WHAT'S UP DOC? HOW TO EFFECTIVELY SHARE PERFORMANCE DATA WITH PHYSICIANS

Capstone Paper

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Abstract

This study aimed to gain insight into the effective means of communicating performance data with physicians in an academic health sciences centre setting. Using both qualitative (one on one interviews) and quantitative (on-line survey), the researcher assessed the experiences of physicians with individual scorecards, along with their opinions on factors important to using data to increase engagement and improve patient care. Five key recommendations emerged, including the importance of involving physicians directly in indicator selection, the use of comparator data and benchmarks, frequency of reporting, the impact of culture, and the importance of accurate data.

Keywords: physician scorecard, physician engagement, healthcare communication

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Introduction

Much has been written about the influence and importance of internal communications and its impact on organizational effectiveness (Men, 2014; Cowan, 2017; Ruck & Welch, 2012; Mishra, Boynton, & Mishra, 2014). Fitzpatrick & Valskov (2014) define internal communication as "concerned with sharing information, building understanding, creating excitement and commitment and, ideally, achieving a desirable result" (p. 7). When we contemplate the opportunities for engaging physicians as an internal audience in hospitals there are special considerations in the Canadian healthcare system compared to the US system of payment and practice. Health spending in Canada is 11% of its gross domestic product (GDP), equating to nearly $228 billion annually with payments to physicians accounting for over 15% of spending (Canadian Institute for Health Information, 2016). As the largest and arguably the most influential component of our healthcare system, physicians play an integral role in both the quality and cost of healthcare, and while the Canadian healthcare system is perceived as one of its greatest assets (Soroka, 2011), Canada in fact ranked in 10th place (of 11 countries) in the Commonwealth Fund 2014 update on international health system performance (the United States was last) (Davis, Stremikis, Schoen & Squires, 2014).

Given this dichotomy of perception versus reality, what role can internal communications have in increasing performance of the health system within the hospital sector? As healthcare has become increasingly digital, measurement and access to data is now unparalleled, with many jurisdictions producing publicly available provider-level report cards (Christianson, Volmar, Alexander & Scanlon, 2010). Berwick, James & Coye (2003) argue that "measurement is necessary but not sufficient for quality improvement" (p. I-30). There appears to be a lack of literature, however, to support how best to use this data directly with physicians to influence

quality, performance and engagement. In Canada, physicians who practice in hospitals are generally not considered employees, but instead independent practitioners who are granted the statutory privilege to care for patients in the hospital setting (Lomas, Fooks, Rice & Labelle, (1989). This presents a unique challenge from a communications perspective as there is no employer-employee relationship. While physicians must follow hospital policies and procedures, typically they are perceived and managed quite differently from hospital employees.

To answer the question of how performance data ought to be used, a 2003 survey of over 1,800 US physicians (Audet, Doty, Shamasdin, & Schoenbaum, 2005) found that 71% of respondents believed that performance data should be shared with their leadership, but only 55% thought it should be shared with patients. Physicians by nature are data driven, and therefore it is no surprise that they believe data should be shared, however it is not clear in the literature what should be shared, how it should be shared, and if sharing data changes practice or increases engagement.

Research Problem

As both the ability to produce individual level data and the pressure to use data increases, the question arises of how best to share this data with physicians (and other providers), and to determine if there in fact are any benefits or potential risks associated with these types of "report cards." A shift in the United States health system over ten years ago has meant that vast amounts of data (mostly claims based) is available not only to hospital administrators and individual providers, but also to consumers (Centers for Medicare and Medicaid Services, 2018). In Canada, where hospital data has been more limited (since there are few claims-based processes with insurers, and the vast majority of funding in hospitals is on a lump-sum, global basis), public and private reporting of data has most often been at an organization level. For example,

the Canadian Institute of Health Information's Your Health System website (2018), shares hospital level data related to a small, standardized set of indicators of quality and performance. These include measures such as readmission rates, emergency department wait times, sepsis, obstetrical trauma, and deaths following surgery. While individual hospitals may have implemented personalized physician scorecards or report cards, there have been no published studies in Canada to link these with increased quality, performance, or physician satisfaction/engagement. There have also been no studies that highlight the potential risks or unintended consequences of providing individual data to physicians. When considering physicians as an internal audience from a communications management perspective, there is a lack of understanding of what factors must be considered that are unique to this audience, and how hospital administrators should engage in excellent two-way communications strategies based on these factors.

Given the digitization of healthcare and the availability of detailed data at the provider level, the researcher would like to understand how this data can be communicated to physicians in a way that is relevant, meaningful, and increases both the quality of practice and the engagement of physicians in a teaching hospital setting.

Research Questions

In order to gain further understanding of the best ways to engage physicians in communicating performance data, the researcher proposed three research questions.

RQ1 **Given the availability of health-related data available in Canada, what types of performance information do physicians want to see, in what format, and how often?**

Hospitals in Ontario and throughout Canada collect data such as length of stay, complication rates, incident rates, risk assessments, patient satisfaction, and medication use.

This data is used for research, system planning, quality improvement, and performance monitoring. This question seeks to understand what types of data are important to physicians in understanding their own practice, and how best to present that data, how often and whether it should be anonymized when comparing to their peers.

RQ2 **How and to what extent does receiving data change practice?**

There is mixed evidence that providing data to physicians changes practice (van der Veer, de Keizer, Ravelli, Tenkink & Jager, 2010; Baker et al., 2010). The researcher wishes to understand how access to data can support improvements in quality of physician practice, including adherence to evidence based guidelines, policies, and standards.

RQ3 **How and to what extent does this type of communication influence engagement of physicians?**

While the literature on employee engagement is fulsome, there is little Canadian-based literature on physician engagement and the most effective means of communicating with physicians in a hospital setting. Two-way communication, including sharing performance data, has the potential to be a catalyst of engagement but not without the risk of alienation and disengagement. This question seeks to understand how and to what extent the provision of performance data to physicians can influence engagement.

Literature Review

Using data as part of internal communications strategies is not a new concept, with significant research dating back over 50 years ago (Drucker, 1954). While famously attributed to Peter Drucker (but not actually what he said), the adage, “If you can't measure it, you can't improve it” continues to be at the forefront of management theories (Marr, 2015; Snee & Hoerl, 2018; Raghupathi & Raghupathi, 2014). At the same time, there is an increasing emphasis on

employee engagement and its impact on business outcomes (Kompaso & Sridevi, 2010; Smith & Bititci, 2017). This literature review will focus on these two concepts and how they interact within the confines of the physician-hospital relationship.

Data as Drivers of Performance

The use of data by organizations to drive performance is a long standing management concept. In 1996 Kaplan and Norton first published literature on the concept of the use of a balanced scorecard to drive organizational performance, and more recently the adoption of lean management systems across healthcare has a strong focus in data-driven decision making (Sloan, Fitzgerald, Hayes, Radnor, & Sohal, 2014). The concept of using scorecards that include both financial and non-financial components to translate strategy into performance resonates across industrial, service and non-profit sectors, including healthcare (Voelker, Rakich & French, 2001; Lilian Chan, 2004; Valmohammadi, & Ahmadi, 2015).

While systems of funding in the US have largely been based on insurance re-imbursement and thus a historical model of fee-for-service, in Ontario hospitals the funding models have essentially remained the same for over 35 years, with little connection to patient volumes and essentially none to patient outcomes (Sutherland, Crump, Repin, & Hellsten, 2013). As the cost of healthcare increases year over year, the historical model of fee-for-service, and even global funding models for health providers has been challenged, with a shift to consider models where fees are based not on pure volume of service or historical annual funding, but on patient outcome measures (Sutherland, 2011). For example, in Ontario, hospitals receive funding related to how they perform on wait times in the emergency department. The results of this pay-for-performance (P4P) model suggest that using data and performance measurement resulted in decreased wait times in Ontario emergency departments (Vermeulen, Stukel, Boozary, Guttmann

& Schull, 2016). On the contrary, a comprehensive review of 69 studies by Mendelson et al. (2017) found there was “low-strength evidence that P4P had little or no effect on patient health outcomes and a positive effect on reducing hospital readmissions” (p. 341).

Increasingly researchers are looking to “big data” as well to support advances in healthcare quality improvement. Murdoch & Desky (2013) outline four ways that big data can assist in improving the quality and efficiency of healthcare. First, it offers the opportunity, using new analysis tools like natural language processing, to gather far more information from electronic health records than ever before. Where in the past research of this type was laborious, costly, and subject to research bias, the ability to comb through millions of records to answer clinical research questions has dramatically increased. Second, the ability to disseminate the latest clinical information to providers in real time in the electronic health record is being made possible by using intelligent systems used in other industries (for example, Amazon’s “customers like you also bought this book” could be translated into “other providers considered this test” when certain lab values were attained). Third, data can potentially assist with the new wave of personalized medicine that is becoming increasingly powerful in treatments for diseases such as cancer. Finally, data may “allow for a transformation of healthcare by delivering information directly to patients, empowering them play a more active role" (Murdoch et al., p. 132).

In a case study written about an Ontario hospital’s experience with implementing physician scorecards, Mohan et al. (2005) noted the “tightrope” that hospital administrators must walk in balancing efficiency with quality of care. They noted that in order for the scorecard to be successful, physicians had to be engaged early in the process. They also highlighted that data accuracy was a key to success in their implementation, as well as ensuring that the scorecard was never seen as punitive, but instead highlighted as a quality improvement tool. Finally,

confidentiality was noted to be important in building trust and reinforcing a culture of education rather than blame. This single case study noted significant improvements in several key indicators after a one-year implementation, including decreased length of stay for patients and reduced readmission rates. The authors also reported that the process increased physician accountability, expanded awareness of how physicians impact the system, and renewed dialogue with physicians about best practice (Mohan et al., 2005, p. 88).

One other study in the literature looked specifically at individual level scorecards for health providers. McNamara (2006) reviewed provider specific report cards from the US and developing countries, resulting in recommendations related to designing and implementing provider report cards. The following considerations were highlighted in the selection of measures for the report cards (p. 107):

- Work with consumers, providers, and quality experts to select the measures
- Select indicators that are valid and reliable at the provider-specific level
- Select measures that are easily tracked and monitored
- Be transparent about risk adjustments
- Include measures actionable by the provider
- Include both technical and interpersonal performance measures
- Choose measures where there is a wide variation in performance
- Include measures across diagnoses and treatments
- Avoid measures that may discourage providers from treating complex patients
- Consider coordination of efforts with other organizations/agencies

In the United States, publicly available information about physician performance has been available since the 1990s. A comprehensive review of seven empirical evaluations of this

data was published in 2000 (Marshall, Shekelle, Leatherman, & Brook, 2000), however few studies have been published since then. Marshall et al. (2000) did conclude that there were gains to be made from the public disclosure of performance data. One of the evaluations involved a significant reduction in mortality (over 40%) in cardiac patients undergoing Coronary Artery Bypass Graft (CABG) surgery in New York hospitals. Similarly, improved outcomes were seen in patients in Ohio hospitals as part of the evaluation of the Cleveland Health Quality Choice project. Marshall et al. (2000) also noted that the despite the public nature of the data in their review, consumers themselves did not appear to search out or use the data to any significant extent. Additionally, they highlight the risk of unintended consequences when data is made publicly available, resulting in the potential for providers to "game" the system, as well as impact provider morale (Marshall et al., p. 1873).

While there is little research in the literature about individual physician level data reports, a randomized controlled study in the 1990s found that physicians who were provided data with achievable benchmarks displayed higher compliance with evidence based best practice than those who were not provided benchmarks (Kiefe et al., 2001). This study compared one group of physicians who was given multimodal feedback about their practice while the second group was given the same feedback as well as a benchmark. The performance improvement related to compliance with best practice related to influenza vaccination, foot exams, serum glucose, and serum cholesterol/triglycerides. Both groups showed improvement with the feedback, however the group that was provided the benchmarks showed statistically greater improvement than those who were not provided with a target (Kiefe et al., 2001). Additionally, Meeker et al. (2016) found that when potential adopters of best practice were told of their peer uptake of the practice, there was increase adoption of innovation and individual behaviour change. This evidence

speaks to the importance of providing physicians with feedback about how their practice compares to either their peers or an evidence-based standard.

In 2010 van der Veer et al. published a comprehensive review of a number of studies related to medical registries (defined as a systematic and continuous collection of defined data sets for patients with specific health characteristics) and whether the use of that data supported quality improvement. Of the 22 analytic studies reviewed, four found a positive effect on all outcome measures, eight found a mix of positive and no effects, and ten did not find any effects. When examining what factors positively influenced the effectiveness of the feedback, they found that the following were most important: trust in the quality of the data, motivation of the recipients, organizational factors, and outcome expectancy of the feedback recipients (van der Veer et al., 2010).

Can using data change an organization's culture? Gibbons & Kaplan (2015) examined a theoretical model of agency and performance, concluding that "developing a scorecard of formal measures internally creates not only the formal measures themselves but also agreement among the participants about how the measures will be used in informal management. In this sense, the internal development of the scorecard helps to create a new corporate culture aligned to the strategy" (p. 450).

Internal Communications & Employee and Physician Engagement

There is an increasing body of literature on physician engagement and its role in improving the quality and safety of patient care (Taitz, Lee, & Sequist, 2011; Lindgren, Bååthe, & Dellve, 2013; Casalino & Crosson, 2015; Parand et al., 2010). When seeking to translate theories from employee engagement to physician engagement, Crawford, Rich, Buckman & Bergeron (2014) note that one of the antecedents to employee engagement is feedback. Feedback

promotes “psychological meaningfulness because it allows them to evaluate their growth and progress towards achieving a goal” (p. 60). While physicians in Canada are not necessarily employees of hospitals, in what way does their engagement support organizational goals and objectives, and how can hospital administrators increase engagement of this specialized audience?

West & Dawson (2012) completed a comprehensive review of engagement and its effect on performance in the National Health System (NHS) in the United Kingdom. They highlighted the work of Prins et al., (2010), who studied a group of over 2,000 Dutch physicians, finding that those who were more engaged were less likely to make mistakes when it comes to caring for patients. West et al., (2012) were able to demonstrate a link between higher levels of employee engagement and patient satisfaction, as well as patient mortality and infection rates.

In recent years there has been a significant focus on health provider burnout and increasing levels of disengagement. A 2015 study found over 50 percent of physicians report symptoms of burnout (Shanafelt et al., 2015). In the Canadian context, a survey of British Columbia physicians found that only 35% of respondents felt that their contributions were valued, and only 38% felt that they had adequate opportunities to improve patient care, quality, and safety (Doctors of BC, 2018). These increasing reports of disengagement are not only important because of their direct impact on physicians, but also on the patients they care for. Dewa, Loong, Bonato, and Trojanowsi (2017) conducted a systematic review of literature on this connection of burnout to patient safety outcomes. They found that there was moderate evidence suggesting a connection between burnout and safety-related quality of care (Dewa et al., 2017). Given the impact that physician engagement can have on patient outcomes, and the increasing

levels of disengagement and burnout, it is important to understand how hospitals and other healthcare organizations can begin to increase levels of engagement.

The Institute for Healthcare Improvement (IHI) published an extensive overview of physician engagement in 2007 (Reinersten, Gosfield, Rupp, & Whittington, 2007), outlining six primary elements of engagement (p. 4):

1. Discover common purpose
    1.1. Improve patient outcomes
    1.2. Reduce hassles and wasted time
    1.3. Understand the organization's culture
    1.4. Understand the legal opportunities and barriers
2. Reframe values and beliefs
    2.1. Make physicians partners, not customers
    2.2. Promote both system and individual responsibility for quality
3. Segment the engagement plan
    3.1. Use the 20/80 rule
    3.2. Identify and activate champions
    3.3. Educate and inform structural leaders
    3.4. Develop project management skills
    3.5. Identify and work with "laggards"
4. Use "engaging" improvement methods
    4.1. Standardize what is standardizable, no more
    4.2. Generate light, not heat, with data (use data sensibly)
    4.3. Make the right thing easy to try

4.4. Make the right thing easy to do

5. Show courage

5.1. Provide backup all the way to the board

6. Adopt an engaging style

6.1. Involve physicians from the beginning

6.2. Work with real leaders, early adopters

6.3. Choose messages and messengers carefully

6.4. Make physician involvement visible

6.5. Build trust within each quality initiative

6.6. Communicate candidly, often

6.7. Value physicians' time with your time

This whitepaper also outlines a key difference when it comes to engaging physicians versus employees in healthcare:

> A belief in personal responsibility for quality is powerfully engrained in the physician professional culture—and is largely responsible for physicians' fierce attachment to individual autonomy. This cultural element puts physicians in conflict with a core tenet of improvement theory: a systems view of quality and safety. It also leads naturally to a blaming culture. Physicians are taught that "If we work and study hard enough, we won't make a mistake." This leads them to believe that if a mistake does happen, then someone (a physician, in this instance) didn't work hard enough or study hard enough. Both of these effects—lack of a systems perspective, and a tendency to blame individuals when things go wrong—arise from the same basic belief in personal responsibility (Reinersten et al., 2007, p. 2).

Assessing employee and physician engagement is an important consideration for any healthcare organization. While there are many tools available, Buckingham & Coffman (2014) in their bestselling book "Break All the Rules" outline twelve questions they believe can assess engagement (p. 24-25):

1. I know what is expected of me at work.
2. I have the materials and equipment I need to do my work right.
3. At work, I have the opportunity to do what I do best every day.
4. In the last seven days, I have received recognition or praise for doing good work.
5. My supervisor, or someone at work, seems to care about me as a person.
6. There is someone at work who encourages my development
7. At work, my opinion seems to count.
8. The mission or purpose of my company makes me feel my job is important.
9. My associates or fellow employees are committed to doing quality work.
10. I have a best friend at work.
11. In the last six months, someone at work has talked to me about my progress.
12. This last year, I have had opportunities at work to learn and grow.

Questions 1 through 6 were deemed to be the most important in terms of being connected with overall performance of the organization (productivity, profit, retention, and customer satisfaction). Based on their meta-analysis, this held true across a wide variety of sectors (Buckingham et al., 2014). By assessing the results of these questions and then working to make specific improvements based on those results, Buckingham et al., (2014) suggest that organizations can increase engagement and subsequently organizational effectiveness.

Research Methodology

As noted in Yin (2014), choosing a research methodology involves the assessment of three major factors: the form of the research question, the need for control of behavioural events, and whether the topic focuses on contemporary events. Yin (2014) notes that surveys are best used when the research question is asking "who, what, where, how many, or how much" (p. 9), when there is no requirement for behavioural control, and when the focus is on contemporary events. Interviews, or the case study approach, are used when answering "how" and "why" questions. At the same time Yin (2014) notes that "your conclusions cannot be based entirely on the interviews as a source of information" (p. 92). Based on this approach, this research study combined two methodologies: survey and individual interviews. As outlined by Dillman, Smyth & Christian (2014), web-based surveys are growing in popularity and are a cost-effective means of conducting research. Web based surveys also allow for anonymity and allow the researcher to reach a wider number of participants compared to paper-based surveys or focus groups. While the survey answers the "what" and "how many" aspects of communicating data with physicians, the interview seeks to further understand the "why." Yin (2014) notes the benefit of interviews for this type of research, including the ability to focus directly on the topic and provide insights into explanations such as perceptions, attitudes, and meanings (p. 106). This study focused on physicians associated with one large (1,100 bed) academic health sciences centre in Ontario.

On-Line Survey Design

The survey questions were designed by the researcher using a number of sources (see Appendix A for survey) as there were no comparable tools available in the literature. Basic demographic data, including length of time practicing medicine, sex, and specialty area were collected in order to ascertain any differences in responses across these variables. Participants

were then asked about their desire to access certain standardized data elements, currently captured by hospital reporting systems in Ontario. These included:

Length of stay - inpatients

Number of Admissions

Number of outpatient visits

Deaths – actual/expected

Medication reconciliation – admission

Medication reconciliation – discharge

Discharge summary dictated within 24hrs of discharge (inpatients)

Readmission data

Consult wait time

Additionally, participants were asked to confirm the desired frequency of reports and how they would like to receive the data for each of these elements. Based on the work of McNamara (2006) and Kiefe et al., (2001), participants were asked to provide an opinion on the usefulness of comparison data, as well as their opinion on anonymity when being provided with comparative data. The final questions were related to physician engagement, adapted directly from Buckingham et al., (2014). While most questions were closed ended, there were also opportunities to provide comments in a free text box.

The web-based survey utilized the McMaster University sponsored LIME survey software with the survey information and link distributed through the office of the Chair of the Medical Advisory Committee at the hospital, to approximately 800 active physicians. The survey included information on how to volunteer to participate in the individual one-on-one

interviews. A follow up reminder was sent directly to physician leaders approximately 3 weeks after the initial survey was sent. Results were analyzed using standard statistical processes.

In-Depth Interviews

The second methodology was one-on-one interviews (n=8) with physicians in various positions (leadership, administration, non-leadership). Interview questions (see Appendix B) were open ended and sought to understand, in more detail, the opinions related to physician communication strategies and the influence of data on both practice and engagement. Interviews were conducted both in person and via telephone. All interviews were recorded and transcribed to facilitate analysis.

Results & Analysis

The online survey was started by 37 participants, and completed by a total of 26 participants. There was a relatively even proportion of male versus female participants (45% female, 52% male, and one participant who chose neither option). Participants were spread across fourteen different medical departments, with the highest participation in the specialty of pediatrics (n=5). The majority of participants had over 15 years' experience in medicine (54%, n=18), with 19% having 10-15 years' experience (n=6), 16% with 5-9 years' experience (n=5), and 7% less than 5 years' experience (n=2).

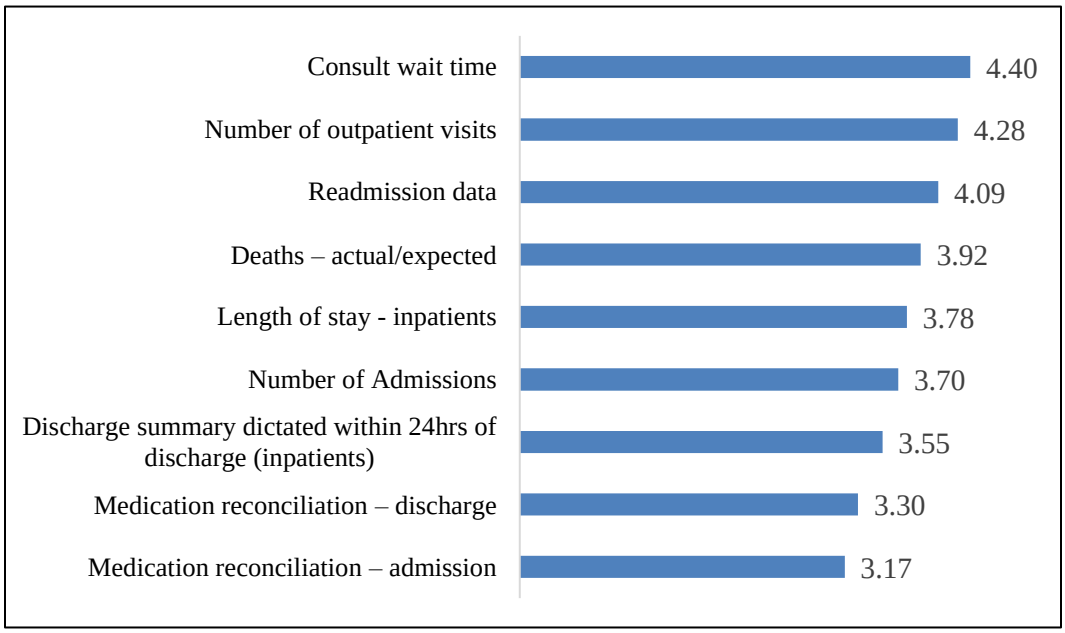
There were eight in-depth interview participants, with 50% (n=4) male and 50% (n=4) female. No other demographic information was collected about the in-depth interview participants.

RQ1 Given the availability of health-related data available in Canada, what types of performance information do physicians want to see, in what format, and how often?

Participants in the online survey were asked to use a Likert scale (from “Strongly agree” to “Strongly disagree”) to describe which data elements they would find useful in terms of personalized reports. The data elements were selected based on current available data commonly measured and reported in Ontario hospitals (for example, readmission rates, death rates, medication reconciliation rates, and consult wait times). Responses from the Likert scale were converted to a 5-point rating scale (Strongly agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strong disagree = 1), and the mean score for each data element was calculated in order to compare overall rating of each element. Figure 1 outlines the overall mean score for each item, based on participants’ rating of desire to receive data related to the element outlined.

Figure 1:

Desired data elements



The top-rated data elements were consult wait times, number of outpatient visits, and readmission data. Participants were offered the option of providing other suggestions for data elements. These comments included:

- Surgical complication rates
- Returns to the emergency department
- Patient satisfaction and experience
- Wait times to access imaging; number of lab and imaging investigations compared to other physicians
- Costs of medications ordered
- Was patient started on "correct "(evidence-based) treatment

Participants were also asked about the frequency they would like to receive data. Results are noted in Table 1. Most participants rated "quarterly" as the desired frequency of data reports, other than for data related to actual versus expected deaths, which the majority of participants noted they would prefer to view annually.

Table 1

Desired frequency of data

	Daily	**Weekly**	**Quarterly**	**Annually**	**Never**	**I don't know**
Length of stay - inpatients	6%	0%	**65%**	18%	12%	24%
Number of Admissions	10%	0%	**48%**	19%	10%	14%
Number of outpatient visits	0%	5%	**63%**	21%	5%	5%
Deaths – actual/expected	5%	0%	36%	**41%**	5%	14%
Medication reconciliation – admission	10%	0%	**33%**	10%	33%	14%
Medication reconciliation – discharge	10%	0%	**33%**	14%	29%	14%
Discharge summary dictated within 24hrs of discharge (inpatients)	5%	5%	**38%**	14%	24%	14%
Readmission data	0%	0%	**60%**	20%	5%	15%
Consult wait time	5%	0%	**71%**	10%	5%	10%

Participants were also asked about the importance of comparing their own results against their peer group, and against all physicians who practice at the same hospital. In terms of comparing themselves against peers, 62% (n=16) rated this as "Very important" or "Important." When asked about comparing to all other physicians, only 8% (n=2) rated this as "Very important" or "Important."

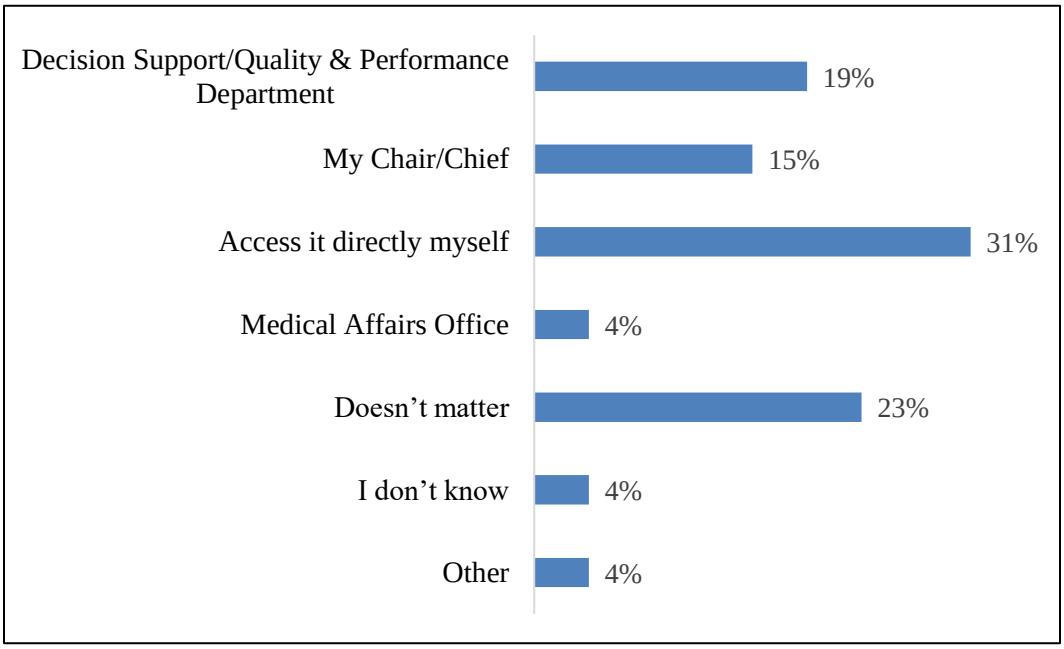
The importance of anonymity was assessed in both the on-line survey and the in-depth interviews. In the survey, 69% (n=18) of participants noted that anonymity was either "Very important" or "Important" to them. In the in-depth interviews, all participants (n=8) noted that anonymity was important. Two interviewees specifically noted the impact of culture, and that the current culture within the organization would require anonymity in order to avoid "shaming and blaming culture," with one participant even noting, "I hear that and I feel allergic to it" when asked about non-anonymized data. However, another participant noted the benefit of full transparency in being assured that you are being compared to similar providers. Several participants noted that as culture shifts and physicians become more comfortable with the data there could be greater acceptance of non-anonymized data.

In terms of confidence in data, only 42% (n=11) of participants felt confident about data supplied to them, with 35% (n=9) actually noting that they either "Disagree" or "Disagree strongly" with the statement "I have confidence in the data that the hospital collects and reports." Participants were also asked about how they would like to access data about their own personal performance. Please see Figure 2 for details from the survey participants. The most chosen option (31%, n=8) was "Access it myself," followed by "Doesn't matter" (23%, n =6). The majority of in-depth interview participants noted that they would like to receive this data through their physician leader, though one participant disagreed, noting that they would prefer to receive

it from a non-clinician. Another participant noted the benefit of receiving quality data in "real time," for example by being notified in the electronic medical record of a patient's return visit to the emergency department.

Figure 2

I would prefer to receive data from



RQ2 **How and to what extent does receiving data change practice?**

Participants in the online survey and the in-depth interviews were asked about their previous experience with receiving personalized performance data. In the online survey 62% (n=16) of respondents reported receiving data in the past; in the in-depth interviews, 75% (n=6) of participants reported receiving personalized data.

When asked about how the data had changed their practice, 38% of survey participants (n=6) said "Yes," and 19% (n=3) said they were surprised by the data. Those who said they were surprised noted that they were surprised that they were performing better than their colleagues (n=2) or surprised at an unexpected opportunity for improvement (n=1). For example, one

physician noted that they had been surprised by the number of blood transfusions they had with their patients compared to peers. When asked about how the data changed practice, participants noted things like:

- Change to laparoscopic procedures from open (less blood loss)
- Highlighted the importance of patient care focus
- Increased attention to assessing consults more promptly
- Improved patient communication style

From the in-depth interviews, participants noted the importance of the data being meaningful to their practice, and in particular within their control to influence change. As one participant noted:

> "I think that the big divide between the administrators and the clinicians is that administrators see kind of big outcome measures. And to be honest, I don't think they have a really good understanding of what are the on the ground process measures that to into that big dot metric."

Another participant noted, "I think the data has to be relevant to what the receiver perceives as value."

The theme of autonomy was highlighted by several participants in the in-depth interviews, and the influence that this has on the practice of medicine as a whole. One participant noted that while physicians are achievement driven before and during medical school, once they begin to practice there is an absence of feedback in the form of data about their own practice. This autonomy can leave them "in the dark."

> "To get into medical school, in medical school, to get into residency, it's all about sort of doing very well on academic tests and getting feedback and daily evaluations. And, you

finish residency, you pass a big exam and then there's very little feedback after that. So, there's a desire for feedback that is unmet often."

Participants noted that feedback on areas such as patient satisfaction, the cost of medications used, and whether a diagnosis was correctly determined would be helpful information to increase quality.

RQ3 **How and to what extent does this type of communication influence engagement of physicians?**

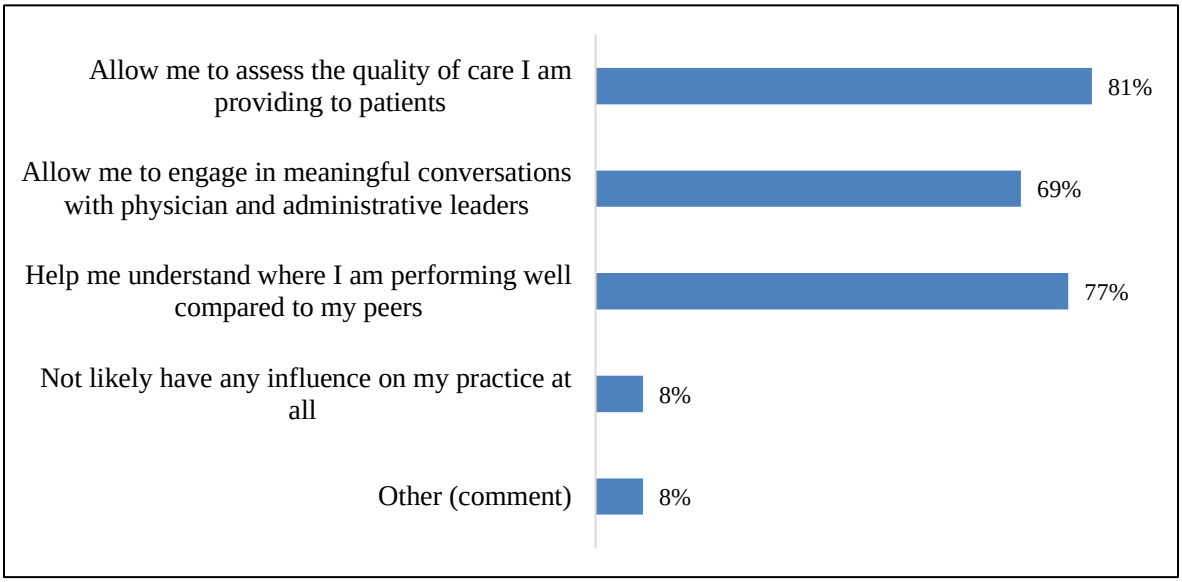
The question of whether data can be used to further develop engagement of physicians in an academic hospital environment was assessed with both the on-line survey and the in-depth interviews. The online survey participants were asked to answer six questions related to engagement, as outlined by Buckingham et al. (2014). In general, participant scores on these items were positive. For example, 81% (n=21) noted that they know what is expected of them at work either "always" or "very frequently." Participants also responded "always" or "very frequently" over 60% of the time for questions related to availability of equipment/materials (n=18), ability to do what they do best every day (n=19) and having someone care about them at work n=16). In terms of recognition, 46% (n=12) of respondents noted that they had received recognition in the last 7 days, however only 31% (n=8) reported that they have someone at work who encourages their development "always" or "very frequently."

Survey participants were asked directly about how accessing data will influence engagement of physicians. The results of the survey are outlined in Figure 3. The participants noted that accessing performance data would assist them in understanding the quality of care they are providing to patients (n=21), their own performance compared to peers (n=20), and allow them to engage in meaningful conversations between physicians and administrators

(n=18). Only 2 participants noted that having access to performance data would likely have no effect on their practice.

Figure 3

Influence of accessing data



In-depth interview participants were asked about how the provision of data to physicians might be an opportunity to engage physicians and administrators. This question prompted responses such as:

> "I think if you were able to have discussions around that data, it would help to build the relationships."
>
> "I feel data is a conversation point. There's always context around it. So I think data on its own is not helpful."
>
> "I think the thing that gets their attention is their data and the relevance of their data to the point that's being discussed. Physicians want to do their best."
>
> "I think that by nature, physicians tend to be Type A, slightly competitive bunch. So, I think that knowing how we're doing, compared to our colleagues, is a motivating factor."

Participants in the in-depth interviews were also asked about the risks associated with providing data. Several participants noted the risk of unintended consequences when providing data to physicians, including shifting a focus from one quality metric to another. For example, one participant noted that when they were being measured on their ability to complete discharge dictations within 48 hours of a patient's discharge, they shifted their focus away from their student supervision in order to increase their performance on the discharge summary metric. Another noted the impact that programs like pay-for-performance can have, potentially having the unintended consequence of rushing patient care, and potentially resulting in reduced quality of care provided. Other participants highlighted the risk of alienating physicians, and the impact that inaccurate data can have.

> "If there's inaccuracies in the data, it will lead to lack of trust of the organization…"
>
> "It can be demoralizing to physicians to receive data about which they feel they don't have a lot of control to change things."

Finally, in-depth interview participants were asked about how providing data might increase, or decease, physician satisfaction. On increasing physician satisfaction, one participant noted the importance of the support system that goes along with the data, including coaching to improve performance over time, which could lead to increased satisfaction. Several participants also noted that the provision of data could increase satisfaction by reinforcing that they are doing a "good job." On the other hand, a participant noted "I think if we focus too much on individual performance level data though, it would just add additional stress to an already very stressful job." Another participant noted:

> "I believe most physicians would gain some satisfaction. There are risks of presenting data to physicians that they have no awareness of, have never perceived to own the data

and are now fully accountable for that data, without any voice. And, without a voice around that data, they will disengage and they will be dissatisfied."

Discussion

This study, while limited in its scope and number of participants, shed light on the impact that data can have not only on hospital administrators' relationship with physicians, but also on patient outcomes. When it comes to selecting what and how to communicate individual performance data with physicians, the ability to choose indicators that are beyond typical administrative data is consistent with the findings related to big data use outlined by Murdoch et al., (2013). Participants in this study highlighted the importance of meaningful, patient level outcomes that can drive improvements in quality of care in real time.

This research showed that physicians in this academic setting are interested in receiving individualized data to assist them in providing better care, but that the data elements must be selected in collaboration with them and must be related to processes or behaviours that are within their perceived control. As noted by Meeker et al., (2016), comparison to peers was found to be an important part of receiving data, as well as ensuring that it was used in a non-punitive way to support best practice adoption and improved quality of care for patients. The study found that risks of sharing individual-level data included lack of trust if there are errors in the data or choosing data that is not within a provider's control, and that one must be conscious of unintended consequences when choosing which metrics to share.

Similar to the findings of McNamara (2006), this study found that involving health providers in the selection of measures, ensuring that measures are actionable by the provider, and avoiding measures that may result in unintended consequences are important factors in providing

data to physicians. When data provided is either not actionable directly by the individual physician, or lacks a demonstrated connection to quality in the opinion of the physician, there is a high risk of increasing dissatisfaction and engagement.

In terms of the influence of data in changing practice patterns or behaviours, this study found that there are opportunities for data to support change, which was supported by the findings of Marshall et al., (2000), but in conflict to the conclusions of van der Veer et al., (2010). With over 30% of those who had received personalized data noting that it had in some way changed their practice, it would appear that providing regular data on key measures may be helpful in shifting practice in a positive direction. At the same time, it was evident, particularly from the in-depth interview results, that how results are shared can be a key factor in engaging physicians in the discussion of data and metrics. Ensuring that an environment of transparency, positive coaching, and "no blame" were deemed as key success factors, similar to those noted by Mohan et al., (2005).

Conclusions and Recommendations

One could argue that physicians are the single greatest influencer of high quality health care provision. While in most settings in Canada they are not considered employees, we know that from other jurisdictions physician engagement, like employee engagement, is linked to better organizational outcomes, and in healthcare settings in particular, to improved patient outcomes, including fewer adverse events and higher patient satisfaction (West et al., 2012). If employee feedback is a significant driver of satisfaction and engagement (Crawford et al., 2014), then what is the best way to communicate feedback with physicians to increase engagement, and contribute to high quality patient outcomes?

Consistent with the literature (Crawford et al., 2014; Buckingham et al., 2014) this study supported the use of feedback in driving performance and satisfaction. However, there are several key recommendations that should be considered in order to avoid the risks of increasing dissatisfaction and decreasing engagement. These recommendations, outlined in Figure 4, include engaging physicians early in selecting data elements that they feel they have the ability to influence. Consistent with the recommendations from the Institute for Healthcare Improvement (Reinersten et al., 2007), early engagement supports a partnership between physicians and administrators, and creates a culture based on shared goals of quality improvement. It also ensures that any measures selected for reporting are within the control of physicians, and that they agree that monitoring the indicators will result in improved patient care. Without this shared understanding and agreement, there is the risk of disengagement and dismissal of the data.

The second recommendation, consistent with the findings of Kiefe et al., (2001), relates to the importance of being able to compare oneself to one's peers, however it was clear that the selection of those in the peer group required input from providers to ensure homogeneity in the comparator group. It must be evident that those in the comparison group are providing care to similar types of patients or performing similar procedures. Without this assurance, the validity of the peer comparison data comes into question and can result in dismissal of the individualized results by physicians.

The third recommendation relates to the importance of assessing and managing culture when it comes to providing individual level data to physicians in an academic setting. The results of this study highlighted the importance of assessing the organizational and departmental culture related to the use of data, and the importance of *how* data is provided to individuals. It

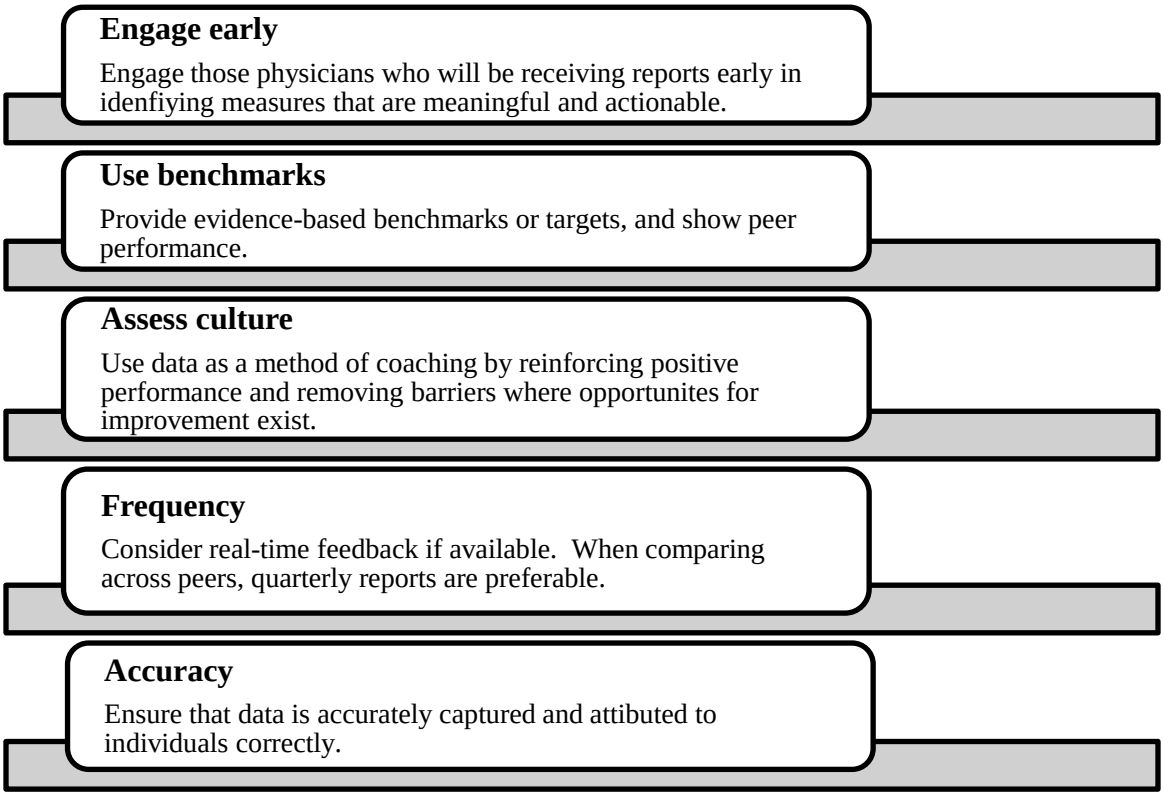
was noted that anonymity was important to ensure that those being provided data did not feel threatened or shamed. Additionally, the importance of supporting any data reports with coaching by the physician's leader was shown to be an important aspect of a performance improvement culture. As Satiani, Sena, Ruberg, and Ellison (2014) have described, providing physician leaders with core management competencies can be pivotal in improving quality outcomes for patients. Physician leaders who provide data to their department members using a non-punitive, transparent approach will support an overall positive response to communicating this type of performance data.

The fourth recommendation relates to the frequency of individualized reports to physicians. Given the intense workloads faced by physicians in an academic hospital setting, hospital administrators must be conscious of over-burdening physicians with frequent data reports. The results of this study indicate that while some physicians may prefer some real time feedback in terms of their performance (for example, receiving instant notification of a patient's readmission to hospital within 30 days), the vast majority felt that reports on a quarterly basis would support an improvement strategy.

Finally, this study highlighted the importance of ensuring that the data selected as part of any individualized physician performance report be an accurate reflection of the physician's performance. Not only is this important to ensure that true opportunities are highlighted, it is integral to the trust necessary as part of the physician-administrator relationship. The risk of inaccurate data includes disengagement, dissatisfaction and lack of trust between physicians and administrators.

Figure 4

Recommendations



Hospital administrators and physicians have a long history of challenging relationships, despite mutually aligned goals of providing high quality, safe patient care. In the quest to use standardized management tools such as individualized performance reports or scorecards, it is imperative that administrators use these tools in a way that supports open two-way dialogue with physicians. Data can be a powerful tool for improving adherence to evidence-based best practice, increasing patient satisfaction, and making care safer, more effective, and even more efficient. By ensuring that hospital administrators and physicians engage in data discussions collaboratively, patients, and the health system, will benefit from this partnership.

Limitations and Future Research

There are several limitations related to the research conducted as part of this paper. First, the limited sample size for both the survey (n=26) and in-depth interviews (n=8) suggests that the results may not be generalizable to the physician population at the specific institution where the research was conducted, nor generalizable to other large academic health sciences centres. Second, the researcher is an employee of the institution where the data was collected and was known as such to some participants. This creates a potential for bias in particular from the in-depth interviews, but also potentially in the research design and interpretation of the results. Finally, there is the potential for sample bias, as those who voluntarily completed the survey and the interviews potentially self-selected those physicians with an interest in the subject matter.

Given the scarcity of research in this area, there are many opportunities for future study, including randomized controlled trials that link the intervention (use of physician scorecards) to patient outcomes directly. Certainly, this study in itself could be replicated with a larger sample size to increase the validity of the data. Finally, further research could include other health professionals such as nursing, midwives, health disciplines and other support staff.

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APPENDIX A: ONLINE SURVEY QUESTIONS

1. Indicate the length of time that you have been practicing medicine (optional)
    - 0-4 years
    - 5-9 years
    - 10-15 years
    - Over 15 years
2. Indicate your gender
    - Male
    - Female
    - Other
    - Prefer not to say

3. Indicate your area of specialty
    - Anesthesia and Perioperative Medicine
    - Clinical Neurological Sciences
    - Dentistry
    - Emergency Medicine
    - Family Medicine
    - Medicine
    - Medical Imaging
    - Obstetrics and Gynecology
    - Oncology
    - Ophthalmology
    - Otolaryngology – Head and Neck Surgery
    - Pediatrics
    - Pathology and Laboratory Medicine
    - Physical Medicine and Rehabilitation
    - Psychiatry
    - Surgery
    - Other _____

4. I would like to have access to the following data related to my practice at LHSC:

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**I don't know**	**Not applicable**
Length of stay - inpatients							
Number of Admissions							
Number of outpatient visits							

Deaths – actual/expected							
Medication reconciliation – admission							
Medication reconciliation – discharge							
Discharge summary dictated within 24hrs of discharge (inpatients)							
Readmission data							
Consult wait time							
Other (please comment)							

5. Frequency of data

	Daily	**Weekly**	**Monthly**	**Quarterly**	**Annually**	**Never**	**I don't know**
Length of stay - inpatients							
Number of Admissions							
Number of outpatient visits							
Deaths – actual/expected							
Medication reconciliation – admission							
Medication reconciliation – discharge							
Discharge summary dictated within 24hrs of discharge (inpatients)							
Readmission data							
Consult wait time							
Other (please comment)							

6. How important is it for you to compare your own results against your peers within your group of practice?
    - Very important
    - Important
    - Moderately important
    - Slightly important
    - Not important
    - I don't know

7. How important is it for you to compare your own results against all physicians who practice at LHSC?
    - Very important
    - Important
    - Moderately important
    - Slightly important
    - Not important
    - I don't know
8. How important is it that your data be anonymous if provided as part of a group report that others may have access to?
    - Very important
    - Important
    - Moderately important
    - Slightly important
    - Not important
    - I don't know

9. I would prefer to receive data from:
    - Decision Support/Quality & Performance Department
    - My Chair/Chief
    - Access it directly myself
    - Medical Affairs Office
    - Doesn't matter
    - I don't know
    - Other

10. I have received personalized data about my practice in the past
    - Yes
    - No

- I don't know

11. [if #10 is Yes] Did the data surprise you?
    - Yes [If yes, describe]
    - No
    - I don't know
12. [if #10 Yes] Did it change the way you practiced?
    - Yes [If yes, describe]
    - No
    - I don't know

13. I have confidence in the data that the hospital collects and reports.
    - Strongly agree
    - Agree
    - Neutral
    - Disagree
    - Disagree Strongly
    - I don't know

14. Please rate the following based on your experience in working at LHSC only.

	Always	**Very Frequently**	**Occasionally**	**Rarely**	**Very Rarely**	**Never**
I know what is expected of me at work.						
I have the materials and equipment I need to do my work right.						
At work, I have the opportunity to do what I do best every day.						
My supervisor, or someone at work, seems to care						

about me as a person.						
There is someone at work who encourages my development.						

15. In the last seven days, have I received recognition or praise for doing good work.
    - Yes
    - No
    - I don't know
16. Having access to personalized data will (check all that apply)
    - Allow me to assess the quality of care I am providing to patients
    - Allow me to engage in meaningful conversations with physician and administrative leaders
    - Help me understand where I am performing well compared to my peers
    - Not likely have any influence on my practice at all
    - Other (comment)

    [the final question will be stored separately from the rest of the survey data]

17. If you are interested in being contacted to learn more about possibly taking part in a follow-up interview to occur in October-November 2017, please provide your contact information below.

If you agree to be contacted for a follow-up, you can always decline the request when contacted.

You may skip this question if you wish.

Name:

E-mail address:

Phone number:

After submit button has been activated

Thank you for taking this survey. Your answers are a valuable part of this research.

Yes "I would like to receive a summary of the study's results".

Please note that your name and contact information will remain completely confidential and will not be linked with any of your survey answers.

Please send the brief summary to this email address:

Or

To this mailing address:

No "I do not want to receive a summary of the study's results."

APPENDIX B: IN-DEPTH INTERVIEW GUIDE

EFFECTIVELY COMMUNICATING PERFORMANCE DATA

Tammy Quigley, (Master of Communications Management student)

(Department of Communication Studies & Multimedia – McMaster University)

Information about these interview questions:
The questions will be open-ended (not just "yes or no" answers). Because of this, the exact wording may change a little. Sometimes I will use other short questions to make sure I understand what you told me or if I need more information when we are talking such as: "*So, you are saying that …"*, to get more information ("*Please tell me more?*"), or to learn what you think or feel about something ("*Why do you think that is…?").*

1. In your career have you ever been provided with individual or group data about the care you provide in hospital?
    a. If yes, explain the types of data and how it was given to you

2. In an ideal world, what types of data would you like to receive, and how would you like to receive that? From whom?

3. Please tell me your thoughts on how access to data might help you as a provider?

4. Please tell me your thoughts on how performance data might be an opportunity to engage physicians and administrators?

5. What are the risks of providing performance data to physicians and physician leaders?

6. How does anonymity factor into how data is communicated? For example, in a group of similar providers, should comparative data be shown to everyone?

7. How might providing data increase or decrease physician satisfaction?

8. What factors are important to consider in communicating performance data with physicians?

9. Is there something important we forgot? Is there anything else you think I need to know about this topic?