

The CROS Clinical Reminder System

Over the last two decades, more than 20 controlled trials have confirmed the usefulness of computerized reminders in improving provider ordering behavior (1,2). Though applied most often to preventive maneuvers, point-of-service prompts have also been employed in chronic-disease care (3) and in cost-effectiveness efforts in such areas as laboratory test utilization (4).

UW developers of the clinical data repository known as MIND (the Medical Information Networked Database) wanted the first decision-support applications written against this database to be of similar benefit. Accordingly, development of CROS (the Clinical Reminder and Outcome System) was begun in 1995 as part of a mammography compliance study funded by the National Cancer Institute.

Over time, the reminder set has grown to include all of the preventive maneuvers included in the HEDIS performance measures required for accreditation of managed-care plans. Process measures for hypertension and diabetes, the first two chronic disease guidelines written by University of Washington Physicians (UWP) task forces, were added recently. A unique feature of CROS is that it prompts for collection of physiologic outcomes such as blood pressure and glycated hemoglobin measurements, as well as measures of functional outcome

and health status such as the SF-12.

This expanded CROS reminder software was alpha-tested at the UW's Roosevelt Family Medicine Center as part of a two-month implementation trial in late 1996. Results showed increases in indicated ordering, ranging from a low of 10% for yearly urine protein determination in diabetics, to a high of over 200% in mammography utilization.

Based on the success of this

trial, the CROS software was successfully deployed during the past year to the four major UW adult primary care clinics — the general medicine and family medicine clinics at Harborview Medical Center and UWAMC/ Roosevelt sites. The system produces patient profile reports (PPRs) which are attached to patient charts at each visit. PPRs include prompts for maneuvers to be performed and data collection forms for required items that are then

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MINDscape 2.5 - connected to HMC - software developed by MCIS

Patient: Male Age: 70

Navigation: [Select New Patient](#) [Help](#) [Log Off](#) [email feedback](#)

Menu: Demographics, Problems, Transcriptions, Medications, Allergies, Immunizations, Reminders, Visits, Findings, Procedures, Lab, Radiology, Pathology, Providers, Create Note

Status	Service/Info Needed	Last Done	Next Due	Criteria For Performing Service
*DUE	Screen (>=50): Stool occult blood (q1yr)	unknown	01-jan-1995	>= 50; Stool occult blood, every year
*DUE	Diabetes (>=18): Retinal Exam (q1yr)	31-jul-1995	31-jul-1996	Diabetes dx, >= 18; Ophthalmology exam, every 1 year
*DUE	Diabetes (>=18): Lipids (q3yr)	unknown	01-jan-1997	Diabetes dx, >= 18; Cholesterol, HDL, LDL & Triglycerides, every 3 years
not due	Diabetes (>=18): Urinalysis (q1yr)	08-jan-1997	08-jan-1998	Diabetes dx, >= 18; Urine protein, every 1 year
not due	Diabetes (>=18): Glycated Hemoglobin (q6mo)	10-nov-1997	10-may-1998	Diabetes Dx, >= 18; Glycated Hemoglobin every 6 months
not due	Screen (>=50): Flexible Sigmoidoscopy (q5yr)	08-aug-1995	08-aug-2000	>= 50; Flex Sig, every 5 years

* Patient may be due for the indicated procedure. Please verify the last date of the recommended service.

manually entered into MIND.

Depression, low-back pain, and pediatric reminders regarding immunization and tuberculosis screening will be added by the end of the academic year. Immunization information is being exchanged with Washington State's registry, the CHILD Project. CROS currently monitors — and updates each evening — the guideline compliance for approximately 30,000 patients. Output is also visible in MINDscape, the institution's web-based Electronic Medical Record (EMR) (see screen display on page 1). Plans call for CROS to be operating system-wide before the end of 1998.

Already, preliminary data have led to related quality improvement projects. For example, it was discovered that blood sugar levels were adequately monitored and controlled for less than 40% of adult diabetic patients. Funding was subsequently obtained from insulin-delivery system manufacturer Becton-Dickinson for a clinical trial to improve levels of control. Another grant from Aetna Insurance investigates whether MIND demographic, functional-status, and clinical data can be employed to adequately risk-adjust

performance measures such as HEDIS and FACCT scores.

Thus CROS shows how faculty participating in the IAIMS program can work synergistically with the technical staff at Medical Centers Information Services (MCIS) to develop computer applications that simultaneously push the applied health-services research "envelope" and improve the quality of patient care. All involved are hopeful that the reminder systems success story will prompt further collaborative efforts and are keeping their fingers crossed.

References:

- 1) Johnston ME, Langston KB, Haynes RB, Mathieu A. Effects of computer-based decision support systems on clinician performance and patient outcome. A critical appraisal of the literature. *Ann Intern Med.* 1994;120:135-42
- 2) Shea S, DuMouchel W, Bahamonde L. A Meta-analysis of 16 randomized controlled trials to evaluate computer-based clinical reminder systems for preventive care in the ambulatory setting. *JAMIA.* 1996;3:399-409.
- 3) McDonald C, Hui S, Smith D, et al. Reminders to physicians from an introspective computer medical record. *Ann Intern Med.* 1984;100:130-8.
- 4) Tierney WM, Miller ME, McDonald CJ. The effect on test ordering or informing physicians of the charges for outpatient diagnostic tests. *N Engl J Med.* 1990;322:1499-1504.

Published by the IAIMS Program Office.
Supported, in part, by a grant from the
National Library of Medicine
(Grant #1 G08 LM 05620-04).

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CSCW 98 - INVITATION TO PARTIPATE

The ACM 1998 Conference on Computer Supported Cooperative Work will be held in Seattle November 14-18. The CSCW Conference is the preeminent venue for presenting research and development achievements covering the design, introduction, and use of technology that affects groups, organizations, and society. Since its inception a decade ago, CSCW has been on the leading edge of our extraordinary expansion in the uses of technology. CSCW'98 will play an important role in framing and extending the discussion about technology's role in work and the home.

CSCW is highly multi-disciplinary. If you think you might belong here, you do belong here. Topics include, but are not limited to:

- * Technology use in specific work domains
- * Innovations and experiences with Intranets, the Internet, WWW
- * Theoretical aspects of coordination and communication
- * New technologies and architectures to support group activity
- * Social and organizational effects of introducing technology
- * Methodologies and tools for design and analysis
- * Ethnographic and case studies of work practice

You are invited to contribute original work to CSCW'98, the 1998 ACM Conference on Computer Supported Cooperative Work.

For further information on CSCW write: Tower Building Suite 1414, 1809 Seventh Avenue Seattle, WA 98101 USA or email cscw98-info@acm.org Website: <http://www.acm.org/sigchi/cscw98/>

Regional Telemedicine Testbed – Update

The goal of the Bench to Bedside and Beyond (B3) project is to link clinical and public health partners at selected urban and rural sites in the five state WWAMI area to provide vital health information and communications. The primary focus is on evaluation of impact.

In October, the three-year Bench to Bedside Regional Telemedicine Project transitioned from the Planning Phase to the Implementation Phase. The year-long Planning Phase ended with the Phase 1 report, a comprehensive operational plan for years 2 and 3. Highlights of the report include a three-part evaluation plan that compares “good”, “better” and “best” care, a detailed explanation of the imaging Information Infrastructure and an analysis of telemedicine needs for local and remote care providers. The report is available at <http://healthlinks.washington.edu/b3/>

The transition to implementation inspired a reorganization of committees and the creation of several workgroups. New workgroups

include General Infrastructure, Clinical Knowledge Resources and Tools, and Evaluation. The General Infrastructure Group will identify and solve problems at remote and University sites. The Clinical Knowledge Resources and Tools Workgroup will facilitate digital library/knowledge resources access, library consults and document delivery service. The Evaluation Workgroup is charged with ensuring that the evaluation of each of the components of the project is coordinated.

The Public Health Workgroup has made exciting progress toward the goal of creating a communicable disease notification system. A computer programmer will be hired to design and create a database that will identify changes in disease reporting, resulting in early notification of possible epidemics. This project, which is being coordinated with the state Public Health headquarters in Olympia, Washington, is led by Dr. Patrick O’Carroll and Dr. Jim Gale, faculty in the School of Public Health and Community Medicine.

Several members of the B3 group will be visiting Friday Harbor later

this month to introduce new services, plan a psychiatry study that will take place there, and discuss site needs. The site, located at InterIsland Medical Center, is scheduled to be up and running early next year. A dermatology image consult project, to be piloted at UWPN-Factoria, is scheduled to start January 1, 1998. The General Infrastructure group is working to solve platform compatibility issues. Relationships with several other remote sites in the Region are being pursued as are additional areas of clinical focus including diabetes and burn care services.

Finally, B3 staff are working with the five state WWAMI Rural Telemedicine Project to transition from individual projects to a single entity called UW Telemedicine Services. UW Telemedicine Services will provide information, consultations and educational opportunities to the WWAMI Region.

IAIMS PROJECT UPDATES

As IAIMS approaches the end of our fourth year we have been looking back to see what was accomplished in 1997. Here are some excerpts from our annual progress report. The full report can be found at http://healthlinks.washington.edu/iaims/ann_rpts/Progress97.pdf

Knowledge Resources Developments

The Vision. The goal of the IAIMS knowledge resources project is to connect people with health sciences knowledge at the University of Washington. Our

projects attempt to integrate knowledge at the point of need for clinicians, researchers, administrators, instructors and students within a distributed and multi-state educational environment.

The knowledge resources projects involve significant collaborations with the Health Sciences Libraries, Medical Centers Information Systems, and Computing & Communications. The IAIMS knowledge resources group works in partnership with faculty and staff to integrate the networked content of traditional literature databases, textbooks and journals with new knowledge bases and multimedia.

Content is derived from a variety of commercial publishers, government agencies and locally created resources.

Web servers, relational databases and search engines are used on the back end to integrate the knowledge content at the point of use in course materials, patient records, digital library reference, and other applications and uses.

HealthLinks. <http://healthlinks.washington.edu/HealthLinks> is designed to create a simple, organized view of sources that integrate into daily work. A

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Updates (cont'd)

new design for *HealthLinks* debuted in February 1997 that moved away from an organizational view to a reference view of information in health sciences. The new *HealthLinks* is based on substantial user group feedback. It features guides to reference sources, enhanced internal and external search engines, and a toolkit view for administrators, care providers, grantseekers, instructors, researchers, students and writers.

Over 3400 html files are part of the core *HealthLinks* web site. This includes several course tutorials, reference databases and many flat pages. The *HealthLinks* core team will address the design and production requirements for a dynamic content web site during the next year. Experimentation with the Dublin Core metadata and XML will be used to develop a "databased" *HealthLinks*. To provide additional alerting and personal customization, we will experiment with channel and push technologies. Finally, we will streamline production of *HealthLinks* to insure a sustainable system for the library and its *HealthLinks* partners during the final year of IAIMS grant funding.

Knowledge Resources at the Point of Care: Work continues to integrate knowledge resources into MINDscape. During the next year we will focus on more sophisticated vocabulary mapping using the UMLS and common query development across multiple potential sources at a particular information point.

The Federated Drug Reference (FDRx) is an IAIMS partnership with the Health Sciences Libraries and the UW Pharmacy. A completely redesigned user interface to FDRx debuted in February 1997 based on user comments during the beta phase. It focuses on speed and visually highlights most frequently needed

information based on user input. Drug Alerts have been recently added.

Testing of the intranet Micromedex product over the past six months confirmed that name level integration of the Micromedex data could be successfully added to FDRx, offering a web-based intranet product to replace the old text-based system. IAIMS provided the host NT server for this trial. Medical Centers Information Systems has converted their Micromedex license, and the transition to the web intranet version should be concluded by the end of 1997.

Patient Education Materials: IAIMS has been collaborating with UWMC Department of Patient and Family Education Services to develop a web-based patient education materials database. The department staff have indexed over 1000 patient education pieces, including the entire Cancer Library pamphlet and book collection. IAIMS provides the web server environment on an NT platform and the SQL database administration. IAIMS staff developed the web-based application used to search the data, which is comprised of Perl-based libraries. The product is currently in beta testing. New content is being added with an expectation of 5000 records total. The web search of the patient materials database will be integrated into the clinician view of the patient record as part of the larger clinical digital library initiative. The project is a joint collaboration between UWMC, Harborview Medical Center, Health Sciences Libraries and IAIMS.

Multimedia Archive: Initially called the Image Database project because of its focus on still images of significant teaching value, the Multimedia Archive has become a collaborative development with the UW Center for Information Systems Optimization in the School of Engineering. The Content software

is engineered for images, audio and video. The package includes an acquisition component for an image owner to submit to a central database from their desktop. The indexing fully supports the Dublin Core metadata definition. The image owner provides descriptive information and secondary indexers check the quality and add controlled vocabulary which can be used for both indexing and retrieval. We will prototype the use of the UMLS. The initial work will use existing image collections to test the medical metadata definition.

UMLS: Research and development continues in the use of the Unified Medical Language System (UMLS) as a vocabulary translator for our clinical digital library project. Our goal is to take information provided by a user or an application's input and infer the correct terminology for the target source via the UMLS. The known and inferred information will be translated to make simple queries to reference materials (e.g., FDRx, Medline, DXplain, clinical textbooks). Tools to allow users to develop advanced queries with finer granularity will also be provided. This advanced mode will take advantage of the richness of the semantic net in the UMLS. IAIMS staff are working with National Center for Biotechnology Information staff to determine the best method to match a user's free text phrase to the preferred MeSH term for a Medline, the ICD-9 for a DXplain query or the best set of synonyms to query a clinical textbook with no controlled vocabulary.

Collaborations. IAIMS staff are frequently called upon for their expertise in web development. During the last year staff worked with the Center of Educational Resources, the Medical Centers Information Systems, Western Washington AHEC, and several

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groups within Family Medicine. Demonstrations have been provided to corporations such as Alaska Airlines who are investigating an integrated Informix database with the Netscape Suitespot server for sophisticated web development. Contractual collaborations have included: Helix and Genline, Washington Information Network for Public Health Officials, Northwest Center for Public Health Practice, Harborview Injury Prevention Research Center, and the Department of Medical Education.

Web Infrastructure and Support. We re-engineered our development infrastructure to take advantage of JAVA servlets in the development of new web-based applications. The servlets are an improvement over the previous infrastructure because applications can now be seamlessly ported to virtually any server platform and database system. For example, we can run the same application using Informix, Microsoft SQL Server or Sybase on a Netscape Suitespot, Apache or JAVA server.

One of the critical issues facing IAIMS staff is providing access to UW faculty, staff and students beyond the UW domain for statewide and regional education, research and clinical programs. We need a security and authentication scheme for web-based services. IAIMS is represented on the Bench to Bedside and Beyond (B3) security group focusing on a single logon solution that provides a high level of authentication, security and encryption. The implementation will address the need for a secure environment across a variety of Internet service connections with a mixed hardware and software client base.

Clinical

During the last year we have made significant progress toward the deployment of our Web-based EMR and its clinical-reminder component. The infrastructure to

view radiographic images institution-wide is now in place. Finally, just within the last two months, we have launched the institution's first endeavor to determine the feasibility of adopting a standardized data dictionary to which all separate vendor and internally-developed system terminology might be mapped.

Web-Based Electronic Medical Record (MINDscape). During the last year MINDscape (the WWW view of the University of Washington Electronic Medical Record) completed testing and refinement, was large scale beta tested, and is completing full scale deployment at Harborview Medical Center. It will soon be deployed at the UWMC. MINDscape security is provided by Secure Sockets Layer with user authentication/ authorization using custom database constructs, and logging/ monitoring of all transactions. Multiple levels of record restriction and user access restriction have been implemented.

MINDscape consists of both a WWW to EMR interface as well as an interface to clinical reference material. Both have been substantially enhanced in the last year. MINDscape currently provides access to demographic information from the registration and billing systems, an ICD-9 based but clinician maintained problem list, on-line transcriptions, all outpatient and discharge medications, allergies from the registration and pharmacy systems, immunization data from multiple sources, automated clinical alerts generated by the CROS custom software package, visit information including automatically generated visit summaries, findings linked to visits, procedures performed, laboratory data in a variety of formats, on-line text radiology reports, on-line pathology reports, list of all previous providers, the ability to enter progress notes (currently being beta tested), and the ability to electronically sign transcriptions

from within the WWW MINDscape application.

MINDscape includes links from demographic data to ethnographic information on health care, from the problem list to Medline (PubMed) and the *Healthlinks* clinical care provider toolkit, from medications to their entry in the FDR (UW Federated Drug Reference), from lab results to the laboratory reference manual, and from selected problems to care guidelines. Plans for the following year include expanding the data entry capabilities of MINDscape and creating a general purpose knowledge integration architecture that will better automate integration of reference material into the medical record.

Clinical Reminder and Outcome System (CROS). During the past year, the CROS software has been successfully deployed to the four major adult primary care clinics — the general medicine and family medicine clinics at both Harborview Medical Center and to the UW Medical Center ambulatory facility at Roosevelt. (See the CROS cover story on page 1.)

Radiographic Imaging. We have on loan from Medweb (San Francisco, CA) — for the period of one year (starting March 1997) — a copy of their DICOM image web server software (list \$50K) replete with free Javascript plug-in for Netscape. DICOM images have been successfully transferred from the UWMC Computed Tomography, Magnetic Resonance and Computed Radiography imaging modalities to the Medweb server. These images have been displayed on a number of computers running Netscape Navigator 3.x and Communicator 4.0. Plans for supporting Internet Explorer 4.0 are near at hand.

The main obstacle to the enterprise-wide implementation of this service is the lack of a deep

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Updates (cont'd)

imaging archive (greater than the current 1-2 days) and the fact that most of the imaging modalities in radiology (with the exception of computed radiography) do not encode the Radiology Information System accession number in the DICOM header. Thus an individual RIS report cannot be mated to the associated image sets. We are working to find the institutional funding to overcome these limitations and provide images enterprise-wide.

The General Electric Medical Systems (GEMS) Picture Archiving and Communication System (PACS) will arrive at Harborview in the first quarter of 1998 with a Web server integrated with its hierarchical storage management (HSM) system. The US mini-PACS currently being installed at UWMC has its own Web server attached to its archive. We are working on methods to link these with the RIS reports in MIND.

Data Dictionary Project. Dr. Peter Dunbar, Assistant Professor, Anesthesiology, assumed leadership of this project in October 1997. The preliminary goal of the Data Dictionary Project (DDP) is to define expectations and the state of ongoing effort. To this end, IAIMS leaders and other stakeholders have been interviewed. All agree that there should be consistency of definition and how we use them terms. Although there does not seem to be much support for a rigidly controlled vocabulary, there is agreement that since each existing system already has its own vocabulary, we should work on translating the existing terms to a common, standardized language. Furthermore there seems to be agreement that new terms should be added only when they are clearly defined in existing terms. The UMLS is the leading candidate to serve as a common language. However, even if UMLS is

employed, we will need to make additions and modifications to adapt to local demands.

Interviews have also revealed that the definition of terms or words is clearly more than their meaning, i.e., what a term represent depends upon the user. For example, the term "allergy" in the ADT system does not necessarily mean the same as the term "allergy" in the pharmacy system. Therefore in addition to a semantic definition, terms need a technical definition analogous to a path (e.g., ADT/allergy vs. pharmacy/allergy).

The perspective of the user is critical. Since CROS and a significant amount of clinical care is driven from problem lists, defining a dictionary of problems is a priority. Since easy user access to knowledge resources is a priority for librarians, translation of terms into those commonly used in existing systems (Mesh and FDR) is also a priority. Clinicians want everything to be seamless, fast, and capable of infinitely accurate definition of clinical problems. For instance ICD9 uses the code 783.2 for edema but the clinician following the patient wants to know how severe the edema is, where it is, what is causing it and so on. There are 70 thousand ICD9 codes and they do not yield a fraction of the detail required for patient care.

Given the complexity of the task as outlined, it has been suggested that the first deliverable for the DDP be a definition of the data dictionary goals and publication of a strategic plan for goal achievement.

Educational Projects

IAIMS continues to address common educational issues of the UW health sciences schools by actively promoting the integration of technology into the clinic, the classroom, and the library. Partnerships and collaborative efforts are now commonplace and highly productive.

Faculty Development. This is

a key issue which occurs both through individual consultation on curriculum and through formal and informal presentations to the campus. Titles for these presentations in the past year have included 'Internet Web-Based Learning: Concepts and Practices' and 'HTML and curriculum Innovation.'

Electronic Course Reserves.

As faculty embrace the development of internet-delivered curricular materials, it is important to provide students easy access to these programs. The UW Health Sciences Libraries Electronic Reserves Pilot Project provides such an access point. The project makes exams, syllabi, readings, and other material suitable for electronic access available at this site and also includes links to individual course pages. IAIMS is a partner in the development of this project.

Multimedia Archive. The acquisition, cataloging, storage, and delivery of images is one of the most important Informatics tasks on which IAIMS is working. For the past year and one-half the groundwork has been laid to create an infrastructure that would provide access to Web-based, distributed image databases. The first image archives to be incorporated into this meta-database are radiograph images from UW Radiology, a collection of biomedical illustrations, and a physical diagnosis database.

Innovative Projects. The Innovative Teaching Awards Program has been an important on-going project. Two years ago, IAIMS provided matching funds for the six health sciences schools so that faculty interested in developing instructional materials would be provided with staff support and computer software. The project has been very successful, with all six health sciences schools

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participating and with 18 different projects funded.

Instructional Templates. To assist faculty and staff with the authoring of internet-delivered educational programs, IAIMS staff have created two templates: The Web Template and the Web Outline Builder. The Web Template has been in use for two years and has recently been modified so that it would run on the Microsoft NT computer operating platform. This template will be available in mid-January at the following address: www.hslib.washington.edu/iaims/ideal/shell/index.html

Because the Internet is becoming an accepted medium with which we can teach, IAIMS is actively looking for robust ways to assist faculty interesting in using the Internet. Over the past year, an informal group of UW educational support staff have been evaluating programs that provide complete web authoring capabilities.

Programs currently being evaluated include WebCT, developed by the University of British Columbia and Web University, developed by the Information Management Group from Chicago.

Copyright. In a world where access to electronic documents is simple, the issue of copyright control becomes crucial. IAIMS and the Health Sciences Center for Educational Resources have drafted a document that discusses authorship, ownership, and copyright management guidelines. This draft is currently being circulated to interested individuals; a final document will be completed soon.

Internal Medicine Report (IMR)

In a novel approach to medical education utilizing the Internet, the Department of Medicine (in collaboration with the IAIMS group) has created Internal Medicine Report (IMR). IMR is an on-line case-based discussion forum focusing on issues in internal medicine. Participants in IMR consist primarily of University of Washington internal medicine full-time and clinical faculty as well as housestaff and fellows. By creating an electronic mail forum in which cases are discussed among and between academic internists, community physicians and housestaff, IMR seeks to explore practice differences while improving communication within the internal medicine community.

Interesting cases, selected from University of Washington affiliated hospitals and clinics, are placed on line for discussion every two weeks by the chief medical residents.

Each case is followed by a set of questions highlighting the major issues for discussion. All participants are encouraged to share their clinical and/or academic experiences to create a lively and dynamic forum.

Utilizing expertise within the IAIMS group, a companion web site has been created. For each case, visual images (such as x-rays and CT scans) and a detailed bibliography, with full text journals when available, are displayed.

Internal Medicine Report was developed by Dr. Stuart Cohen, Chief Medical Resident, University of Washington School of Medicine. It is jointly supported and funded by the University of Washington School of Medicine's Medical Informatics Office; Health Sciences Integrated Advanced Information Management System (IAIMS) program; and Health Sciences Libraries and Information Center.

Creation and maintenance of the IMR web page is made possible by generous support from the Department of Medical Education, Providence Medical Center.

IMR is a closed email list and is thus not open to the general public. However, if you are a physician affiliated with the University of Washington School of Medicine and would like to take part in this discussion forum, please send email to cohenst@u.washington.edu with a one line description of your affiliation with the University of Washington. Within a few days, you will receive an email message confirming the processing of your account and the addition of your name to the discussion list.

National Meetings

Some meetings listed can be found on the IAIMS homepage.
<http://healthlinks.washington.edu/iaims/events/>.

The Information Connection 3rd Annual Conference - Implementing Effective Technologies in Healthcare

January 28-30, 1998
The Sheraton Hotel and Conference Center Burlington, Vermont
<http://uvmce.uvm.edu:443/infoconn/infocon.htm>

ACM SIGCHI Conference on Human Factors in Computing Systems: "Making the Impossible Possible"

April 18-23, 1998
Los Angeles Convention Center, Los Angeles, CA
<http://www.acm.org/sigchi/chi98/>

3rd Annual Conference on The Emerging Health Information Infrastructure (HII'98) - "Managing Change Through Information"

April 27-29, 1998
Georgetown University Conference

Center, Washington, D.C.
<http://www.fnim.org/HII98.HTML>

IEEE Engineering in Medicine and Biology Society Information Technology Applications in Biomedicine (ITAB '98)

A 'Special-Topic' Conference of the EMB Society
May 16-17, 1998
Washington DC

1998 AMIA Spring Congress

May 27-30, 1998
Wyndham Franklin Plaza Hotel Philadelphia, PA
<http://www.amia.org/events.html>

Valencia International Meetings on Bayesian Statistics

May 30-June 4, 1998
Valencia 6, Las Fuentes (Alcossebre, Spain)
<http://www.uv.es/~bernardo/valenciam.html>

Medinfo '98

9th World Congress on Medical Informatics
August 18-22, 1998
Seoul, Korea
<http://www.medinfo.or.kr/>

UW Presents at AMIA

The Annual Fall Symposium sponsored by the American Medical Informatics Association is the most prestigious forum for researchers and scholars working in informatics to exchange information on new developments. The 1997 October meeting in Nashville included peer-reviewed papers by the following UW authors:

Jim Brinkley
L. Fouche
Sherrilynne Fuller
Harold Goldberg
Kevin Hinshaw
Jim Hoath
Kevin Ibrahim
R. Jakobovits
Debra Ketchell
Jim LoGerfo
Tao Kwan-Gett
K. Maravilla
B. Modayur
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