

information services

News of the UMass Medical School Department of Information Services

IS supports shared clinical research vision

UMass Medical School (UMMS) and UMass Memorial Health Care have a shared vision of advancing health care and developing therapeutics through clinical research. The IS Department is playing a key role in making that vision a reality.

In order to perform clinical research, patients must be recruited and biologic samples such as blood and tissue must be collected and analyzed and made available for research. Such biologic samples are vital to the study of disease. One of the challenges to build a “biorepository” is safeguarding patient privacy and anonymity while maintaining enough patient information in relation to their samples so that the research is clinically meaningful. A more fundamental challenge has been access to clinical data for feasibility analysis.

Last summer, IS selected the i2b2 (Informatics for Integrating Biology and the Bedside) platform for use in developing the data repository—a prototype named Massachusetts Integrated Clinical Academic Research Database (MICARD). The project was led by Ralph Zottola, PhD. A breakthrough came when it was demonstrated by the project team that MICARD

has the capacity to support critical quality reporting needs of the hospital. A central data repository that supports both clinical and research needs, the Analytic Health Repository (AHR), is now under development by UMMS and UMass Memorial IT staff with Recombinant Data Corporation as an implementation partner.

Data from clinical activities is the foundation for medical research and, therefore, central to the vision of translational medicine. Typically, clinical data resides in the information systems at UMass Memorial, but the traditional approach to getting this data for research required requests to clinical IT staff, which raised several efficiency issues. To resolve these issues, IS explored a number of commercial options and ultimately selected the Clinical Research Chart (CRC) and related tools from i2b2 (for more information on i2b2, visit www.i2b2.org).

i2b2 allows researchers to independently analyze clinical and genomic data. The strategy at UMMS is to use the i2b2 framework to create an AHR that supports all of the analytic requirements of the UMMS—UMass Memorial environment. The collaboration ensures that the investment in the central repository provides returns in both clinical and research outcomes.

In developing the strategy, a decision needed to be made about where the shared repository should reside. The Medical School network is open to a large number of students and researchers engaged in a variety of projects with multiple institutions. Hospital environments typically do not allow integration of data from other institutions. A team of school and clinical IT staff developed a solution based on the “honest broker” model. The solution has been named

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continued on page 2

Virtual Microscopy preserves slide collections



Roger Craig, PhD, professor of cell biology, has been an enthusiastic supporter of the innovative technology, adding the overlay functionality to his block of the Histology course. Dr. Craig credits VM with facilitating group learning by allowing several students to view images simultaneously, encouraging group discussions and creating a more interactive learning environment.

So far, 775 slides have been added to the VM library. To see how this interactive tool works, visit islide.umassmed.edu/java/index.html ■

Virtual Microscopy (VM), a computer-based technology offering the full range of traditional microscope functionality, went live at UMass Medical School in August 2007. One of the reasons this technology was pursued is the age of the School of Medicine’s traditional glass slide collection used in the curriculum and the fact that many of the slides are irreplaceable. Digitizing the slides is a way to preserve the collection. VM also provides students with open and easy access to the collections. The Bacus Laboratories system was selected by the Virtual Microscopy working group comprising Information Services (IS) employees and faculty.

A virtual slide is a digitally captured, diagnostic-quality image of a glass slide, and use of a computer provides on-demand viewing, navigation, magnification and focus via the Internet. Notes and overlays can be added to digital images to enhance teaching and learning.

To integrate VM technology into the online curriculum, IS has incorporated VM into its Learning Management System through a Media Library Collection; links of PDFs and PowerPoint presentations of lectures and notes; and in the Assessment and Assignment Tools, which includes self tests and homework.

IS at a glance

Servers supported	677
Total usable disk (Terabytes) space	166 Tb
Active network ports	18,492
Wireless access points	528
Average monthly Help Desk requests logged	2,928
Intel computers supported	3,990
Apple computers supported	745
E-mail mailboxes	8,587
Active phone extensions	11,147
Voicemail accounts	6,826
Average monthly visits to www.umassmed.edu	294,393

IS builds a high-performance computing environment for researchers

High performance computing (HPC) is a system made up of multiple processors linked together allowing the ability to quickly process large amounts of data. HPC has been a component of scientific investigation and research for nearly four decades. However, for most of this time, HPC has been expensive and restricted to large, centralized computation centers. Recently, UMass Medical School Information Services developed an HPC environment for UMMS researchers. The environment, called Binar, was built to provide a system with a variety of applications, including genomics, structural biology, molecular mechanics, imaging and simulations.

A high-performance computing environment requires several components: many computational units (processors, memory), large-file space capacity and high-speed networking to bind the components together. This modular environment is called a cluster. Clusters are versatile, expandable and cost effective. Binar is composed of three types of computational units or nodes, for a total of 82 nodes with 352 CPUs:

- 54 HP DL145 nodes with two dual core AMD Opterons (275) and 4 Gb memory each;
- Two Dell PE6850 nodes with four dual core Intel (7100) and 64 Gb memory each; and
- 25 Dell SC1435 nodes with two

dual core AMD Opterons (2216), 4 Gb memory each, connected with high-speed networking.

IS has created a queuing system on Binar that allows for a mix of jobs, minimal congestion and fair allocation of resources to research groups. There are also architecture queues (e.g., the Dell SC1435 with high-speed interconnects, which can be used for computations).

The home directories for Binar are a 2 Terabyte share on a Clarion file space system, which provides fast file access for all of the nodes. It is possible for researchers to obtain file space that can be associated with Binar. IS is currently implementing a plan for the research community for near-line

high speed storage that can be accessed through the network. The Deep Sequencing Core, for example, generates 700+ Gb of data for each run, which is processed on Binar. The processing of image data from the sequencer to base-called sequences (20-35 million), and mapping to a genome requires eight nodes and takes four or five hours. On a single processor that would take more than four days to finish.

IS has recruited a dedicated HPC Systems Engineer to manage the environment and work directly with researchers using the systems. Accounts on Binar can be obtained by contacting the Help Desk at 6-8643 or umwhelpdesk@umassmed.edu. ■



Electronic Classroom Upgrade

Mastering the tips and tricks of polling technology or image editing on a Macintosh or PC is now possible as a result of the upgrade in training lab S2-307D. The upgrade included the installation of 17 20-inch display Intel Macintosh desktops and the testing of applications in both the Mac and PC environments with a user-friendly interface to toggle between platforms. This allows the learner to use their preferred platform in class. The iMac desktops create a streamlined, updated and friendly learning environment.

Customer Service Help Desk

The Customer Service Help Desk provides first-level technical support for the UMass Medical School community. Among the range of services provided by the Help Desk staff, their primary responsibility is to receive telephone, e-mail and walk-in service requests, and then log, troubleshoot, triage, resolve and escalate requests that need further analysis. Of the requests logged by the Help Desk staff last year, 24.3 percent were resolved on a first-contact basis without any escalation required.

The Help Desk has contributed to several successful initiatives in the last year that provide high quality services to our customers:

- Automated open and closed notification
E-mail to our customers stating when a service request was opened or closed
- Self services Web site, implemented by IS Enterprise Network Services staff
Allows the user to update Outlook contact information (without calling the Help Desk) by visiting selfservice.umassmed.edu/umms
- Expansion of walk-in service locations
New location at South Street Campus Building 2, 2nd Floor

Help Desk walk-in services are also located on the University Campus first floor across from the Chancellor's Suite in Room S1-321 and are available Monday through Friday, 7 a.m. to 6 p.m. The Help Desk staff are available by phone at 6-8643 or e-mail at UMWHelpdesk@umassmed.edu, Monday through Friday, 7 a.m. to 9 p.m. (Urgent requests should not be sent via e-mail.) Please visit our Web site at <http://inside.umassmed.edu/is/helpdesk.aspx>

Shared clinical research vision

continued from page 1

the Trusted Independent Data Environment (TIDE).

TIDE is located in the Medical School data center but has its own security infrastructure and processes. The TIDE environment includes dedicated firewalls and intrusion detection systems, restricted access (only authorized data repository developers), two-factor secure ID authentication and rigorous auditing. Additionally, all developers receive training in the Protection of Human Subjects. The environment is designed to securely host and process data from multiple sources. It is similar to the environments that are already in place to support the University's PeopleSoft and the campus' Commonwealth Medicine programs. The AHR Staging Server is located within the TIDE.

MICARD is the UMass Medical School implementation of i2b2 CRC

for research. UMMS was among the first academic health centers to adopt the i2b2 framework. There are now 20 academic health centers implementing this framework. MICARD currently operates as an i2b2 cell that can receive, process and respond to data requests from anywhere. The MICARD workbench allows investigators to quickly determine if a patient cohort with a specific clinical characteristic exists in the system, which facilitates proposal development and Internal Review Board workflow. Additionally, the system will report the availability of consented biospecimens.

UMMS and UMass Memorial have created MICARD to provide an informatics platform for translational medicine. Its success is the result of effective data warehouse development, organizational cooperation and the support of executive management at both institutions. ■

Focus on Information Services

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