Using System Maps to Gain a System Perspective to Improve Outcomes

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Abstract

Throughout the world, people are living longer, and chronic and degenerative diseases are on the rise (Bloom et al. 2011; National Institute on Aging and WHO 2011; Yach et al. 2004). These factors place great demands on healthcare systems and threaten sustainability. Fundamental changes are needed to improve health outcomes and reduce costs. Changes that affect desired outcomes include aligning and understanding stakeholders' motivations and behaviours as well as gaps in key processes. Through that understanding, when desired outcomes are not achieved, we can answer why. A system perspective provides insight into what changes to make, and system maps are critical tools to help gain that system perspective.

Taking a System Perspective

As Dr. Paul Batalden says, "Every system is perfectly designed to get the results it gets" (McInnis 2006: 32). It is important to take a system-level perspective of people with complex medical and social needs. Today, we treat people in isolation in healthcare and social systems, when, in fact, their problems are not isolated but related. Therefore, we need to understand how these problems are related and take a holistic view to address people's social and medical needs.

When people have problems, they often seek help from several different programs. Often, these programs operate in isolation, with different criteria, locations, funding and rules, when in reality, they depend on each other. We can continue to optimize these programs in isolation or, as we propose in this paper, we can optimize the entire system from the perspective of all the stakeholders. In order to do so, we need to take a system perspective, which involves documenting who the users are, what services and providers they currently use, what paths they take and the gaps in those paths. We need to develop metrics for each of the important paths and methods to detect successes and failures; we also need to provide recovery when needed. We need to coordinate the payers and rationalize reimbursement throughout the various pathways, across multiple jurisdictions.

A system perspective amalgamates the medical and ancillary service needs and helps us gain a deeper understanding of the users' experience of these services. To gain a system perspective, we need to do the following:

1. Map out the services, providers, interactions and pathways.
2. Understand the perspectives, motivations and incentives of the people who provide and use the services.
3. Understand, establish metrics for and measure the desired outcomes.

This knowledge can be used to propose and test pathways and services that can improve outcomes and reduce costs.

The Ministry of Health and Long-Term Care (MOHLTC) is taking a system perspective. In 2012, it introduced the Health Links (HLs) model. The purpose of this model of care is to improve care coordination, overcome system fragmentation and reduce costs for the top 5% of frequent healthcare users, who account for 66% of healthcare spending (Ministry of Health and Long-Term Care 2013; Wodchis 2012). A cost reduction of 10% for the top-5% users would result in $2 billion of annual savings (Ontario Pharmacists Association n.d.). Each HL has the flexibility to create strategies to deliver integrated care based on its own population.

The Halton Hills Health Link (HHHL) is co-led by Links2Care and Halton Hills (HH) Family Health Team. Mark Spence is chief financial officer at Links2Care. "Based upon my work as a co-lead for the Halton Hills Health Link, it is clear to me that we can provide better healthcare outcomes for Ontarians by coupling healthcare and social care providers in a model of improved coordination of care," he says. "Today, we have a clear example of sub-optimization of a system – each participant (hospital, physician, police, pharmacist) works to achieve their narrowly defined outcomes, but the system as a whole falls far short of total success from the patient's perspective. If Health Links succeeds in its mandate to provide better system-level coordination of care, we will deliver better healthcare outcomes. And, because waste and delays are reduced, we will save money too." The HHHL members examined the care pathways and services used by the top 5% of users living in HH. System maps were created based on interviews with HHHL partners.

> **… frequent healthcare users** typically find the complex healthcare system too difficult to navigate …

What Is a System Map?

A system map is a cross-functional diagram that describes who does what. It consists of a series of rows called *lanes*. The work performed by each stakeholder is described in a lane, making it easy to see the interdependencies between stakeholders and the paths patients take through their healthcare journey.

To create system maps, in-person interviews were conducted with providers from various sectors: police, paramedics, mental health providers, community care, pharmacy and primary care. Interviewees were asked to consider a patient from the top 5% of users when answering a set of questions about coordination of care. The interviews were then analyzed to produce population-specific system maps.

The system maps begin with a 911 call, because frequent healthcare users typically find the complex healthcare system too difficult to navigate; so, when they need care, they simply go to the nearest emergency department (ED) or call 911. After a 911 call, paramedics and police must take these patients to a safe place. Currently, the only safe place available is the ED – it is always open, so people go there by default. The medical system is inundated with issues related to social problems, such as social disorders, mental illness and addiction that manifest in many ways, leading these patients to end up in the hospital. This complex problem is becoming more significant, because of increasing associated cost.

Recommendation

- Create a parallel path at emergency departments to triage non-emergency cases, related to a breakdown in the social fabric.

System Maps to Gain a System Perspective

Figure 1 (available at: http://www.longwoods.com/content/24788) illustrates the large number of providers – medical and nonmedical – needed to coordinate care, address gaps in pathways and initiate interactions between stakeholders. It is interesting to see the type of nonmedical providers that impact the health of frequent users: lawyers, Ontario works, faith organizations, food banks and regional offices. The red arrows in the figure represent areas for improvement. Such opportunities exist between hospitals and specialists and between primary care providers and pharmacists.

This figure provides the reader with a sense of the entire system, but is too large to explain in detail, so a smaller, more detailed system map is presented in Figure 2. This system map has five lanes: urban hospital, rural hospital, patient, police and Community Mobilization and Engagement (COMMANDE). The map is meant to be read from left to right. Ovals represent the start and end of the process, squares show process steps and diamonds are decision points. The arrows represent the direction of the process, with red arrows again depicting opportunities for improvement.

Figure 2 (available at: http://www.longwoods.com/content/24788) starts with a 911 call to the police for a tenant dispute in community housing or a domestic, addiction or mental health issue. Upon arrival, the police assess the situation, and patients needing medical attention are taken to the nearest ED, in this case a rural hospital. Once medical issues are resolved, a decision is made regarding the need for a psychiatric assessment under Form 1. If an assessment is not required, the police drop the patient off at a local mall, and a red arrow is drawn back to the first process step. If a psychiatric assessment is required, police must drive the patient to an urban hospital. Following the assessment, a decision is made whether to admit the patient. If the decision is not to admit the patient, the police then drop the patient off at the local mall and a red arrow is drawn back to the first process step. If the decision is to admit the patient, treatment is provided, then the patient is back on the street and a red arrow is drawn back to the first process step.

Alternatively, if the police identify a mental, social or addiction situation, a risk assessment is completed. If the situation is acute, the patient is asked to consent to be part of the COMMANDE strategy. If the patient gives consent, the case is presented at the COMMANDE table and the patient receives the services needed. If the patient does not consent, they are provided with community service information and a red arrow is drawn back to the first process step. All these red arrows illustrate how the healthcare system can be a revolving door for these patients.

Halton Regional Police adopted a policing model from Glasgow, Scotland, to reduce costs and time spent on non-criminal and non-enforcement responses to social disorders and mental health or addiction issues. This model involves multiple agencies coordinating responses to community safety and public health issues. The COMMANDE table is comprised of medical and nonmedical providers: Halton Police; emergency services; addiction services; John Howard Society; Halton Housing; Halton Public Health; Reach Out Centre for Kids; Town of Milton; Halton Paramedic; Canadian Mental Health Association; and Halton Alcohol, Drug and Gambling Assessment Prevention and Treatment Services (ADAPT). These providers meet weekly to provide a real-time, coordinated response to people at high risk. As a result, these people get the assistance they need, such as education to secure a job, a place to live or medication. Providing these supplementary supports reduces unnecessary contact with other services or agencies and prevents looping in the healthcare system, thereby reducing the demand on police and hospitals. Even though a formal assessment of COMMANDE is not completed in these circumstances, there are qualitative measures and anecdotal evidence that indicate that COMMANDE is making a difference (Halton Regional Police Service 2014).

Colleen Sym is executive director at Halton Community Legal Services. "Nearly 18% of people who report having a legal problem experienced stress or emotional difficulty as a direct consequence of having that problem," she says. "As well, persons with mental illness are disproportionately criminalized, incarcerated, impoverished and under-housed – all of which are justice issues that bring them into conflict with the law and, often, in contact with the medical system. System approaches that include medical–legal partnerships, like the North Halton Health Link, are important to increase access to justice and improve the health outcomes of high-risk patients. System maps are an effective way of starting the conversation on system improvement."

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Recommendations

- Provide leadership commitment, at an organizational level, to build relationships through face-to-face meetings between medical, social and community providers.
- Use the system maps to identify high-risk patients early in the healthcare journey and provide cross-sector coordination.

Value of the system map

The system map can also be used to identify how and when people access the system and to understand stakeholders' accountabilities and motivations (Table 1).

The map can be used to identify where in the care process patients at high risk access the system. There are two problems with exclusively focusing on the top 5% of users – first, this approach does not address other users who will become the top 5% of users in the future, and second, it is very hard to identify the top 5% of users. One way these users have been identified is by the number of times they have visited the ED in the previous 12 months. This method comes with challenges. For example, in a rural setting, patients may visit the ED because they need to see their doctor, who is on call in the ED. Other patients may have used the ED many times in the previous 12 months for the same needs, because those needs are unmet in the community. Alternatively, there are high-risk patients who visit the ED only once or twice in 12 months, but see their primary care provider (PCP) 10 times in the same period, because they are unable to self-manage their condition and need care coordination. We need to be proactive in identifying those patients who need better care coordination in the community and intervene before they go into crisis.

Because of differing policies, goals and funding, each stakeholder is motivated to behave in a certain way. Here are examples of how these motivations come into conflict:

Paramedics and MOHLTC – an estimated 40 to 60% of 911 paramedic calls are for falls and assistance with activities of daily living (ADLs). Paramedics want to reduce the number of these calls by sharing information with patients' PCPs. However, under the Ontario Personal Health Information Protection Act, paramedics are not permitted to share patient information.

Recommendation

- Make changes to the Personal Health Information Access and Protection of Privacy Act to facilitate information sharing between providers.

Ministry of Justice and MOHLTC – the Ministry of Justice wants police to spend time on core policing activities, whereas MOHLTC policy requires police to take patients to the nearest hospital. This places an additional burden on the police and increases costs. Both ministries are part of the mental healthcare process.

TABLE 1.
Stakeholders' funders, accountabilities and conflicts

Stakeholder	Funder	Level of government	Measure	Conflict between stakeholders
Patient	Province, private insurance, national defence			Patient and paramedics
Community service sector	Local Health Integration Network	Municipal	• Number of complex patients that have a meeting with core service providers • Proportion of meetings with the patient at the table at case conferences • Number of ED visits per patient • Number of visits to primary care provider and walk-in clinic per patient	
Paramedics	MOHLTC	Regional	• Number of 911 calls by patients who called five or more times in one year • Number of ED visits for patients – Canadian Triage and Acuity Scale (CTAS) Levels 3, 4 and 5	Paramedics and MOHLTC
Police	Ministry of Justice	Regional	• Number of calls for services due to mental health issues • Time spent in hospitals for mental health issues	Police and hospital
Pharmacy	MOHLTC – drug plans for seniors	Provincial	• Number of times pharmacist contacts the hospital for clarification • Number of times pharmacist contacts primary care provider for medication renewal	
Hospitals	Local Health Integration Network	Regional	• Number of ED visits • Shorter length of stay • Patient satisfaction	Hospital and primary care provider
MOHLTC	Federal Government, OLG, LCBO	Provincial	• Number of ED visits	MOHLTC and Ministry of Justice
Canadian Mental Health Association	Ministry of Children and Youth Services		• Number of successful connections made in specific sectors • Number of complex patients who receive the identified required services • Number of patients served	Mental health providers and hospitals
Primary care providers	MOHLTC	Provincial		Primary care providers, patients and MOHLTC
Care providers	Community Care Access Centre			Paramedics, hospital and care providers
Legal aid clinics	Legal Aid Ontario	Regional		Lawyers and hospitals

ED = emergency department; LCBO = Liquor Control Board of Ontario; MOHLTC = Ministry of Health and Long-Term Care; OLG = Ontario Lottery and Gaming.

Hospitals and police – after a 911 police call for domestic violence, addiction or mental illness, police may need to take the patient to the ED. Police want to reduce time spent in the ED; however, hospital staff need the police security to deal with potentially violent patients.

Caregivers and hospitals – Caregivers who are unable to provide care for their elderly loved ones or cannot afford other arrangements call 911 to have the paramedics take their family members to the hospital; this way the patients are admitted to the hospital until other arrangements are made. These patients are designated an alternative level of care (ALC), which affects the hospital's ALC evaluation metric and increases the number of unnecessary hospital admissions. The MOHLTC requires hospitals to "achieve an ALC rate of 9% or less" and to "reduce unnecessary admissions to hospitals."

MOHLTC, patients and PCPs – the MOHLTC wants to reduce the number of ED visits for patients whose needs can be met in the community, but patients and doctors use the ED to obtain services when there is a long wait for specialists.

Recommendation

- Create a common forum to establish changes at the system level.

Different stakeholders also have different performance measures. In order to engage stakeholders, we need to help them achieve these measures. The problem with focusing on performance measures is that they are final outcome measures, which do not take into account the processes that need to be improved and measured to achieve the desired outcomes. Thus, we are unable to answer why outcome measures were not achieved. For example, one of the MOHLTC HL's metrics is to "ensure primary care follow-up within seven days of discharge from an acute care setting." This metric ensures that discharged patients have quick access to their PCPs. However, focusing on this outcome measure does not take into account the complex processes involved to achieve it. The assumption that patients can see their PCP within seven days does not take into account barriers that might preclude a quick visit, such as transportation needs, lack of a phone to make the appointment or the need for assistance to get to the appointment. Instead, we need to understand what happens to those frequent users after they leave the hospital. On the provider side, we need to understand the communication process between hospitals and PCPs. Currently, there is no standard method of communication to alert PCPs to patients' hospital admissions, visits or discharges within 24 hours to achieve follow-up within seven days.

Different stakeholders also have different performance measures … we need to help them achieve these measures.

Recommendations

- Create a holistic needs assessment to be completed on hospital discharge.
- Create a process to ensure two-way communication between hospital, primary care provider and specialist on hospital discharge.
- Include pharmacists in hospital discharge planning.

Another results-based metric is to "reduce the number of avoidable ED visits for patients with conditions best managed elsewhere." Some patients call 911 so they can receive "VIP" treatment in the ED and be sent to the head of the line to receive the care they have been waiting months to receive in the community.

Unless we understand the stakeholders' motivations, behaviours and processes behind each outcome measure, we will not be able to affect these outcome measures. Thus, having a system-level understanding allows us to apply an organized approach to prioritize improvements, build a business case for interventions and develop meaningful measures.

Best practices for creating a system map

When creating a system map, consider the following points:

1. It is important to carry out an organizational readiness assessment to determine if there are competing priorities and to gauge the level of leadership commitment and support. If organizations have competing priorities and/or there is no leadership support, it will be hard to get the required collaboration for real change.
2. Build your system to accommodate population and regional differences. Urban settings are different from rural settings. There are usually few, if any, specialists' offices in rural settings; hence, patients need to drive to urban settings to see a specialist. This necessity puts a greater burden on patients and reduces their ability to see specialists.
3. Use the system map to identify patients at risk. The earlier the patient is identified in the system flow, the earlier interventions can be used to prevent looping, preferably before a crisis occurs. Paramedics and police are the eyes and ears of the medical system and can help to identify these patients. Social disorders, mental illness and addiction issues lead to repeated 911 police calls that can be linked to community services. "VIP" and assistance with ADLs or falls lead to repeat 911 paramedic calls that could also be linked to community services.
4. Be prepared to bring in additional partners to optimize the processes as the gaps are being addressed. Patients may be evicted from their homes while in the hospital or their health conditions may prevent them from returning to an unhealthy home environment. Lawyers and social workers may need to be involved to facilitate housing issues.
5. Align patients', providers' and funders' motivations and rewards to drive desired behaviours and outcomes.
6. Prioritize based on return on investment of scarce resources and improving health outcomes. There will be many areas on the map for improvements; however, not all improvements are equal – those that require policy changes will have a greater impact than those that improve workflow.

Final Discussion and Conclusion

All stakeholders in the healthcare and social support services have needs and experience frustrations about solutions to system problems. We need to look at root causes as well as solutions that cannot be resolved easily. The answers are not solely within healthcare and are not Health Link–specific. It also does not make sense to try to solve them in isolation, in each area across

the province. At a provincial level, frequent users of the system are at the mercy of poor inter-sector collaboration. These are government issues and they need to be addressed at a government level. The fact that some providers are at a regional level and others at municipal levels leads to a whole list of challenges. Some of these services differ by municipality, based on the municipality's own funding, while others are outside the funding envelope. Primary care is not always integrated, and social and community services are separate. This is, therefore, a national problem, and not just a provincial problem. We are dealing with both complex patients and a complex system. We need to take a system perspective to redesign the system for the best results. HQ

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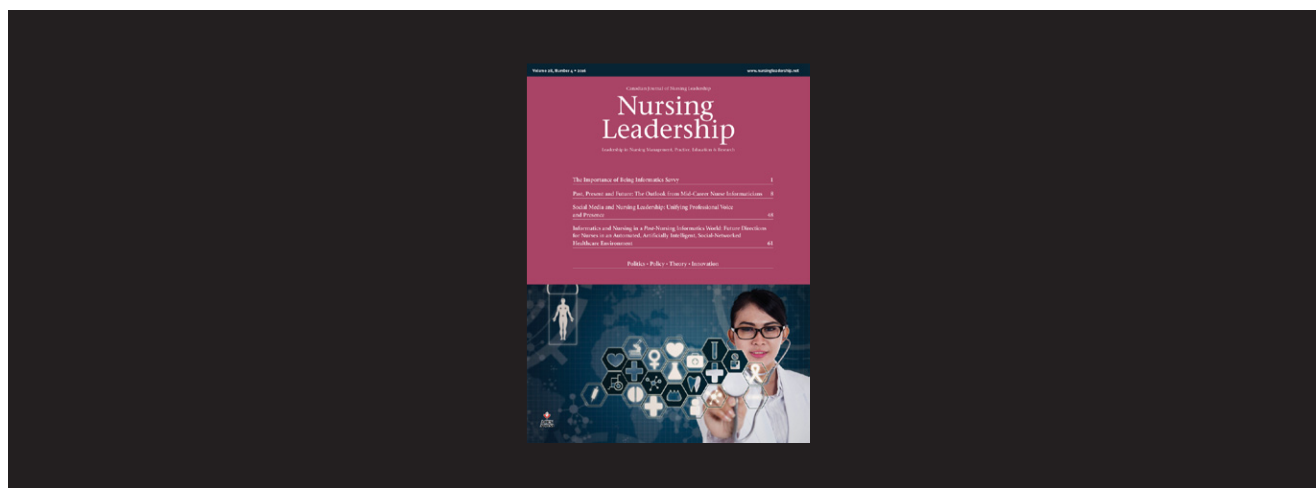

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