THE OPPORTUNITY

In Ontario, Canada, the government’s health care expenditure has doubled from $21.6B in 1999 to $45.2B in 2009. In comparison, over the same time period, Ontario’s GDP grew at a rate of 39% (from $409 billion to $570 billion). This trend of rising costs is not limited to Ontario; other jurisdictions have experienced similar cost increases.

At the same time as costs are increasing, people want to receive higher quality health care — improved health and greater quality of life, greater safety and shorter waits. The challenge that the health care industry is facing is finding approaches to shift this trend downwards and improve the quality of care at the same time. Key recommendations include transforming the delivery of care to complex patients with chronic diseases, and increasing leading practices in key clinical areas.

We therefore are advocating a solution to disrupt the health care system. Using a communication platform that fits within clinician workflow and results in high adoption amongst clinicians, it facilitates coordination of care around a patient. It also enables further functionality to standardize care using validated tools such as checklists and balanced scorecards.

A CASE

Mrs. Smith is an 83 year old woman who visits her family doctor complaining of shortness of breath. The family doctor makes a diagnosis of heart failure, starts her on medications to treat her heart failure and faxes a referral to a cardiologist for urgent consultation. Unfortunately, the cardiologist’s next available appointment is 2 months away. While waiting for this appointment, Mrs. Smith’s condition deteriorates, requiring her to visit the nearest emergency department and being admitted to hospital with heart failure.

After one day in hospital, Mrs. Smith develops rapid atrial fibrillation, and she becomes very short of breath. Her nurse repeatedly pages the doctor on call but receives no call back from the physician. In frustration, the nurse calls another ward who informs her that the original doctor who was on call is sick and was replaced. The nurse proceeds to page the physician on call who responds after 15 minutes to find that the delays have caused Mrs. Smith to become unstable and her blood pressure has dropped to a critical level. She is immediately transferred to the intensive care unit for a brief stay.

Once her condition has stabilized, she is discharged from hospital. A discharge summary is faxed to the family physician’s office with instructions to follow up with Mrs. Smith and a nurse visit through community care is initiated.

One week later, the community care nurse visiting Mrs. Smith’s home is concerned that she is gaining weight due to her heart failure. The nurse tries to communicate with the family physician but is only receives a recorded message telling her that if it is a medical emergency, to go to the nearest emergency department. She tries leaving several voice messages but obtains no response. She also tries to contact the internist who discharged her from hospital asking for direction but is unsuccessful. Mrs. Smith develops further fluid accumulation, has increased trouble breathing, and is readmitted to hospital.

This case illustrates the increasing complexity of providing patient care as well as the critical importance of good communication between health care providers. As characterized by the Institute of Medicine, there is a “growing complexity of health care, which today is characterized by more to know, more to do, more to manage, more to watch, and more people involved than ever before.” And yet, we have failed to meet this challenge of increased complexity as we continue to rely on communication methods such as paper mail, paging.

and fax. Poor outcomes or adverse events result with inadequate communication. Communication in health-care is critical, and was highlighted by the Joint Commission’s Annual Report on Quality and Safety, which identified poor communication as the leading root cause of medical errors and sentinel events.\textsuperscript{3-4}

**The issue: poor communication resulting in adverse events and inefficiency**

In the hospital setting, communication and collaboration issues can occur in the management of urgent medical issues when a clinician is needed in an emergency. They can also occur in other situations including when multiple members of the interprofessional care team contribute to resolving a patient’s issue such as discharge planning. Depending on the complexity of the patient’s condition, care must be coordinated across multiple disciplines and specialties. This includes the nurse, the pharmacist, and other allied health staff, along with the various specialists. Most of this communication is facilitated through the use of numeric pagers and is inefficient and interruptive.

The literature has also suggested that eliminating these communication inefficiencies and failures will significantly improve patient safety and quality of care.\textsuperscript{5-9} Poor communication in hospitals also contributes to a significant burden of rising healthcare costs. A 2009 report estimated that communication inefficiencies among care providers in U.S. hospitals cost the country $12 billion per year.\textsuperscript{5} Research indicates that the greatest sources of waste in healthcare – time and money (54%) – are largely due to increases in patients' length of stay that stem from slow discharges. The researchers concluded that much of this unnecessary waste could be eliminated by investing in healthcare information technology (IT) solutions that help streamline communication among hospital caregivers.

**THE CHALLENGES**

What prevents health care organizations from effectively addressing the communication challenges? The challenges that health care organizations face can be categorized into teams and workflow, and organizations and information technology:

**Teams and workflow**

- Medical teams are often staffed by transient members that often care for different patients on different teams.
- The transient nature of the medical teams makes it difficult for interprofessional relationships to develop since the team culture is constantly changing. Therefore, the lack of camaraderie often hampers effective care coordination.
- Transitions in care from one clinician to another occur multiple times a day, increasing the likelihood of errors due to unfamiliarity with the patient and omission of key information being communicated during the transfer.
- The patient’s circle of care consists of clinicians from multiple disciplines and specialties, often making it difficult to align care activities and ensuring everyone has a shared understanding of the overall care plan.
- Transforming communication can be difficult and so the capacity to innovate is often hampered by overwhelming workload.
- There is a wide breadth of evidence based medicine available to improve care through standardization, but incorporating these practices into existing workflow is challenging.

\textsuperscript{5} Agarwal R, Sands DZ, Schneider JD. Quantifying the economic impact of communication inefficiencies in U.S. hospitals. J Healthc Manag 2010 Jul;55(4):265-81
• Patients are becoming much more interested in being an active participant in the care they are provided, but existing processes don’t have mechanisms to facilitate this

Organizations and Information technology
• Large information technology projects are usually focused on order entry and documentation of care as opposed to communication and collaboration
• Increasing complexity of care being managed with outdated technology – pagers, telephone tag
• Systems to measure performance and tools to enable new care processes are difficult to implement into clinical workflow
• Too many information systems operate in silos making it difficult to make changes at a systems level
• Current systems are not intuitive and easy to use as vendors have not realized the importance of us ability and accounting for human limitations in the design of technology
• Hospitals lack the ability to build and sustain shared commitment from all stakeholders involved in care delivery and care management
• In hospitals, the culture of accountability and transparency is very strong when it comes to care delivery, however, the same cannot be stated when it comes to the management of care

A SOLUTION

We propose the following five phases to address the main challenges with communication and collaboration facing health care institutions. These recommendations are based on the assumption that organizations do not have a significant new capital funds to implement complex and risky information technology projects. Therefore, the solution needs to provide the highest impact to patient care at the lowest possible cost, that is easily scalable and can be sustained in the long term within an organization’s corporate strategy.

1. Improve transitions of care using standardized handoff

There has been recognition that the transitions of care are opportunities for increased error.\(^\text{7}\) Reduction in resident work hours have resulted in an increase in the number of physicians caring for patients. Nursing care in the inpatient setting needs to be available on a 24/7 basis so transitions occur frequently throughout the day. Overall, transitions of care will increase in the future and these cannot be eliminated, they need to be managed effectively. We advocate the use of a highly usable handoff system that has the clinically relevant information at the clinicians’ fingertips when they need it.

Ideally, this is available on computers, tablets, and smartphones – can rapidly view critical patient demographics and clinical information securely. While there is always the option to print, this is less desirable because it can become out of date quickly and has a higher potential for loss, leading to a potential breach of privacy and confidentiality.

A highly usable handoff system is a quick win for clinician adoption. It enables proper handover of crucial information and aids patient management. This highly usable system should also require little training and so is appropriate in the academic center where there is high turnover of clinicians.

2. Improve communication between clinicians

It is critical to address the communication challenges that occur between clinicians. These result from old challenges such as persistent use of pagers but also newer challenges related to personal smartphone use in the hospital setting. Challenges include the following:
• Use of pagers with difficulty in knowing if the message was received, difficulty in triaging the urgency of messages, and difficulty in responding to messages except through highly interruptive telephone calls

• Use of personal smartphones to transmit patient information insecurely
• Use of secure institutional devices with resulting high cost per device
• Difficulty in knowing who to contact for a specific patient (whether most responsible physician, most responsible nurse, consulting physician)\(^8\)
• High use of informal communication methods as workarounds that have higher failure rates
• Poor documentation of primarily verbal communications

We advocate the use of a secure centralized communication system. Built on the same system that facilitates handover, it is the place to send and reply to messages. It enables the following functionality:
• Knowing who the clinicians are that are providing care for a specific patient including the primary physician, consultants, nurses, allied health professionals, family physician, and community care resources\(^9\)
• Knowing the availability of the clinicians to respond to messages
• Rapidly send messages about a specific patient to multiple members of the care team
• Being able to know the status of messages, whether received, reviewed or replied, thus closing the loop on communication\(^10\)
• Uses logic to manage escalation if there is no reply to a message, eliminating the guesswork from communication
• Device agnostic to support a Bring Your Own Device model where clinicians are able to use personal smartphones securely, thus avoiding costs for managing hospital devices
• Identify issues with communication. With recording and documentation of communication events, now being recorded, powerful analytics are able to report on response rates and response times.

3. Improve communication with patients and caregivers
Ultimately, responsibility of the person’s health resides with the patient. Yet, often patients are not empowered as patient education can often be hurried. Patients are unaware of who is involved in their care, are often unaware of their care plan, and do not have any method to provide real-time input regarding the care they are receiving.

We recommend a patient-centered communication system where the patient or their family member is able to see who is caring for them, is able to communicate with the care team regarding the care they are receiving, and is aware of their care plan so they can be more actively involved with decisions.

While contentious to some, we recommend that patients and their caregivers are able to follow the communication between their clinicians. While this is a disruptive shift for some clinicians, it fundamentally returns control of health back to the patient.\(^11\) [2] If clinicians know that patients and their caregivers can view communication, it will likely change communication, but we believe for the better.

‘Nothing about me without me’
— Valerie Billingham, Through the Patient’s Eyes, Salzburg Seminar Session 356, 1998

4. Further implement standardized processes through validated tools like real-time balanced scorecards and checklists
There is huge variability within healthcare and some of this is expected due to patient variation. However, there is also variation that exists between individual care providers even though evidence based practices are available to reduce this variation. The current lack of standardized processes such as the use of checklists or real-time scorecards contributes to increased errors and inefficiency. The aviation industry has demonstrated the safety and efficacy of using checklists, yet implementing these in a meaningful way in healthcare is ham-
perared due to the difficulty with data collection and usability of technology solutions. Similarly, providing real-time feedback to clinicians on their performance is important but hampered by difficulty in data collection and presentation to clinicians.

With the increase in information and communication becoming electronic, combined with higher usage of communication and handover tools, this momentum can be leveraged to implement standardized processes within these existing systems.

The key is to measure, intervene and report on key metrics that are meaningful to clinicians. These interventions can be enabled by leveraging data entered into handover tools (venous thromboembolism prophylaxis, assessing code status), leveraging communication data (response rate, response times to urgent messages) and having the ability to enter other metrics (handwashing). These customizable interventions have the ability to transform care by providing standardized processes and using feedback to enhance these processes in real time.

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![Figure 1: Example of a real-time clinical balanced scorecard that could be provided to a team to feedback performance on important quality metrics](http://clinicalmessage.org)
Finally, the need exists for health care innovation to be broadly disseminated so that other groups and organizations can realize the benefits. Currently this learning typically exists within a clinical unit or ward and sharing is difficult. Facilitated through a highly used system for capturing and reporting useful metrics, organizations can transform themselves from one that limits innovation to silos and where change occurs in isolation, to one that can readily adapt and learn from its best and brightest across the entire organization.

This knowledgebase or learning cloud has been effectively used in other industries and can be used in health care to achieve further improvements in care.

An example could be a new organization quality directive to improve handwashing from 45% to 80%. Currently, this would involve significant work for a team in using personal contacts to try to figure out who is doing it better, arranging meetings and finding out what they might have done. With the learning cloud, successful teams would post and describe their initiatives. Other teams could quickly view, learn and implement changes.

**SUMMARY**

Significant disruption is required within health care to improve quality while reducing costs. We describe steps to achieve these goals through improving transitions of care, improving communication and collaboration, enabling patients, using standardized processes, and utilizing a learning cloud.
ABOUT THE CM™ TEAM

The CM™ (Clinical Message) capability is the result of a joint venture between the University Health Network, a network of teaching hospitals in Toronto, Canada and QRS, a global continuous-improvement and systems engineering firm, that provides both a comprehensive Quality System and model to engage all staff to improve care.

ABOUT THE UNIVERSITY HEALTH NETWORK

The University Health Network (UHN) is an academic teaching hospital fully affiliated with the University of Toronto. It comprises of the Toronto General, Toronto Western, and Princess Margaret hospitals.

Specifically, UHN is represented by the Centre for Innovation in Complex Care (CICC) (www.thecicc.com) and the SIMS Partnership CICC is dedicated to studying how to improve the entire process of care for patients with multiple problems. Its purpose is to engage its patients and clinicians to identify problems with current healthcare practices and develop solutions for addressing them. Innovative research and evaluation in a real clinical environment allows its clinicians to utilize the latest technology to improve patient care. The SIMS Partnership provides leadership in streamlining and standardizing information technology practices in the healthcare sector.

ABOUT QRS

QRS provides thought leadership and best practices in how to define, develop and exploit information management capabilities to achieve the organization’s strategic intent. The company employs over fifty enterprise architects, program management and software engineering professionals in offices across North America, Europe, Asia and South America.