- Matthew Anderson -

# UHN's Information Enabling Care Strategy -

## *Moving beyond the traditional theme of reliability and availability of technology*

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In the three years since the approval of University Health Network's last information management strategy, *care@uhn*, significant resources have been invested in developing a highly integrated, content-rich and reliable information infrastructure. As a result, UHN is effectively using information and technology to support the delivery of care and business processes. Despite the progress made in reducing the organization's dependence on manual systems and paper-based information storage, there remains a significant opportunity to leverage the investment made to date and profoundly improve patient care through increased access and use of information and technology.

While the long-term vision for information management established in *care@uhn* remains relevant, the strategic objectives and implementation plans needed to be updated to align with organizational, industry and technological developments, including:

- UHN's new corporate strategy, *Strategic Directions 2011*, identifying specific objectives for the use of information and technology at UHN;
- SARS and its impact on hospitals, highlighting the need for improved access to information from remote locations to support ongoing operations in the event of an external disaster;
- Investments at the national and provincial levels to accelerate the use of technology in health care, presenting new infrastructure funding and partnership opportunities for UHN;
- Increasing public awareness of the role of information and technology in health care especially around patient safety;
- Developments in technology, introducing new opportunities to deploy low-cost reliable devices that support decision-making wherever information is required.

As a result, in February 2004, UHN introduced *Information Management Strategy 2009: Information Enabling Care*, moving beyond the traditional theme of reliability and availability of technology and focusing instead on the use of information and technology to profoundly change and improve the delivery of patient care.

To be successful, we realized this strategy requires significant involvement and engagement from UHN and external stakeholders, particularly the clinical community - not an easy task to accomplish for a 1,000-bed integrated teaching health-care organization that includes Princess Margaret, Toronto General and Toronto Western hospitals. We would need to build on the previous information management strategies, while articulating the future information management vision for UHN and aligning with key internal and external developments.

There was no place better to start than with our Clinical Decision Support (CDS) technology.

## Clinical Decision Support

We wanted to improve our utilization numbers, so we implemented Misys' Order Entry system and it worked. For example, let's look at a drug called Troponin, an appropriate test used for indicating risk in suspected myocardial infarction patients. The modified order screens improved effective ordering by non-cardiologists less familiar with the intricacies of cardiac markers. If they were to inappropriately order the drug, they would receive an advisory indicating why it was not needed as well as additional information supporting the advisory (e.g. online articles).

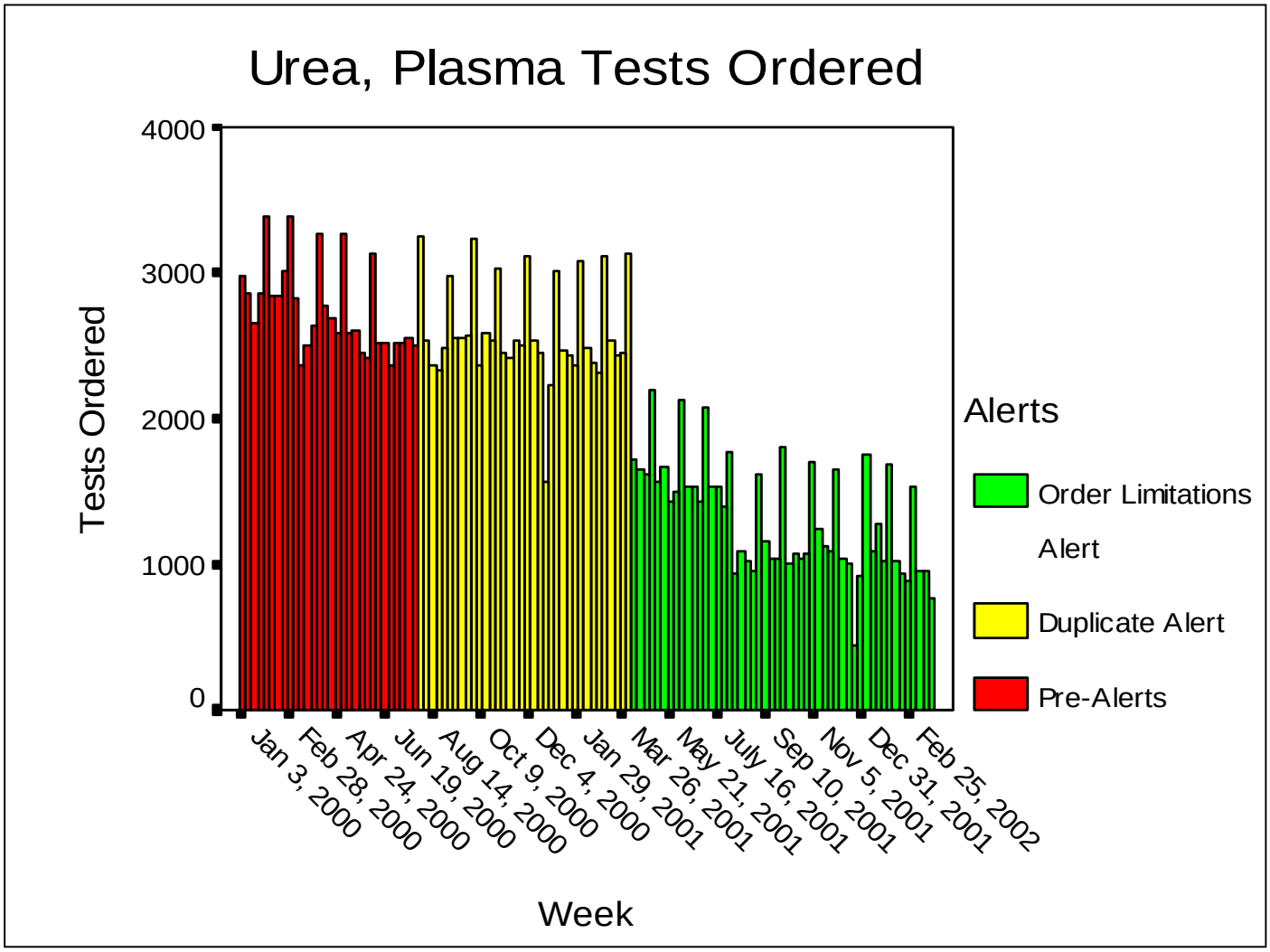
Over the course of two years, we saw an 88 per cent decrease in the inappropriate use of the drug. However, at the same time, we saw a 60 per cent increase in its appropriate use.

Another example along this line is with Urea, one of the most frequently ordered biochemistry tests at UHN prior to the alerting system. A lot of the time, it tended to be ordered in conjunction with Creatine, but for no added benefit. It is rarely helpful except in patients on hemodialysis in order to calculate dialysis adequacy and dietary protein intake. With Urea added to the Order Entry rule base, we saw a 51 per cent decrease in the ordering of the test over the span of two years (REFER TO CHART - Urea Utilization).

The whole purpose of UHN's CDS program is to equip clinicians with active decision support tools that improve the quality and efficiency of patient care, providing intelligent and relevant guidance at the point of decision-making. However, we also want to ensure operational efficiency and cost effectiveness with knowledge-based information management tools while at the same time enhancing patient care and safety - that's why we introduced Misys Insight.

Misys Insight is a sophisticated rules-based alerting system that integrates data from UHN's ADT, Lab, Radiology, Pharmacy and Microbiology systems, providing real-time decision support. Bottom line - it delivers patient specific information to the clinicians who need to know.

How it works: The ancillary systems transmit patient data through an HL7 hub, which in turn passes patient data to Misys Insight. Insight generates and delivers alerts to the appropriate providers via pager, Web, e-mail (which can include PDAs or cell phones), fax or network printers when pre-determined criteria are matched.




Clinicians have the unique ability to customize the type of alerts received and how to receive them. There are currently just over 400 rules related to admission, lab results, drug/lab and drug/drug interactions, diagnostic imaging orders and microbiology results at UHN.

Now the real question - does it work? Let's look at a specific case.

On a Tuesday evening, an Infection Control practitioner received a page at home that a patient admitted to Emergency had previously tested VRE (Vancomycin Resistant Enterococci) positive. The staff member immediately called the Emergency department, requesting that the patient be placed in isolation. The ability to isolate the patient immediately helped control and prevent the spread of VRE.

In Canada, research indicates it costs $20,045 to treat each VRE case ($13,545 for detection and prevention of cross-transmission plus $6,500 in unspecified costs). By having Misys Insight in place, there is an immediate cost savings to UHN through the quick control and prevention of VRE (e.g. decreased length of stay, decreased number of VRE culture tests, no additional nursing care needed and a reduction in environmental cleaning as well as isolation gowns, masks and gloves).

What didn't work? We implemented several alerts that had no impact. For example, duplicate alerts were being generated on lab tests. However, the alerts were being generated based on when the order was placed, not when the test was scheduled. The logic was incorrect in the system, causing erroneous alerts that were seen as a nuisance by our clinical staff. The effort to reduce utilization was there, but we needed to fine-tune the rules to look at event time versus ordering time. The duplicate alerts were disabled until we were able to fix the logic with the assistance of the vendor.

Moving forward, there will be a renewed emphasis on utilization as well as a focus on patient safety, clinical best practice and efficient use of hospital resources.

## Online Medication Order Entry and Medication Administration Records

UHN clinicians understand the safest process guaranteeing the right patient, drug, dose, time and route is to implement a "closed-loop" online medication management process. Incorporating computerized physician order entry (CPOE) clinical decision support tools backs UHN's Patient Safety initiative of combining the latest technologies with medical practice to enhance quality of patient care delivery and patient safety.

Meet UHN's online Medication Order Entry and Medication Administration Record, aka MOE and MAR. While MOE allows health-care professionals to place, send and process medication orders on UHN's Clinical Desktop, MAR allows them to view the medication orders at their convenience.

With physicians entering the majority of all electronic medication orders, this project represents a major step forward in the adoption and increased scope of physician order entry at UHN.

The primary aim of the project is to improve patient safety and the quality of patient care at UHN by reducing medication order transcription errors and by providing clinicians with online medication history as well as clinical decision support. In addition, the project provides an opportunity to evaluate a Graphical User Interface (GUI) for order entry, a wireless device solution and system downtime and recovery procedures.

In February 2003, we began the pilot project on a General Internal Medicine (GIM) inpatient unit at Toronto General Hospital (TGH). Eighty-seven clinicians were involved in the 32-day pilot. During this period, 1,742 medications were electronically ordered and 3,704 medication administrations were electronically documented for 62 patients.

A month later when the pilot ended, the data were tallied - physicians had placed 62 per cent of the electronic medication orders, taking an average of one minute, 35 seconds per order. It's important to mention that the relative ease of order entry was primarily due to the number of predefined typical medication orders and order sets.

The outcome of the pilot project demonstrated that UHN physicians were willing to enter electronic medication orders into the clinical desktop as long as *the ordering process could occur efficiently*.

Despite the success of the pilot project, we were not able to implement the system until almost a year later because of the effects of SARS. When SARS hit, the project was put on hold for six months while a lot of our resources were spent supporting hospital staff (e.g. operating UHN command centre, manual scheduling, screening patients).

In June 2004, clinicians began ordering medications electronically for all patients admitted to the General Internal Medicine service of TGH. The level of CPOE quickly reached an average of 90 per cent. Since June, 192 physicians have been using the system, electronically ordering 25,931 medications.

Online medication order entry is central to UHN's clinical best practice strategy and an enabler for patient safety initiatives. In keeping with the institution-wide emphasis on discovery, information and communication, UHN's MOE project promotes the value of trialing solutions, setting the platform for change. The next step is to continue improving its functionality and start rolling it out to the rest of our organization.

As of October 2004, UHN has been implementing the electronic Medication Administration Record in combination with MOE, thereby truly achieving a "closed-loop" process. With medication administration online, clinicians will have access to a complete medication record.

## Patient Results Online (PRO): Improving continuity of care between organizations

The PRO project is a collaboration between Mount Sinai Hospital, UHN and MDS Diagnostic Services to provide clinicians with an integrated, single point of access to patient information using UHN's eChart. What's unique about this Web-based application is that it provides *real-time access* to clinical documents stored in various systems, across institutional boundaries.

The current implementation of PRO allows access to clinical documents from UHN's Clinical Desktop, the hospital information system at MSH and current and historic lab information stored in MDS's Lab Information System. Since August 2004, more than 6,250 clinicians across both hospital organizations have had access to the PRO system.

Prior to its implementation, physicians treating patients who had records at UHN and Mount Sinai would have needed access to the clinical applications of both hospitals or they would have had to rely on faxed reports to obtain the needed information. This process would have taken anywhere from two to 15 days.

Since implementation, clinicians have been accessing patient data in less than two minutes! Incorporating patient information has enabled physicians and other care providers to treat and diagnose patients faster, based on a better quality and breadth of information.

All told, PRO receives an average of 1,200 hits per month, achieving a total cost avoidance of more than $243,000 annually through administrative and support staff time-savings. This has the potential to grow as we move toward an enterprise-wide release of PRO.

Giving UHN clinicians access to the right information at the point of care delivery allows for efficiency in assessment turnaround time, improved clinical outcomes and a better experience for the patient.

In September 2004, the Canadian Information Productivity Awards (CIPA), Canada's largest business awards program relating to the field of information management, presented UHN with an Award of Excellence in Customer Care for its PRO initiative. The award recognizes the exceptional and innovative application of information technology to solve real-world business problems and bring greater benefit to all its stakeholders.

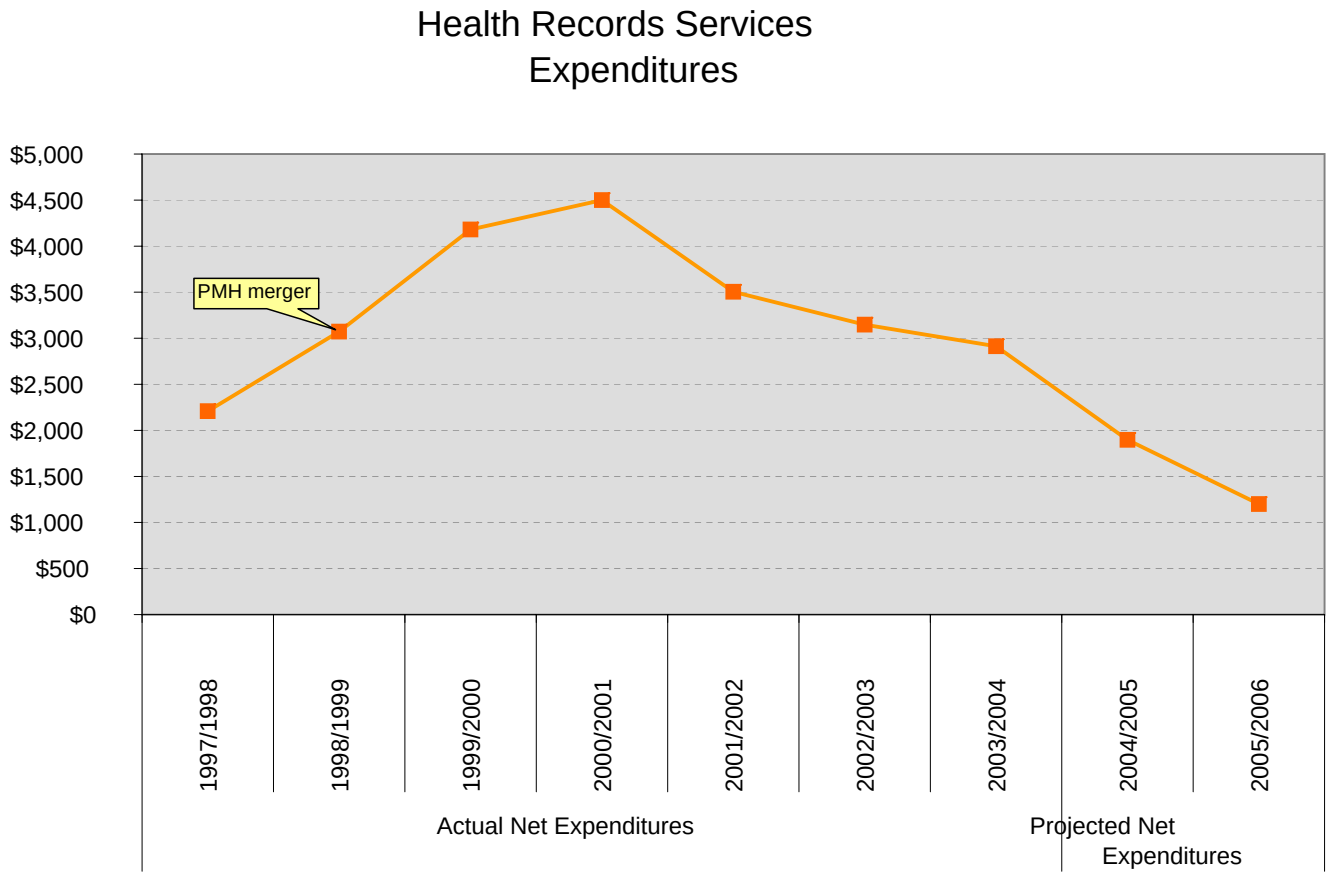
What's next with this system? Expanding it to include more community partners as well as piloting to community physicians, giving them access to their patients' results through their own office browser.

## UHN's Plan to Scan: Achieving reduction of $$$s in Health Records

A key component of our last strategy, *care@uhn*, was implementing a process for scanning patients' charts. Known as Centralized Document Imaging (CDI), the project is contributing to the continued development of electronic patient records. With no paper chart to order, clinicians are adapting to using the online chart.

Patient information such as clinical forms, bar-coded ambulatory forms and external documents are scanned into digital images and made accessible to clinicians online through our UHN Clinical Desktop. This gives clinicians and support staff instant access to electronic patient records from all three hospital sites. It also allows for multiple users to access a single chart at the same time, eliminating the wait for charts from the Health Records department. From a privacy standpoint, it offers audit trail capabilities, indicating who accessed patient charts and when the charts were accessed.

One area of our organization where we didn't implement CDI was in Princess Margaret Hospital's chemo daycare unit. Instead, we focused on moving their charts to order entry and clinical documentation. This was done because they use active charts that include both in-patients and out-patients.




While the changes to our Health Records department were made to help decrease dependency on a paper chart, they were also part of UHN's Shared Information Management Systems (SIMS) commitment to help with the hospitals' bond repayment. In 2001/2002, UHN was spending at a rate of $4.5 million on health records. By 2005-2006, this amount will have been reduced to $1.2 million.

As of April 1, 2005, $2.5 million will be given back to the hospitals' budget from SIMS in health records savings alone, in turn decreasing health records staff from 63 employees to 13. An additional $800,000 has been reinvested into information technology.

Over the next several months, we will be introducing many more initiatives in our effort to reduce the amount of scanning at UHN and move toward comprehensive electronic clinical documentation. This will result in a further reduction of health records staff to six employees. (REFER TO CHART - HR Expenditures)

## Moving Forward

For this strategy to be truly effective, clinical leadership, strong communication and commitment to education and training are crucial. It also requires UHN to continue to pursue creative partnerships with the public and private sectors both to manage costs and meet strategic objectives.

UHN has already started evolving its vertical integration with other organizations across the health-care continuum, including St. John's Rehab and the Toronto Community Care Access Centre. Our three organizations are collaborating on establishing a shared technology service that supports the health-care information needs of each organization. By sharing patient information, our health-care workers will have a better idea of the availability of community services and will be able to more readily discharge patients who no longer require hospital care, freeing up beds and reducing wait times.

As well, introducing clinicians to the PRO intelligent electronic patient record that's accessible from numerous organizations promises the potential of providing care in a more seamless, timely fashion.

It's important to note that funding for information technology is indexed to hospital revenues. We set a course to get to 4.5 per cent by 2005/2006 and while we have not quite gotten there, we are continuing to target that level of investment. This is a challenge corporately as finances get tighter for Ontario hospitals and costs for IT development tend to grow non-linearly.

On the plus side, due to an early investment in infrastructure, our rate of project implementation is growing at an exponential rate to exploit our infrastructure. With systems like PRO, we are seeing a huge increase in functionality while keeping our costs low. This is something we need to continue to explore in our efforts to profoundly change and improve the delivery of patient care.

Meeting patient and public expectations, a continued focus on continuity of care and privacy of health information, and the implementation of new technologies - these are just a few of the key developments UHN is striving for. As the use of information and technology continues to change, UHN's *Information Enabling Care* and our partnership with Toronto Community Care Access Centre and St. John's Rehab is there to meet it.