMIN prepare member-only homepages for their members. Registered UMIN users can access those of different academic societies or research groups using only one UMIN ID if they are members of them. This is very convenient for members of multiple academic societies or research groups. UMIN provides some Web-based application programs, namely member list database retrieval system, abstract and paper retrieval system, electronic bulletin board system, mailing list archive retrieval system, etc. for use in the member-only homepages.

Communication support services

For communications among medical professionals, UMIN offers email service, mailing list services and news services. UMIN developed a Web-based mail system in 1996 and offers it to its users. The significant characteristic of this system is the capability of handling encrypted email. The advantage of this system for handling encrypted email is discussed elsewhere[3]. The number of mailing lists operated in UMIN is more than one thousand. The largest one is "UMIN all-user mailing list", and the second largest is "all-member mailing list for the Japanese Society for Gastroenterology" which has about 27,000 members. All the academic societies who registered all their members with UMIN operate all-member mailing lists in UMIN. They informed their members that their announcements are sent to their UMIN email account. Each member of the academic societies can choose whether he or she will use the UMIN email server or specify their ordinary email address for email forwarding, using a Web-based user interface. This system is convenient because each academic society does not have to maintain current email addresses for their members.

Data collection support services

UMIN data collection support services are classified into the following four:

1) Data collection systems for university hospitals

UMIN collects monthly national university hospital basic statistics, yearly university hospital (including private, prefectural, and municipal university hospitals) management statistics, and yearly university hospital guides (list of departments, executive members, building maps, etc. of university hospitals in addition to major hospital statistics)[4]. The Ministry of Education, Science, Sports, and Culture uses the statistics to evaluate the management of each university hospital.

2) On-line abstract and paper entry system

UMIN offers an online abstract and paper entry system for Japanese academic societies and international academic meetings held in Japan. This system is designed to accommodate different data specifications used by each academic society. As for abstract entry for academic meetings, more than 130 Japanese academic societies use this system. In Japan, as far as we know, more than 95 percent of online abstract entries are performed using this system. UMIN offers a retrieval system for collected bibliographic information from abstracts and papers to Internet users free of charge. This database is an important free database for Japanese medical communities. As for abstracts and papers themselves, some are open to the Internet, while others are password-protected, according to the policy of each academic society.

3) Internet-based data collection system for medical research

Because of U.S. export regulation of high quality encryption algorithms, it was difficult in Japan to collect clinical and epidemiological research data using the Internet, although we had been interested in Internet-based research data collection systems [5-6]. Deregulation occurs at the end of 1999 and thus Internet-based data collection in Japan began in 2000. We are now operating four patient registration and random allocation systems for clinical trials, and one data collection system for epidemiological research. Two patient registration and random allocation systems and three data collection systems are now in preparation. As far as we know, all Internet-based research data collection in Japan is performed using the UMIN service.

4) MINCS program management system

Thirty Japanese national university hospitals have bi-directional, digital HDTV-based, satellite broadcasting systems called Medical Information Network by Communications Satellite for University Hospitals (MINCS-UH)[7]. UMIN offers an online broadcasting program information collection system for MINCS-UH.

Discussion

The characteristics of UMIN services today can be summarized as follows:

(1) Large variety of services

UMIN provides large variety of services, and they are available using only one UMIN ID. This is convenient for users. If each service were provided by a different site, users would have to have a different account for each service. As for providers of information services, UMIN is

also beneficial. Combinations of some services are necessary or desirable to carry out a specific project. For example, both mailing lists and member-only homepages are beneficial for Internet-based clinical research groups in addition to the research data entry system itself. Drug related information may be helpful for research participants.

(2) Large number of user accounts of medical professionals

As UMIN has offered attractive services to medical professionals, the number of registered users has increased. Today, the large number of user accounts itself becomes attractive to academic societies, research groups, and other parties. In gastroenterology, cardiology, nephrology, gastrointestinal surgery, thoracic surgery, and neurosurgery, since the largest academic societies among these specialties have registered all their members, other smaller and more specific academic societies and research groups do not have to register most members with UMIN in order to prepare their member-only homepage services. If each academic society or research group operated its own server and software, it would have to maintain hardware, software, and user accounts by itself. This is costly and laborious. As for freedom of operation, an individual server may be more flexible. But we believe that this merit does not exceed the demerits of cost and labor.

UMIN started as a collaborative project of the national university hospitals. Since then, many services including those for academic societies and research groups have been added. UMIN is now essential to some medical specialties in Japan. We believe that more medical specialties will join in the near future and that UMIN is now, in fact, evolving into a collaborative project of the Japanese medical community.

UMIN servers, databases, and software are shared resources for Japanese medical professionals. For their benefit, UMIN accounts can be used for various purposes. We think that these UMIN resources can be considered as the key information infrastructure for the Japanese medical community. Of course, each party has the freedom not to use UMIN resources. But we believe that, in most cases, it is convenient and beneficial to use them. As the role and significance of UMIN increases, requirements for the reliability of UMIN hardware and software also increase. We have to make further efforts to maintain reliability of services.

Acknowledgement

We thank the UMIN Center staff, local staff in each university hospital, and support staff in each academic society for their assistance.

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