Abstract
Quality is being measured and reported across healthcare organizations and sectors, but efforts are rarely made to connect the activity in one organization to quality experienced by patients and clients in another part of the healthcare system. This article describes one regional health organization’s journey to measuring health quality at a system level. The authors describe a highly consultative and iterative process used to measure quality across the continuum of care, and the challenges experienced in approaching this type of measurement, and they highlight some of the early findings.

Measures of quality in healthcare are ubiquitous. The nature of care provided to patients and clients in the system is of utmost importance to all healthcare providers, and they are measuring how well their organizations are doing at providing a high standard of care. Activity in quality measurement has increased in Ontario since the introduction of the Excellent Care for All Act 2010. Despite these efforts, when Toronto Central Local Health Integration Network (TC LHIN), tried to assess quality at the local health system level, to look at quality across sectors and at points of intersection, there was a paucity of examples in the literature where different sectors were held accountable for their contribution to a single system indicator.

A LHIN is responsible for the care received by the population that resides within its boundaries and those who seek care within its boundaries. TC LHIN, one of 14 regional health planning and funding bodies in Ontario, provides funding to more than 180 healthcare organizations that deliver services ranging from quaternary hospital services to community mental health and addictions services. While the collection of quality data at an institutional level is occurring and is essential to fuel improvement at the point of care, the drive toward common large system goals, and a way to measure each sector’s and each organization’s contribution toward these goals, was absent. The system approach to quality is pivotal to furthering improvement in care across the region.

The Impetus
The journey began in 2010, as TC LHIN examined the indicators used in its own accountability agreements with health service providers (HSPs), and noted (1) that the majority of these indicators were volume based and (2) how few were related to the outcomes of care and quality of care. When the LHIN did examine indicators that reflect system quality, such as readmissions to hospitals, it was not possible to connect the data on these indicators to what is occurring for patients in other parts of the healthcare system that contribute to or reduce readmissions to hospital. A need emerged to identify a small set of quality improvement goals, toward which all HSPs in TC LHIN could work.

TC LHIN recognized that a comprehensive approach to quality measurement was required. A review of quality indicators was conducted, an advisory group was assembled, and the
ensuing report (TC LHIN QITG 2011) included as one of the top priorities, “Measuring system perspective – focusing on transition of care indicators, ensuring that indicators are cross-sectoral, and encouraging cross-sectoral collaboration to address issues.” The issue of cross-sectoral collaboration for improving transitions has also been recognized by the Ontario Ministry of Health and Long-Term Care (MOHLTC) and leading experts (MOHLTC, Avoidable Hospitalization Advisory Panel 2011).

The TC LHIN Quality Table was formed, with a clear and focused purpose and broad and thoughtful membership. The group was charged with selecting a few “big dot” quality indicators that would be measured across the LHIN, and sector-specific “small dot indicators” that individual healthcare organizations could measure that contribute to performance on the big dot indicators. The composition of the group was critical: researchers, clinicians, a patient and caregiver, the Ontario Medical Association, Health Quality Ontario and Toronto Public Health were among the group. These individuals complemented a rich cross-section of providers – including providers of community mental health and addictions care, hospitals, community care access centres, long-term care (LTC), community support services and community health centres.

**Approach and Methodology**
The Quality Table began by developing its own quality framework. System quality frameworks from other jurisdictions were examined, and a review was performed of published and grey literature, including the Institute for Healthcare Improvement’s Triple Aim and Whole System Measures. Perspective from consultations with patients was also used to derive areas of focus for the TC LHIN quality framework. The resulting framework was anchored in overarching goals: to improve the overall health status of people living within the TC LHIN as well as residents from outside our LHIN who receive care from our health service providers, and to improve outcomes and the experience of care. Three themes have emerged across LHIN work as critical to quality at a system level:

1. Appropriate access to care, focusing on avoidable time in hospital
2. Transitions of care, focusing on patient experience
3. Care for patients with complex needs

A starting assumption was that each health service organization was collecting its own quality and safety data, and that the focus would be on those with impact on the broader health system. Criteria were developed (see Table 1 for abbreviated criteria descriptions) and a modified Delphi method was used to select the final indicators.

For each theme, major issues were identified – those with multiple causes that all sectors could contribute to improving:

---

**TABLE 1. Criteria for the selection of big dot indicators**

<table>
<thead>
<tr>
<th>Criteria Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive</td>
<td>Affected by factors across the spectrum of services/continuum of care. Requires cross-sectoral collaboration to achieve improvement. Pertinent to two or more sectors. Issue that indicator measures is under TC LHIN jurisdiction.</td>
</tr>
<tr>
<td>Alignment</td>
<td>Reflects TC LHIN’s strategic priorities, including equity, improving access and outcomes for mental health and addictions clients, reducing ER wait times etc. Aligns with or is linked to activity in primary care and public health. Is consistent or aligns with Health Quality Ontario indicators.</td>
</tr>
<tr>
<td>Focus area</td>
<td>Focuses on issues that have potential to affect significant segments of the population and/or users of the health system. Is system wide and not disease or program specific. Is a big dot indicator into which small dot indicators can feed.</td>
</tr>
<tr>
<td>Scientific soundness</td>
<td>Meets technical requirements criteria:</td>
</tr>
<tr>
<td></td>
<td>• Reliable</td>
</tr>
<tr>
<td></td>
<td>• Valid</td>
</tr>
<tr>
<td></td>
<td>• Clear</td>
</tr>
<tr>
<td></td>
<td>• Actionable – actions that could be undertaken by relevant health service providers can result in change in the indicator</td>
</tr>
<tr>
<td></td>
<td>• Responsive</td>
</tr>
<tr>
<td></td>
<td>• Comparable</td>
</tr>
<tr>
<td></td>
<td>• Feasible – the required data can be measured and collected and calculated, and the agencies/organizations are able and willing to do so; data do not have to be currently available</td>
</tr>
<tr>
<td></td>
<td>• Timely</td>
</tr>
</tbody>
</table>

ER = emergency room; TC LHIN = Toronto Central Local Health Integration Network.
• Avoidable time in hospital, for example, unscheduled repeat visits to the emergency department (ED) and in-patient readmissions, is a significant challenge in TC LHIN. It can be due to multiple factors, including medication errors, poor discharge planning, a lack of communication with primary care providers or community providers and not receiving timely primary care or other follow-up in the community.
• Transitions are a critical and stressful time as people wait, often for long periods, to know where they will receive the next care. Many vulnerable patients are at risk for worsening outcomes or “falling through the cracks” during transitions. Smooth and expedient transitions require proper communication between the referring and receiving providers, as well as proper communication to the patients to enable them to care for themselves.
• Complex populations require and receive services from multiple sectors. These people are often the most vulnerable and utilize multiple high-cost services. There is a need for integration of services among different sectors to care for these individuals.

After significant work and consultations through sector-specific subgroups, six big dot indicators were selected to match the above themes with each sector (Figure 1). Subsequently, small dot indicators were established whose results could affect performance on the big dot indicators. The six big dot indicators are these:

1. Unscheduled in-patient readmissions within 30 days of discharge for selected case mix groups (CMGs; stroke, chronic obstructive pulmonary disease, congestive heart failure, cardiac, pneumonia, diabetes, gastrointestinal, asthma, mental health and addictions)
2. Repeat unscheduled ED use within 30 days for any reason (may focus on Canadian Triage Acuity Scale levels 4 and 5)
3. Percentage of hospital patients who know important discharge aspects, for example, danger signals to watch for after going home, medication-related information, when to resume usual activities, whom to call if they need help
4. 90th percentile decision time (number of days from the date that the referral is sent to final response by receiving agency)
5. 90th percentile waiting time from acceptance to admission
6. Percentage of patients with complex high care needs identified who are targeted/receiving appropriate care (e.g., intensive case management [in development!])

A full list of sector-specific indicators is available on TC LHIN’s website (http://www.torontocentrallhin.on.ca/).

Data were drawn from existing data sets and, in some cases, survey data from the organizations; the first results were produced in May 2013. The desired outcome was a set of information that would help elucidate challenges and opportunities for quality improvement across the continuum of care.

**Early Findings**
From the first set of analyses, the data yielded more questions than answers. But it did demonstrate the impact of activity in one sector on another.

**FIGURE 1.**
Example of system and sector-specific indicators alignment

- Hospital
  - 90th percentile days waiting from acute to rehab/CCC
  - Average wait time for transfer of pediatric patients to CCAC

- CMHA
  - 90th percentile days waiting for assessment
  - Processing time for CCAC referrals (90th percentile days waiting for assessment)

- LTC
  - 90th percentile days waiting for services (developmental)

- CSS
  - 90th percentile days waiting for assessment

- CCAC
  - Number of clients admitted and 90th percentile days waiting for services

- CHC
  - Processing time for CCAC referrals
  - Percentage of clients newly registered to CHC in past year

- ACTT = Assertive Community Treatment Team; CCAC = community care access centre; CCC = complex continuing care; CHC = community health centre; CMHA = community mental health and addictions; CSS = community support services; ICM = intensive case management; LTC = long-term care; MHA = mental health and addictions; SH = supportive housing.
Unscheduled In-patient Readmissions
TC LHIN has the highest rate of unscheduled readmissions within 30 days of discharge from hospital among all LHINs in the province. In the third quarter (Q3) of 2012–2013, the overall rate for selected CMGs was 18.1%. Figure 2 shows the readmission rate within 30 days by clinical cohort for the 2011 calendar year. Observed rates for all conditions were higher than the expected rates, indicating potential areas for improvement (results not shown). While not all readmissions can be prevented, the variation in rates across hospitals suggests a need for strategies to decrease unnecessary readmission.

Hospitals selected medication reconciliation completed at discharge as one of their small dot indicators, as medication error is a cited reason for readmission. Hospitals reported medication reconciliation at discharge starting with selected populations or patient units. In Q4 2012–2013, results ranged from 36 to 100%.

The LTC sector selected unscheduled admissions to hospital via the ED for their residents as one of its small dot indicators. Between Q4 2011–2012 and Q3 2012–2013, nearly half (49%) of the unscheduled ED visits by TC LHIN LTC residents were admitted to hospital. For the 7,443 active residents in TC LHIN LTC homes, there were a total of 2,607 ED visits ending in admission, a rate of 350.3 admissions per 1,000 active residents. The rate of ED visits that resulted in admission for TC LHIN residents was higher than the provincial rate (350.3 versus 254.8/1,000 active residents). Figure 3 indicates that the rate varied from a low of 127.3 to 605.4 per 1,000 active LTC residents among the LTC homes. These results may suggest opportunities for improvement in managing conditions that frequently result in admissions.

Wait Time to Receive Services
For wait time indicators, the focus of the big dot indicators is measured from a client perspective and splits the wait in two parts: (1) decision time – when does a patient know where they will receive care? and (2) wait time – after being placed on a wait list, how long will the patient wait to be admitted to the home? The small dot indicators relate to business processes (measured in business days) and patient outcomes. The main indicators are measured as 90th percentile to include as many people as possible; however, the median wait time is also captured for each indicator as it is less influenced by outliers.

For wait time, one of the small dot indicators is the 90th percentile days waiting for LTC from acceptance to admission. In the fiscal year (FY) 2012–2013, there were 1,277 individuals admitted to TC LHIN LTC homes. The 90th percentile wait time was 306 days, indicating that 90% waited 306 days or less. There was wide variation in the 90th percentile wait time (Figure 4), which may be related to the impact of outliers on this measure. The median wait time was 26 days for the TC LHIN, and it ranged between four and 416 days.

The wide variation in wait times is affected by many factors, which could include a lack of capacity in the LTC home, inefficiencies in processing individuals on wait list and client preferences. The LHIN has been working to understand the variances and determine which are within or outside the homes’ influence. In addition, given the diverse population served by the TC LHIN, it is important to determine if some population subgroups are affected more than others. The indicator has been broken down by source of referral (hospital, community or other LTC home), religious preference, language preference and ethnocultural preference. The results showed that, generally, wait times were higher for those individuals who had religious, language and ethnocultural preferences.
Challenges
Developing a regional system quality measurement initiative, and obtaining support and participation from more than 180 health service providers, was far from simple. Many challenges were encountered, including the following:

- The best place to measure what is occurring is not always in the organization that can influence the results. For example, when measuring how well information is transferred following hospital discharge to primary care, the easiest place of measurement is in the primary care sector. However, the ability to influence results on such an indicator falls mostly outside of primary care. In an era with an ever-increasing focus on accountability, health service organizations are concerned about their ability to drive or influence performance of data that are collected within their own organizations.

- Comparative measurement exercises are typically limited by the availability of valid, reliable data across multiple organizations. Quality Table members recognized that exclusively relying on well-established data sets narrows the available information to the metrics that have always been reported. This was particularly true in the community mental health and addictions sector and community support services sector, where consistent, reliable, relevant information is less common. TC LHIN and the agencies determined that it was important to collect and report this information regardless, to drive improvements in the data quality and initiate conversations about quality improvement in these sectors.

- Developing indicators for measuring care for complex patients is complicated by the numerous definitions of complex users in the literature. The TC LHIN Quality Table used a framework (Schaink et al. 2012) for describing and understanding complex patients that includes the following five dimensions: (1) medical/physical challenges (e.g., multi-morbidity, poly-pharmacy, physical functioning), (2) mental health challenges, (3) social health issues (e.g., social support, caregiver strain), (4) demographic characteristics and (5) health and social experiences (e.g., self-management, healthcare system navigation). Because there is no standard definition of complex users, measuring the care these individuals receive and the outcomes that ensue proved complicated.

- Measurement of patient experience was deemed to be a critical part of quality, yet the existing data sets for reporting and analysis posed significant challenges. Across the healthcare system, there is no established minimum set of common indicators as a means to promote continuous quality of care. In some sectors, there are disparate reporting processes and instruments lacking systemized categories. In these same sectors, only a handful of organizations have adequate systems for collection, interpretation and reporting. Few organizations are reporting results to the front line as a means to implement quality improvements. In the hospital sector, a standardized methodology and survey tool is used by most facilities in Ontario; however, the data from these tools are rarely used, in part due to low sample sizes and low response rates, and in part due to the delayed timing of seeing results (Beard Ashley et al. 2013).

Most importantly, across all sectors, measurement of patient experience is principally focused on episodic care. Many complex patients in the healthcare system receive care and

---

**FIGURE 3.** Unscheduled ED visits resulting in an acute in-patient admission per 1,000 active LTC residents*

| LTC Home 1 | LTC Home 2 | LTC Home 3 | LTC Home 4 | LTC Home 5 | LTC Home 6 | LTC Home 7 | LTC Home 8 | LTC Home 9 | LTC Home 10 | LTC Home 11 | LTC Home 12 | LTC Home 13 | LTC Home 14 | LTC Home 15 | LTC Home 16 | LTC Home 17 | LTC Home 18 | LTC Home 19 | LTC Home 20 | LTC Home 21 | LTC Home 22 | LTC Home 23 | LTC Home 24 | LTC Home 25 | LTC Home 26 | LTC Home 27 | LTC Home 28 | LTC Home 29 | LTC Home 30 | LTC Home 31 | LTC Home 32 | LTC Home 33 | LTC Home 34 | LTC Home 35 | LTC Home 36 | LTC Home 37 |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Rate/1000 active residents | # of ED visits that were admitted |

ED = emergency department; LTC = long-term care; Q3 = third quarter; Q4 = fourth quarter; TC LHIN = Toronto Central Local Health Integration Network.


Source: Data from Ministry of Health and Long-Term Care, Health Analytics Branch.
services from multiple healthcare providers and multiple sectors; currently, there is no way to measure the holistic experience of these patients with their care.

• **The complexity of the healthcare sector was itself a challenge.** Six sectors fall within the jurisdiction of the TC LHIN, yet many different organizations with different foci and services comprise a single sector. For example, the community mental health and addictions sector includes agencies with multiple services, such as supportive housing and case management. Reflecting the work of our health service providers through a small set of indicators proved extremely difficult.

• **Despite commitment from providers to this system quality work, all healthcare providers in the system are collecting and reporting data to many bodies for many purposes.** There is a lot of work associated with these efforts, and with multiple indicators reported in various places, the significance of new system quality reporting has the potential to be diluted.

**Lessons Learned**

The most significant learning from the system quality initiative has been the importance of engagement. At each stage in the process – from concept through measurement, reporting and ultimately improvement – engagement and consultation with clinicians, health service providers and patients has been critical.

**Selecting Indicators … through Patients’ Eyes**

As providers and administrators, we have clear notions of what quality means, but patients and caregivers remind us that these perspectives may be limited. One of the most pronounced examples of this was the inclusion of referral and wait time data as quality indicators. Most members of the Quality Table initially viewed referral data as access or efficiency data. The LHIN views these data as reflecting how quickly a provider accepts a person into a program from a process perspective. Quality Table members were reminded that from a patient lens that referral data demonstrate how quickly a person finds out where he or she is going to next for care, and when that will start. Undoubtedly, this is a core aspect of quality and the patient experience during transitions.

**Selecting the Right Measures and Then Tweaking Them**

Developing system indicators is an iterative process. The indicators are rarely perfect, or close to it, and often it takes an examination of the resulting data to determine that the indicator itself requires tweaking. Deep-dive sessions were held with each sector after two quarters of data to review the data, highlight any methodological flaws and note key interpretation points. These sessions were pivotal to understanding what story the data are telling and to increasing buy-in to the quality measurement initiative.

**Making Data the Conversation Starter**

While the passion and commitment of the individual Quality Table members were themselves assets, the construct of this table of different types of clinicians and people working across the healthcare system discussing how to know that quality care for patients and clients is being delivered produced dynamic conversations regarding how quality can be improved across transitions of care. Similarly, as discussions began among the sectors about the small dot indicators, and ultimately the first
data on these indicators, conversations about the right methodology quickly morphed into the acceptability of the results and how to work together to change the results for patients.

**Final Thoughts**

As the system quality effort was initiated, it was understood that single measures of quality rarely describe the picture of health quality for multiple populations. It is well known that socio-demographic factors affect the access, quality and outcome of care. The critical next step for the system quality initiative is to analyze the data by socio-demographic variables. Hospitals and community health centres in TC LHIN have begun collecting standardized socio-demographic data elements that can allow the examination of quality data through a health equity lens.

The power of data is strongest when it is shared and used. For quality data to be meaningful to both providers and health system planners, the data must be anchored to the baseline of where we are coming from as a system, and to aspirational goals of where we are striving to be.

The importance of this initiative is not the collection or reporting of specific quality indicators but, rather, the relating of activity in different parts of the healthcare system to one another. To understand and ultimately change how patients experience care, a system approach is required. Criticisms of frequently used quality indicators demonstrate this point. In a 2012 *New England Journal of Medicine* article, the authors concluded that “the primary drivers of variability in 30-day readmission rates are the composition of a hospital’s patient population and the resources of the community in which it is located – factors that are difficult for hospitals to change … some of the most important drivers of readmissions are mental illness, poor social support, and poverty” (Joynt and Jha 2012: 1367)). Our point exactly.

**Acknowledgements**

The authors gratefully acknowledge the tireless efforts of the TC LHIN Quality Table members (past and present): Linda Jackson (chair), Chris Gillies, Dr. Phillip Ellison, Anne Wojtak*, Beverly Leaver*, Brigitte Wirkowski*, Charissa Levy, Deborah Bonser, Gayle Seddon, Giancarla Curto-Correia, Gita Schwartz*, Katherine Henning*, Kathy Buga, Norm Umali, Dr. Rick Glazier, Dr. Samir Sinha, Sujata Ganguli*, Vivia McCalla, Wissam Haj-Ali, Dr. Andrew McDonald, Dr. Barbara Yaffe, Dr. Bill Watson, Kristin Ramdeen, Trish O’Brien, Dr. Tara Kiran, Karen Beckerman, Fredrika Scarth, Shirley Bryant, Cynthia Damba, Rachel Solomon, Vanessa Ambtman, Dr. Barbara Liu and Janine Hopkins. (The asterisk [*] denotes sector subgroup chairs.)

The authors also would like to thank the Quality Table sector sub-groups and their chairs. As well, thanks are extended to the health service providers who have participated in this initiative.

The tireless and exceptional analytical efforts of Lara de Waal, Mahwesh Siddiqi, Nathalie Sava, Nathan Frias, Mohamedraza Khaki, Ranjeeta Jhaveri, and the Resource Matching and Referral team and other data providers are appreciated. Thanks are also extended to all TC staff for their contributions and to Camille Orridge for her bold leadership.

Finally, the authors would like to express their deep appreciation for the late Dr. Kevin Leonard and his wife and caregiver, Sandra Dalziel, for both their contributions as members to the Quality Table and for inspiring the system to do better for patients.

**References**


**About the Authors**

**Rachel Solomon**, BA, MPH, is the senior director of performance measurement and information management at the Toronto Central Local Health Integration Network (TC LHIN), in Toronto, Ontario.

**Cynthia Damba**, MBChB, MHSc CH&E, is a senior planner/epidemiologist in performance measurement and information management at the TC LHIN.

**Shirley Bryant**, MHSc, CHE, is a senior planner in performance measurement and information management at the TC LHIN.