Application of the Delphi Method to Identify Risks in an Acute Healthcare Setting

by Silva Nercessian

Abstract

In efforts to mitigate risks and reduce incidences and medical legal claims, risk management programs in acute healthcare settings analyze historical data to determine root causes, improve care delivery processes and ultimately mitigate further harm. In order to maintain highly coordinated, strategic and systemic frameworks required to identify risks, risk management teams must fundamentally expand beyond grounded, compartmentalized and decentralized issues management. As a strategy to identify an applicable solution, this Major Research Project (MRP) trials foresight methods to identify risks in acute care settings. Using a foresight technique called horizon scanning, seventeen risks were identified to form a draft futures risk registry. A delphi study was conducted whereby the identified risks were rated upon by a panel of healthcare experts. Consensus was reached on eleven risks over two rounds of polling, which formed the 2025 futures risk registry; a registry that can be applicable to any comparable acute care hospital. The study concludes with three operational strategies to imbed the trailed foresight methods into routine hospital risk identification processes.

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To Kris

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Introduction

The chapter provides a brief introduction to risk, risk management, and sets the reader up for research questions that are explored within this Major Research Project.

Introduction

Healthcare risk management, in its current state did not begin to form until the malpractice crisis in the mid 1970s whereby the rapid rise in claims costs, with subsequent increases to insurance premiums pushed health care organizations to build risk management programs (Carroll, 2009). A second factor that contributed to the formation came from the findings of the 1999 Institute of Medicine study (as published in To Err is Human: Building a Safer Health System) outlining the devastating consequences of medical errors on the health of the American nation. It was estimated that as many as 98,000 people died yearly in United States hospitals as a result of preventable medical errors (Institute of Medicine, 1999). With the intention to reduce medical malpractice and liability claims, and to reduce adverse events - "unintended harm associated with the delivery of care that can result in prolonged hospital stay, disability or death" (Canadian Institute for Health Information, 2019, p. 1) - acute care organizations established risk management departments (Young, et al., 2001; Carroll, 2009). Refer to Figure 1 for a summary of the timeline.

Risk management plays a pivotal role in strengthening the organization's ability to recognize, understand, accommodate and respond to new opportunities and challenges (Government of Canada, 2010). Risk is defined by the Federal Treasury Board as "the effect of uncertainty on objectives. It is the expression of the likelihood and impact of an event with the potential to affect the achievement of an organization's objectives" (Government of Canada, 2010, p. 7).

1970's Malpractice crisis in the mid 1970s where increased incidences of harm to patients were increasing claims costs

1980's Ontario hospitals faced crisis when their liability insurance premiums rose dramatically, and commercial insurance companies refused to offer liability coverage

1987 Ontario Health Association provided funding to create HIRO (later HIROC), a not-for-profit insurance reciprocal

1999 Results from the Institute of Medicine Study outlined the devastating consequences of medical errors on the health of Americans
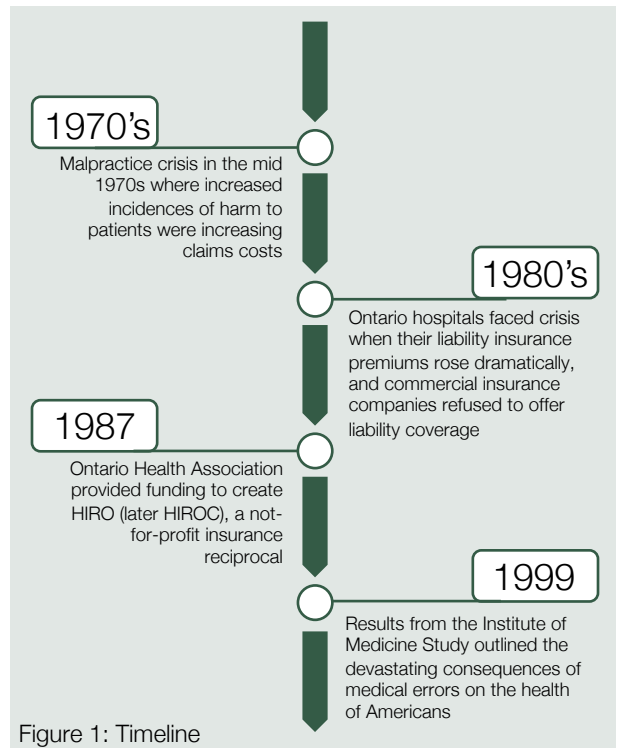
Figure 1: Timeline

In efforts to continuously, proactively and systemically understand, manage and communicate risk across acute care organizations, risk management departments

have strived to create Integrated Risk Management (IRM) programs (HIROC, 2017; HIROC, 2019; Government of Canada, 2010). The outputs of IRM programs are the development of risk registers; list of identified risks that may potentially impact an organization (HIROC, 2017; HIROC, 2019).

Risks are future events that have not yet occurred (Sankararajan & Shrivastava, 2012). As such, risks that occur become incidences that require management. Incidences pose risks as they have the potential to reoccur. An example that helps to differentiate risks and incidences is that of a flood. A building may be at risk of flooding. As such mitigation strategies may be put in place to prevent flooding. Once a flood occurs (example a burst pipe) it becomes an incident that requires management. There is however a risk for the flood to recur in the future posing a risk. For the purposes of this MRP, risks will be examined on the basis of future events that have not yet occurred. Despite this fact, data on risks are generated through retrospective claims (incident) analysis and provided to organizations by their insurance companies (HIROC, 2017; HIROC, 2019). This MRP specifically focuses on the risk identification processes within a 330 bed acute care hospital located in Ontario; hereinafter referred to as the "Hospital." To maintain confidentiality, any information that may implicate the hospital is redacted. In addition to leveraging the resources provided to the Hospital by its insurance company, the Hospital also identifies risks by analysing and identifying trends from the Hospital incident reporting system, and by asking key stakeholders through interdisciplinary team meetings. However, the data used to inform the Hospital risk register only implicates and predicts risks into a short-term framework; one to two years in advance.

This MRP explores the utilization of foresight methods to identify risks and extend beyond a one to two year time frame. It strives to answer the primary research question *"How might the delphi method work as a foresight tool for identifying risks in an acute care setting?"* Along with the secondary research question *"How might we use foresight methods to identify risk in healthcare?"* Lastly it sets the reader up for the post study question of "*How might we embed foresight principles into routine risk identification exercises in health care?"* One final contribution of this study is a future risk registry applicable to any comparable acute care hospital. Another, is a robust extrapolation on the applicability of foresight principles for risk identification, along with strategies to operationalize the delphi method as a consensus reaching tool within Hospital IRM programs.

Primary Research Question

How might the delphi method work as a foresight tool for identifying risks in an acute care setting?

Secondary Research Question

How might we use foresight methods to identify risk in healthcare?

Post Study Question

How might we embed foresight principles into routine risk identification exercises in health care?

Context

This chapter reviews risk management and insurance coverage in healthcare and in the Hospital. Gaps and opportunities are identified, and the delphi method is explored as a foresight technique that may bridge the gaps.

- Insurance and Risk Management in Healthcare
- Risk Identification
- Gaps and Opportunities
- Delphi Method

Context

Insurance and Risk Management in Healthcare

There is no doubt that modern medicine changed patient outcomes. The advance treatments and expanded service options to improve care brought along complex processes, all of which increased the likelihood and impact of adverse events (Messano, De Bono, Di Folco & Marsella, 2014). Risks associated with patient care can never be completely eliminated, and during the 1970's malpractice crisis, Canadian hospitals faced just that; increased harm to patients (Carroll, 2009). At the time insurance coverage was the only available tool for managing risks (Messano, De Bono, Di Folco & Marsella, 2014). As a result, in the 1980's Ontario hospitals faced a crisis when their liability insurance premiums rose dramatically, and commercial insurance companies refused to offer liability coverage (Carroll, 2009; HIROC, 2019). Two commissioned reports recommended the formation of a not-for profit insurance reciprocal for Ontario (HIROC, 2019). Funding from the Ontario Hospital Association (OHA) provided the opportunity to form the initial

Hospital Insurance Reciprocal of Ontario, which eventually became The Hospital Insurance Reciprocal of Canada (HIROC) (Hiroc, 2019). A summary timeline can be found in Figure 1 on page 9.

The biggest challenge healthcare organizations face is the ability to maintain patient safety (HIROC, 2019). In the past few decades, risk management in healthcare has shifted beyond just insurance coverage and into the development and adoption of tools and techniques to identify, evaluate, report and manage corporate risks (Messano, De Bono, Di Folco & Marsella, 2014). As the Honorable Stephen Goudge (2017) stated in his medical liability review for the Ministry of Health and Long Term Care, it is widely known that apart from offering insurance coverage and safe council, HIROC helps its partners increase healthcare safety by offering risk management solutions (HIROC, 2019). Leadership in healthcare risk management and patient safety are what set HIROC apart from commercial insurers, as HIROC strives to educate healthcare organizations on risk management tools and techniques (HIROC, 2019). Managing risks appropriately may result in fewer claims, which leads to more surplus and ultimately more money given back to reciprocal subscribers (HIROC, 2019).

HIROC owns the largest Canadian healthcare liability claims database, which they conduct extensive retrospective review and develop and share lists of high cost risks for each healthcare sector; acute, long term and community care (HIROC, 2019). The top risks are those which have lead to significant medical malpractice claims (HIROC, 2019). With intention to reduce occurrences of harm, improve patient safety and lower claims costs, HIROC predicts and shares information on high risk areas where patient safety incidents may occur (HIROC, 2019). From their evaluation they create Risk Assessment Checklist (RAC) modules for their subscribers, tailored to the type of healthcare organization (HIROC, 2019). In a nutshell with the use of the RAC, HIROC enables healthcare organization to systematically self-assess compliance with evidence-based strategies to mitigate risks in the future (HIROC, 2019). The RAC also provides guidance and direction to risk management teams to develop risk averse organizations.

Risk Identification

As stated above, this MRP refers specifically to one Hospital, and reflects on the risk identification processes the Hospital has operationalized. The Hospital has been insured by HIROC for a number of years, but has not participated in HIROCs Integrated Risk Management Program until the 2018/19 fiscal year. Integrated Risk Management is "a continuous, proactive, systematic approach to identifying, assessing, understanding, acting on, and communicating risk from an organization-wide, aggregate perspective" (HIROC, 2019, p. 1). HIROC is central in this MRP because the Hospital identifies risks by utilizing HIROCs standardized, evidence-based approach to Integrated Risk Management (HIROC, 2019).

An IRM approach to risk management enables the Hospital to hold an aggregate perspective on risks within the organization - care, human resources, financial, technology, and so on - and develop a systemic approach to mitigating risks. For example, a risk whose senior lead may be the Chief Human Resources Officer may have an action item to mitigate risk that stems from an operational area. The systems approach to IRM helps to break down silos and reduce duplication of mitigation efforts. Another component of IRM is the integration of risk management throughout the organization. Historically at the Hospital, IRM was managed at the Board and Senior Leadership Team (SLT) level. In year one it was brought to the Directors, and in year two to Managers and various Clinical Leaders.

HIROCs IRM tools are the go to standard for risk identification at the Hospital. For example, to establish the 2019/20 fiscal corporate risk register, the risk management team provided an hour long education session to all expert stakeholders reviewing risk management principles, HIROCs IRM program, the corporate risk register, and the HIROC tools and resources that would be leveraged to establish the 2019/20 risk register. Over the course of a month, the risk team met with 26 interdisciplinary teams within the hospital to collect data on current and future risks to the organization, its patients, staff, strategic plan, finances, and so forth. All stakeholders were provided HIROCs year end review of risks, identified from its subscribers in 2018, the taxonomy of healthcare organizational risks (summary and detailed), risk profiles associated with their expert areas, and risk rating cards (HIROC, 2017; HIROC 2019). With the provided tools, structured meetings were led with the interdisciplinary teams that comprised of Chiefs, Directors, Managers, and Clinical leaders. Each interdisciplinary team is formed based on their discipline; for example operational units, facilities, strategy, information technology, and so forth. Each session was 30-60 mins, and had a minimum of four to a maximum of ten people within each group. Lastly all the meetings were facilitated by two

members of the risk team. The data was qualitative in nature, gathered through semi-structured interview questions. The collected data was recorded, thematically analysed and categorized into a list of risks that made up a draft corporate risk registry. The draft was presented to SLT for approval before being presented to the board. Once approved, all stakeholders were re-engaged to review the final risk register and create action items to mitigate risks. The final risk register was comprised of 21 risks spread across various categories defined by HIROC. Risks are revisited at a minimum every quarter with the same interdisciplinary teams.

Gaps and Opportunities

Health care providers own a wealth of knowledge and expertise of the front lines. They have the potential of providing rich data and feedback that may inform - and currently does influence the formation of - the corporate risk register. Since the Institute of Medicine results in 1999 outlining the devastating consequences to human medical error, there was increased recognition for healthcare organizations to monitor, trend and learn from patient safety incidents (Hutchinson et al., 2009). As a result, health care facilities nationwide implemented incident reporting systems for front line staff to

report events (Hutchinson et al., 2009). Every staff member at the Hospital has access to the incident reporting system, and even visitors are able to submit incidences with the help of staff members. The system is the only existing platform to capture 3000+ staff member's feedback on issues occurring within the Hospital, at any given time. Incidences reported are monitored and responded to by managers who are accountable to follow up on issues management on their units. The incident reporting system as a whole is monitored by the Risk team on a higher level for trends that may inform the corporate risk register.

It is important to remember though that risks are future events that have not yet occurred (Sankararajan & Shrivastava, 2012). The data within the incident reporting system are of events or issues that have already occurred. As a result, regardless of its wealth, the incident reporting data is retrospective and can certainly be used to identify incidences that have a likelihood of recurring, but it does not provide direct data on risks that have not yet occurred. A gap exists as the Hospital does not currently have a process that harnesses input from 3000+ front line staff for potential risks that have not yet occurred. Engaging in the discussion with front lines would provide rich data as the front lines have the

greatest insight to operational risks. There is an opportunity to use a digital form of data collection similar to the incident reporting system to identify risks.

That brings us to our next gap, the social dynamics of group discussions. Morgan (1996) states that "focus groups should be distinguished from groups whose primary purpose is something other than research" for example discussion for decision making and brainstorming (p. 130). Even though the two risk team members facilitating the meetings are not researchers, and even though they are not facilitating the group meetings for research, it is made very clear in the meetings that the group discussions are being used as a technique to collect qualitative data to inform the risk register (Morgan, 1996). In addition, the risk team acknowledges their role in facilitating the group discussion for data collection purposes, and that the interaction between the interdisciplinary team members are also used as a source of data (Morgan, 1996). Thus for the purposes of this MRP, the interdisciplinary team discussions will be compared to focus group discussions, and will be referenced as such moving forward.

According to Kitzinger (1995), "Focus groups are a form of group interview that capitalises on communication between research participants in

order to generate data" (p. 299). Participants of focus groups are encouraged to talk to one another; ask questions, comment on opinions, provide points of view, and so forth (Kitzinger, 1995). Researchers facilitating focus group discussions play close attention to the interaction within the group discussion to obtain the data they require (Morgan, 1996). At the Hospital, the risk team conducts risk-based focus group sessions by providing a brief introduction and review of the HIROC IRM tools described above, then encourages the group to discuss risks within their areas, within the hospital, and risks to meeting the hospital strategic plan. The risk team injects at moments when the group appears stuck; although in most instances the teams are left to work through silence and continue their discussions. There is no shortage of the "expression of the likelihood and impact of an event with the potential to affect the achievement of an organization's objectives" when identifying risks (Government of Canada, 2010, p. 7).

The advantages of the focus group sessions are maximized when data mining for risks. For example, the risk team is able to obtain data in a method that is familiar to the organization, quick, convenient and helps people diverge and converge as they explore and clarify their views (Kitzinger, 1995). Individuals who would normally be reluctant to be interviewed on their own, or whom generally feel they have nothing to say or anything to contribute, are encouraged to participate and are given the chance to discuss (Kitzinger, 1995).

There are nonetheless circumstances when the disadvantages of focus group sessions impact the outcomes of the discussion. Informal methods of reaching consensus such as committees, or in this case formal focus groups, are recognized to be prone to domination by powerful and senior individuals, resulting in biased responses (Murphy et al., 1998; Powell, 2003). Within the Hospital's IRM process, teams are re-engaged to rate risks through focus group sessions. During the sessions, the dominant personalities or in some cases the most senior member of the team would drive and influence the rating (Hsu & Sandford, 2007). Risks rated by dominant or senior staff would not benefit from an integrated and collaborated upon approach. The outcome of the rating would not be reflective of all the participant's expert opinions. Thus with a dominant voice, there would be challenges to achieve true consensus within a team. Additionally, participants of groups sessions are subjected to group pressures for conformity and noise (Dalkey, 1971).

Noise, is described by Hsu and Sandford (2007) as "the communication which occurs in a group process which both distorts the data and deals with group and/or individual interests rather than focusing on the project solving" (p. 2). If a group had social, political or personal conflict, it would lead to suboptimal group discussions, as the conflict would be the focus of the conversation rather than the risk identification (Rowe & Wright, 2001).

Interestingly enough, the conflict among teams did lead the risk team to establish a potential collaboration and communication risk; however that risk did not score a high risk rating to remain on the final corporate risk register. It is evident that group dynamics may interfere with maintaining an integrated approach, as the disadvantages of focus group discussions may result in added noise to data collection. There is an opportunity to use an anonymized approach for data collection in order to reduce the negative impacts of dominant individuals, group pressures, and seniority influences among teams, as well as establish consensus when identifying risk to the organization (Hsu & Sandford, 2007).

With the intent to predict top risks to healthcare organizations, patients and staff, HIROC conducts retrospective analysis on its database of medical malpractice claims (HIROC, 2019). HIROC also provides Hospitals yearly summaries of its claims data. The risk team reviews historical data from the Hospital's risk registry and its incident reporting system to evaluate whether any risks have a threat to reoccur. All these points of data help inform the risk team when engaging in the interdisciplinary sessions and forming the corporate risk register. However once again the data is retrospective, and furthermore the analysis is specific to the Hospital itself.

One could argue that the HIROC claims data has characteristics of external scanning, however the scanning is only specific to healthcare, instead of scanning other external areas such as political, economical, social or technological forces that may impact the Hospital in the future. An opportunity exists whereby future trend analysis, internally, externally and in themes outside of healthcare could be completed to inform the risk register.

In the next section we explore the delphi method as a technique to address the opportunity areas listed above; a survey method that has anonymity, establishes consensus and by scanning externally and into the future.

Delphi Method

As Linstone and Turoff (1975) clearly explain the "delphi technique is in essence a series of sequential questionnaires or 'rounds' interspersed by controlled feedback, that seek to gain the most reliable consensus of opinion of a group of experts" (as cited in Powell, 2003, p. 376). Mainly developed by Dalkey and Helmer (1963) at the Rand Corporation in the 1950s, the delphi is a widely accepted method of reaching consensus on opinions regarding real-world issues, from experts in a chosen field (Hsu & Sandford, 2007). More specifically, apart from reaching consensus, delphi is useful for exploring and exposing underlying assumptions, developing a full range of alternatives, seeking information, addressing a lack of agreement, correlating informed judgements and achieving better forecasts on a topic spanning a wide range of disciplines (Dalkey & Helmer, 1963; Hsu & Sandford, 2007; Powell, 2003; Rowe & Wright, 2001). Delphi is especially beneficial in helping with subjective forecasting and predicting the occurrence of future events (Rowe & Wright, 2001; Hsu & Sandford, 2007).

The delphi has notable characteristics that offset shortcomings of conventional pooling discussed above. When pulling information from group interactions, the delphi offers anonymity to respondents, a controlled feedback process and the ability to interpret the data by conducting statistical analysis in a variety of ways (Dalkey, 1972). Firstly, as responses are obtained from respondents electronically, delphi is able to provide anonymity to respondents (Dalkey, 1972). This may minimize the disadvantages of group dynamics including coercion or manipulation to conform or agree with certain viewpoints (Hsu & Sandford, 2007). It may also reduce the negative social, political and personal conflicts that may lead to suboptimal group performances (Rowe & Wright, 2001). Also, the delphi is regarded as a rapid, inexpensive and relatively efficient way to structure and organize group communication (Powell, 2003).

The controlled feedback process consists of a synthesized summary of results from a survey round, intentionally distributed to participants to provide an opportunity to reflect and generate additional insights for subsequent rounds (Hsu & Sandford, 2007). As a result of the iterations (multiple rounds), respondents enter problem-solving mindset as they review and assess the responses, adjust their answers and/or offer their informed opinions in the subsequent round(s) (Hsu & Sandford, 2007). The statistical analysis itself allows for an impartial and objective

summation of the collected data, further reducing the potential of group pressures for conformity and noise (Dalkey, 1971). Noise and distractors may be reduced by providing anonymity and controlled feedback, whereby participants can reflect and respond on their own accord (Dalkey, 1972).

Lastly, the Delphi provides the opportunity to apply a variety of statistical analysis techniques to interpret and share the data (Dalkey, 1972). Rowe et al., (1991) states for delphi to be useful it should provide more accurate assessments or judgements on real-world issues that would not have been obtained by individual or by group interactions (as cited in Powell, 2003, p. 377). In order for the delphi to be useful, the statistical analysis must display the data in a manner that supports participants to reflect and problem-solve during rounds. For example as Hasson, Keenet and McKenna (2000) state, quantitative data can be analysed with measures of central tendency (mean, median and mode) and level of dispersion (standard deviation and interquartile ranges) in order to present the results concerning the collecting responses of the participants (as cited in Hsu & Sandford, 2007, p.4; Rowe & Wright, 2001). The threshold or determination on reaching consensus can be agreed upon quantitatively prior to initiating the

exercise (Hsu & Sandford, 2007). Qualitative analysis may also be utilized if open-ended questions to solicit participants' opinions are conducted in any of the iterations (Hsu & Sandford, 2007). Considering the first round of the delphi questionnaire is usually unstructured and requests explorative response, qualitative analysis is usually undertaken after the first round to construct the second and subsequent questionnaires (Powell, 2003).

Despite the opportunities the delphi provides, there are also drawbacks and shortcomings to the technique that are important to discuss. The multiple rounds of the technique may prolong the duration of the study as respondents may be slow to respond, or even worse, drop out between rounds, impacting the credibility of the final data (Hsu & Sandford, 2007). Additionally as Altschuld (2003) states, the iterative characteristics of the Delphi can potentially lead investigators to mold opinions when they provide feedback between rounds (as cited in Hsu & Sandford, 2007, p.5). The workload is also deemed high for the principal investigator as the synthesis of data between rounds can be time consuming and laborious (Hsu & Sandford, 2007). Lastly as Powell (2003) states, the success of a delphi technique depends on the combined expertise of the participants that make

up the expert panel, and the level of knowledge they have on the chosen topic. The literature does not provide clear guidelines on the minimum required sample size, thus more emphasis is placed on representativeness of the panel rather than its size (Powell, 2003; Hsu & Sandford, 2007).

Delbecq et al. (1975) notes "that heterogeneous groups, characterized by panel members with widely varying personalities and substantially different perspectives on a problem, produce a higher proportion of high quality, highly acceptable solutions than homogeneous groups" (as cited in Powell, 2003, p. 379). Emphasis is placed on the facilitator of the delphi to grasp the level of existing participant knowledge on a given topic, as choosing the appropriate panel is the most important step in the delphi process, considering it directly impacts the quality of the results generated (Altschuld & Thomas, 1991; Hsu & Sandford, 2007). Obtaining heterogeneous groups may be a challenge depending on the availability of participants.

As Fink et al (1991) and Powell (2003) state, the delphi method has been widely used in the healthcare field for policy determinations, program planning, needs assessment, resource utilization and problem solving (as cited in Powell, 2003, p. 376). As Miller (2006) stated, "common surveys try to identify 'what is,' whereas the Delphi technique attempt to address 'what could/should be'" (as cited in Hsu & Sandford, 2007, p. 1). In many real-world forecasting exercises, statistical techniques may not be practical or available, and expert opinion and judgement need to be leveraged to provide the research basis for a forecast (Rowe & Wright, 2001). As a result, the delphi method was chosen as the method to use for this study. Within the next chapter this MRP will dig deeper as to how the delphi method, in conjunction with a foresight technique called horizon scanning was used in the study to identify risks in an acute care setting.

Methodology

In the previous chapter we identified opportunities in the Hospital's current IRM program and identified the delphi as a potential technique to target the opportunities. In this next chapter we look at the in depth literature review and the scanning method that was utilized to identify the seventeen risks that made up the delphi questionnaire.

- Study Preparation
- Horizon Scanning
- Future Risk Identification
- Future Risks
- Questionnaires

Methodology

Study Preparation

There are four necessary features that characterize the delphi method and allow it to develop consensus; anonymity, iteration, controlled feedback of the participants judgements, and statistical aggregation of the participants responses (Rowe & Wright, 2001). It is needless to say, in order to complete a delphi questionnaire, participants are required. In order to recruit participants in a study that conducted research, a Research Ethics Board (REB) application (#3170) was submitted and approved through the Ontario College of Art and Design University (OCAD U) REB. The REB extensively outlined the purpose and method of the study, and the recruitment and management of the study participants. It was necessary to outline the measures put in place to ensure the study was conducted ethically, anonymously and without harm to participants. Additionally, a Quality Improvement (QI) initiative was submitted and approved through the Hospital's REB, along with the corresponding proposal for the MRP and the OCAD U REB application (#3170).

Lastly, the MRP and study details were presented to the Senior Leadership Team (SLT) strategy meeting.

To prepare for the recruitment of participants for the study, invitation and consent letters were established. A subscription to a survey platform that met the REB provisions was purchased, and lastly the literature review was conducted through horizon scanning to identify the risks that would make up the questionnaires.

Horizon Scanning

Horizon scanning is described by Charest (2012) as active, ongoing and systematic assessment and monitoring of commercial, technological or other type of environment with a scope to anticipate changes that are likely to occur. "Being focused and continuous (as opposed to passive and episodic), horizon scanning fits with an organization's longer-term objectives regarding strategic directions and risk management" (Charest, 2012, p. 1). Choo (1999) similarly describes environmental scanning as the "acquisition and use of information about events, trends and relationships in an organization's external environment, the knowledge of which would assist management in

planning the organization's future course of action" (p. 21). Horizon scanning is useful to detect and assess emerging threats and opportunities, and guide decision-making ahead of actual events (Charest, 2012). Organizations scan the environment they may be in or faced with in order to understand external forces of change, and to ultimately develop effective responses that improve or secure their position in the future (Choo, 1999). As stated above, risks are future events that have not yet occurred, and as Bishop, Hines and Collins (2007) state "it is vitally important that we think deeply and creatively about the future, or else we run the risk of being surprised and unprepared" (p. 5).

One of the gaps identified above in the Hospitals current IRM framework was that risk identification incorporates minimal risk analysis external to the hospital. However, the extent that the hospital is able to adapt to its outside environment is dependant on its knowledge and interpretation to the external changes taking place (Choo, 1999). That is where external scanning can be useful as a mode of organizational learning (Choo, 1999). An additional gap identified within the current IRM

framework was that it does not scan too far into the future. As Bishop, Hines and Collins (2007)

also state, "the future is uncertain so we must prepare for multiple plausible futures, not just the one we expect to happen" (p. 5). It is pertinent that the external scan look at the possible environment(s) that the hospital would be exposed to in the future when identifying risks.

The horizon scanning within this MRP answers the question: What are the environmental forces that may lead to potential risks to acute care organizations? This scanning was conducted through trend analysis categorized according to the STEEP+L framework, to build a rich list of potential future social, technological, economical, environmental, political and legal based risks. As a guide Choo's (1999) four modes of organizational scanning was utilized; explained in the next paragraph. The arena was healthcare, with a particular focus on any forces impacting the Hospital. The scanning took place in the near horizon of five years (2025) to accommodate for an audience who many not be familiar with horizon scanning, and with the realities that healthcare strategies are tied closely with political mandates that are on a four year election cycle. Lastly, the scanning explores risks to the Hospital for three main audiences; hospital staff in leadership positions, risk management teams, and health care insurers. Refer to

Figure 2 for an illustration of the Arena, Horizon and Audience.

Environmental scanning includes both looking at (viewing) information and looking for (searching) information (Choo, 1999). The following four modes of organizational scanning as outlined by Choo (1999) were followed; undirected viewing, conditional viewing, informal searching and formal searching. Figure 3 provides an explanation for each mode of scanning as explained in The Art of Scanning the Environment.

Using the principles of environmental scanning, a wider net was cast using a STEEP+L framework to analyze information about external environmental sectors that can impact the Hospital's future. STEEP+L analysis examines the following forces as macro orientation; social, technological, economical, environmental, political and legal (Crossan, Rouse, Rowe & Maurer, 2016). The approach might seem silo'd, however Crossan et al. (2016) gives a great example of how the STEEP+L forces impact each element of the value chain; "for example, demographics can be used to assess demand many years in advance, as in the case of planning for the construction of new schools and as in the case of planning for delivery of health

care to an aging population" (p. 63). You will find the latter example relevant when discussing risks in the upcoming sections of this MRP.

In order to be effective, this MRP engaged all four modes of environmental viewing and searching (Choo, 1999). The external environmental scanning began by conducting undirected viewing of literature on the World Wide Web and through scholarly articles. Search terms such as *"Healthcare trends," "Future of healthcare," "Drivers of health care delivery,"* and so forth were utilized to conduct the initial undirected viewing. The intent was to gain exposure to information pertaining to future trends in Ontario healthcare, with no specific informational needs in mind. The objective was also to identify some early leads, signals or changes, which once gained progressed the scanning method to conditional viewing, whereby focus was directed at selected topics or certain types of information (Choo, 1999). Once the undirected and conditioned viewing were complete, the risks within the STEEP+L sections started to become clearer
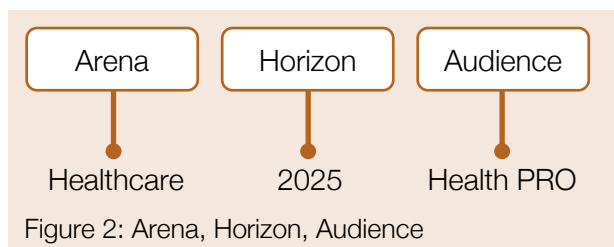
Figure 2: Arena, Horizon, Audience

Four Modes of Organizational Scanning

Mode	Purpose	Goal	Result
Undirected Viewing	The individual is exposed to information with no specific informational need in mind	To scan broadly in order to detect signals of change early	Individual becomes sensitive to selected areas or issues
Conditional Viewing	The individual directs viewing to information about selected topics or to certain types of information	To evaluate the significance of the information encountered in order to assess the general nature of the impact on the organization	If the impact assessed to be sufficiently significant, the scanning mode changes from scanning to searching
Informal Search	The individual actively looks for information to deepen the knowledge and understanding of a specific issue	To gather information to elaborate an issue so as to determine the need for action by the organization	If a need for a decision or response is perceived, the individual dedicates more time and resources to the search
Formal Search	The individual makes a deliberate or planned effort to obtain specific information or information about a specific issue	To systematically retrieve information relevant to an issue in order to provide a basis for developing a decision or course of action	Information gathered on a specific target

Figure 3: Four Modes of Organizational Scanning

and informal and formal searching were utilized to actively deepen the knowledge and understanding of the risk, and to deliberately obtain specific information about the risk respectively (Choo, 1999).

The four modes of organizational scanning is obvious in the bibliography as certain sources discuss general trends, drivers, issues or risks in healthcare, and others search formally to gain background knowledge regarding the issue or risk that had the potential to impact the Hospital in 2025. The horizon scanning utilizing the STEEP+L framework led to the identification of seventeen risks that have the potential to impact the Hospital. In the next section we explore the identified risks to the Hospital that eventually established the bulk content of the delphi questionnaire.

Future Risk identification

As risks were being identified, a systematic approach was taken to explore and extrapolate them. Each risk was given a risk name, the scope (Boundaries) of the risk, the corresponding STEEP+L force, the risk

statements and the background. The scope of the risk, set by the scanner, helped define the boundaries of the risk to support the development of the risk statement. For example, when we extrapolated the risk Data Integrity, the scope was determined as Inaccurate and Accurate. That steered the discussion on impacts to patient records with mergers. Had the scope been determined as Breach and Confidentiality, the discussion of the risk would have led to maintaining patient privacy within the realm of digital records. The risk statement succinctly framed the risk each participant was required to rate. It ensured the focus of the risk was clearly defined, to reduce the possibility of the participants misinterpreting the risks. Each likelihood and impact statement was created in direct relation to the risk statement. For example for the risk Inappropriate Utilization of Health Services, the risk statement was as follows; patients who cannot access family doctors or community care providers in a timely manner may choose to seek treatment from higher cost providers (such as hospital emergency departments), which may result in inappropriate utilization of healthcare services. The likelihood statement was framed as "How *likely* will patients inappropriately utilization health services at the hospital in 2025?" And the impact was framed

as "How *severe* would the impact be to the hospital if patients inappropriately utilized health services at the hospital in 2025?" Lastly, the background contained a summary of the deeper research that was conducted to understand the basis of each risk.

If we compare the breakdown of each risk with Choo's (1999) modes of environmental scanning, during undirected viewing, risks were being identified broadly. Once a potential risk was linked to a STEEP+L force the focus switched to conditional viewing. Next while informally searching, the scope (boundaries) of each risk was determined which helped frame the risk name and statements. Lastly, to deepen the knowledge on the risk statement, deliberate formal searching was conducted to understand the background context for each risk. The order in which all the components were established are as follows; STEEP+L force, boundary, risk name and statement, background. The final compilation of risks, categorized according to the STEEP+L framework, built a rich deck of social, technological, economical, environmental, political and legal based risks that are likely to impact the Hospital in 2025. A visual of the spread of risks sorted by the STEEP+L macro forces can be found in Figure 4 on page 21.

STEEP+L Risks	Social	Technology	Economy	Environment	Political	Legal
Potential Futures Risks						
Inappropriate utilization of health services	O					
Patient as a Consumer	O					
Predisposed Ethnic Diseases	O					
Evolution of Disorders/Self Destruction		O				
Technological Advancements to Healthcare		O				
Predictive Data Analytics		O				
Data Integrity		O				
Inflation			O			
Resistance to Mergers			O			
Fee for Service Funding Model			O			
Aging population				O		
Human Resource Shortages				O		
Changing Government Regulations					O	
Changing Sector Coverage					O	
Gun Regulations					O	
Governance						O
Rise in Malpractice Claims						O

Figure 4: Risks STEEP+L Spread

Future Risks

In this subsequent section, each one of the seventeen potential future risks are laid out in a table with their components; risk name, scope, corresponding macro force, risk statement and background. The format in which the risks are displayed is explained below in Figure 5, along with the mode of environmental scanning that was used to obtain the relevant information. Each section of the table is numbers in the order in which the information was obtained during environmental scanning.

3. Risk Name was determined by informal searching	2. Scope (Boundaries) was determined through conditional viewing and informal searching.	1. STEEP+L macro force was determined by undirected viewing

4. Risk Statement: Once the scope (boundaries) of the risk was defined, the risk statement was developed by conducing further informal searching.

5. Background: Once the risk statement was defined, the background context for the risk was gained by conducting deliberate formal searching.

Figure 5: Example of Risk Table

Inappropriate Utilization of Health Services

Inappropriate Congruent | **Social**

Risk Statement: Patients who cannot access family doctors or community care providers in a timely manner may choose to seek treatment from higher cost providers (such as hospital emergency departments), which may result in inappropriate utilization of healthcare services (TXCIN, 2019).

Background: There are a subset of patients who visit Emergency Departments (ED) that McHale et al. (2013) call Inappropriate Attendances (IA). IAs were defined as patients who were self-referred, received no investigation and either no treatment or guidance/advice only, were not attending a follow-up and were discharged with either no follow-up or a follow-up with primary care provider (McHale et al., 2013). IA patients were those who could not access their family doctors or community care providers in a timely manner (TXCIN, 2019). Statistics Canada's most recent survey from 2016 showed that 9.7 per cent of the Ontario population did not have access to a primary care provider (as cited in Hill, 2018). That means for many Ontarians, securing regular access to a primary care provider or family physician is a struggle that may result in IAs (Hill, 2019). Health professional workforce shortages or maldistribution of health professionals also contribute to patients seeking care from higher cost providers (TXCIN, 2019). Additionally, the homeless population are subset that may also exhibit higher frequency of ED visits than the general public (Shepherd, 2013).

This struggle places a higher burden on emergency departments as patients who should be seen by family doctors end up taking space and seeking treatment from higher cost providers (Hill, 2019; TXCIN, 2019). Additionally, "utilizing a physician for a service that another professional is able to effectively and safely provide is a missed opportunity to utilize a lower cost provider" (TXCIN, 2019, p.3). Affleck, Parks, Drummond, Rowe, & Ovens, (2013) however state that "contrary to popular perceptions, ED overcrowding is not caused by inappropriate use of ED's, or by high numbers of low acuity patients presenting to the ED; the inability of admitted patients to access in-patient beds from the ED is the most significant factor causing [emergency department overcrowding] in Canadian hospitals" (p. 359)

Regardless of the flow, patients who cannot access the right treatment at the right place due to an inability to access it at the right time may increase the health care spend, and pose a financial burden to the hospitals they are visiting.

Risk Statement: Patients see themselves as consumers; as purchasers of health services (Bhanu, 2010; Meill & Ericson, 2012). By providing greater information, access and autonomy, we are treating patients as in control, typically proactive and well-informed consumers (Meill & Ericson, 2012). However patients may not have all the tools to make the best medical choices (Meill & Ericson, 2012). As consumers in the driver's seat, patients may demand and receive inappropriate treatments and may inappropriately utilize healthcare services.

Background: The Institute of Medicine in 2001 outlined six pillars for health care systems to consider in order to deliver high quality care; one being patient centered (as cited in Bhanu, 2010, p. 1). A patient centered care delivery approach results in patient being treated as consumers, and patients seeing themselves as buyers of health services (Bhanu, 2010; Meill & Ericson, 2012). The "empowered patient" movement encouraged patients to be hyper-informed and in control over their care (Meill & Ericson, 2012). However, providing greater information, access and autonomy whether through wearable personal health monitoring technology, accessible health records, or even a world wide web full of data does not necessarily drive better care (ThinkResearch, 2019; Meill & Ericson, 2012). In this case, as Brown, Nelson, Bronkesh, & Wood (1993) state, patients are seen as individuals who acquire health services in the same manner they acquire commodities, and who have the know all as to what services they require (ThinkResearch, 2019).

There are risks with placing patients in the driver's seat of their own health needs, as it results in the assumption that all patients are typically proactive, in control, and well informed advocates of their own health (Meill & Ericson, 2012). Firstly, patients may not actually want to be in the driver's seat when they themselves are experiencing crisis (Meill & Ericson, 2012). Secondly, patients are not necessarily equipped to be there, even if they are willing to be decision makers, they may not have all the tools to make difficult, timely and informed choices on treatment decisions that requires specialized expertise (Meill & Ericson, 2012). Thirdly, Patient are not in the health system alone, as health is a complex system made up of multidisciplinary teams, and may require decisions from an interdisciplinary team (Meill & Ericson, 2012).

As healthcare continues to place patients in the position of consumer, patients may continue to demand and receive unnecessary and inappropriate treatments, potentially leading to harm, delay in accurate diagnosis and inappropriate utilization of health services. When healthcare designers can delineate between a patient and a consumer, they can ultimately create a more effective experience (Meill & Ericson, 2012).

Risk Statement: Results from the 2016 population census showed that 67% of the population the hospital serves are Asian; comprised of south, south east and south west Asians (Markham, 2016). This may place a greater demand on the hospital to acquire services that it does not currently provide in order to deliver timely care for culturally predisposed conditions. For example, south Asian people in Canada have higher rates of heart disease, double the rate of diabetes and are more prone to becoming overweight (Carter, 2014).

Background: The Greater Toronto Area (GTA), an area that has been projected to be the fastest growing region of the province is accounting for over 65 percent of Ontario's net population growth in 2041 (Ministry of Finance, 2018). Growth in the area that the hospital serves is projected to be significantly faster than the Ontario average, with the addition of over 1.8 million people to the suburban GTA (Ministry of Finance, 2018). The hospital catchment area contains a high population of individuals of Asian descent (Markham, 2016). Results from the 2016 population census showed that 242,105 (67 percent) of the population were Asian; comprised of south, south east and south west Asians (Markham, 2016). A study out of McMaster University in Hamilton Ontario suggests that individuals of South Asian descent living in Canada have higher prevalence of heart disease, hypertension, double the rate of diabetes and are more prone to becoming overweight (as cited in Carter, 2014). The study consisted of examining data collected in Canada between 1979 and 2007 that included over 5.8 million people (Carter, 2014). An article out of The New York Times (Why do South Asians Have Such High Rates of Heart Disease?) also notes that South Asians are the second fastest-growing ethnic group in America that have a higher death rate from heart disease than any other ethnic group (O'Conner, 2019).

When compared to individuals of Caucasian descent, South Asians had higher percentages of body fat, as they have a greater tendency to store body fat in places where it should not be, like the liver, abdomen and muscles (Carter, 2014; O'Conner, 2019). Fat stores in those areas are known as visceral or ectopic fat, and can cause greater damage than the heart stored underneath our skin, known as subcutaneous fat (O'Conner, 2019). As a result, individuals of Asian descent may suffer from one of the following conditions that The Heart and Stroke Foundation lists under heart disease; angina, atrial fibrillation, heart attack, heart failure, arrhythmia, cardiac arrest, valvular heart disease and vascular congenital impairment (Heart and Stroke Foundation of Canada, 2018). As the population grows within the GTA, the hospital may potentially see an increased rate of patients with symptoms of heart disease such as heart attack, stroke, or requiring coronary artery bypass surgeries (Carter, 2014; Heart and Stroke Foundation of Canada, 2018).

The hospital may be faced with a greater demand to acquire and provide services that it does not currently provide in order to deliver timely care for culturally predisposed conditions.

Evolution of Disorders/Self Destruction

Harmless Harmful

Technological

Risk Statement: The patients we serve are living in an environment where technological advancements are co-created without a fulsome understanding of their co-destructive consequences. For example, adolescents experiencing negative psychological symptoms due to social media, or rise in patients suffering from lung injury due to e-cigarettes (Charles, 2019; Centers for Disease Control and Prevention, 2019). Disorders impacting patients are evolving and may lead to negative outcomes, as the hospital may not currently provide the services in order to deliver timely care to patients.

Background: Patients are living in an environment where technology surrounds them; from their personal phones, laptops, tablets to behind-the-scenes technology, technology is here to stay and will continue to expand and morph (Pietrangelo, 2019). As technology advanced it must be co-created with a comprehensive understanding of its co-destructive consequences, to prevent the risk of negative physical or mental health impacts (Pietrangelo, 2019). Recent studies have shown that increased use of social media is positively correlated with symptoms of social anxiety, social isolation, and feelings of loneliness (Charles, 2019). Adolescents are also experiencing sleep deprivation as they are exposed to the light of their devices right before bed, delaying their sleep by 30 mins minimum (Charles, 2019).

Among youth, e-cigarettes and vaping have become more popular than any traditional tobacco product (Blaha, 2019). The U.S. surgeon general (2015) reported that e-cigarette use among high school students had increased by 900 percent, and 40 percent of young e-cigarette users had never smoked regular tobacco (as cited in Blaha, 2019). The Centers for Disease Control and Prevention (CDC) (2019) and the U.S. Food and Drug Administration (FDA), state and local health departments, and public health partners are investigating a multistate outbreak of lung injury associated with e-cigarette and vaping use. Yet the CDC and FDA have not been able to identify the cause or causes of lung injury in patients who have reported the use of e-cigarette and vaping products (The Centers for Disease Control and Prevention, 2019).

Pietragelo (2019) lists a number of negative impacts to health from technology such as eye strain, musculoskeletal health, sedentary lifestyles, obesity, addition, and so forth. Technology will continue to evolve and impact population health. Practitioners and health care organizations must remain knowledgeable and resourceful to be able to provide timely care to patients

Risk Statement: Advances in medical technology can both increase efficiencies in health care delivery, and also encourage unnecessary utilization of expensive treatments due to an existing fee-for-service model (TXCIN, 2019).

Background: The past decades have seen changes in the utilization of hospital care and services, primarily due to technological changes (Canadian Institute for Health Information, 2011). Technology referred to in this risk may include medical devices and equipment such as imaging, surgical improvements such as robotic devices, prescription drugs and information and communications technology (Canadian Institute for Health Information, 2011). Changes and increased use of technology has created increased costs for hospitals (Canadian Institute for Health Information, 2011). Physicians receiving remuneration under a fee-for-service model may generate stronger incentives to perform high volume of tests and services, regardless of whether those services improve quality or contribute to a broader effort to manage care (TXCIN, 2019). Thus, in a roundabout way, there is and has been a connection between hospital costs and the treatment and prescription decision physicians make when managing patient care (Canadian Institute for Health Information, 2011).

As a consequence, maintaining a fee-for-service model may generate extra hospital costs as physicians over prescribe or encourage the utilization of expensive treatments. Physicians must adopt a Choosing Wisely approach to reduce unnecessary tests, treatments and ultimately costs in healthcare (Choosing Wisely Canada, n.d.)

Risk Statement: Predictive analytics has become increasingly useful in operational management, personal medicine and epidemiology, however may result in ethical and moral hazards and increase liability cases as providers believe they are protected by a machine perceived as being accountable (Watson, 2019).

Background: Medicine has always revolved around probabilities, as physicians make medical decisions using the best evidence based research available (Greengard, 2018). However, in the digital age predictive analytics is gaining traction in operational management, personal medicine and epidemiology, and becoming the new doctor in town (Greengard, 2018; Watson, 2019). The approach of predictive analytics taps data mining, statistical modeling and machine learning to turn historical or real-time data into predictions that impact patient and organization health (Greengard, 2018). Google for example was able to run a study where analytics was used to detect diabetes from heart rate patterns with 85 percent accuracy (Thinkresearch, 2019). Hospitals have been using predictive analytics to achieve optimal patient-to-staff ratios, forecast patients seeking care, and assisting in the recruitment and assessment of new staff competencies (Watson, 2019). According to a survey conducted by the Society of Actuaries (2017), 93 percent of health investors and providers believe that predictive analytics is important to the future of health, and 89 percent said they plan to use predictive analytics within the next five years (as cited in Greengard, 2018). As executives in healthcare plan to invest in AI in the next three years, predictive analytics may rapidly shape the way healthcare will be delivered (Siwicki, 2017; Thinkresearch, 2019).

However there are risks associated with the new technology as the pace of the decision-making processes increases and it becomes difficult to pinpoint the exact moment at which the decision is handed over from a machine to a human (Watson, 2019). There are also moral hazards in which providers may consider undertaking more risk if they think they are protected by a computer being accountable and bearing the costs of unintended harm (Waston, 2019). The transfer of risk and liability within the medical industry is complex and adding the risk of misdiagnosis from a machine will add to the complexity that already exists (Watson, 2019). The risks may result in physicians being held accountable for injury that could have been avoided had they reviewed their patients medical records more carefully, or medical negligence lawsuits if patients feel a physician overrode a machine's recommendation (Watson, 2019). Lastly, liability may also arise if a doctor follows a predictive analytics model recommendation and it contains an error (Watson, 2019).

Until clear regulations controlled by industry standards are set in place, and healthcare practitioners are educated on the use and hazards of the technology, predictive analytics poses risks to healthcare and all its stakeholders.

Data Integrity	Inaccurate Accurate	Technological

Risk Statement: Integration, unification and merging of health care services may impact data integrity and quality of digital patient health information systems, as clinicians and decision support teams struggle to keep patient records coherent, and to maintain unified files across multiple applications (Trader, 2016; Community Health Ontario, 2018). Loss of data integrity may result in adverse events to patients, missed essential information pertaining to care, data breaches, violations to privacy legislation, missed revenue and inaccurate claims data (Trader, 2016).

Background: As Trader (2016) points out, care providers and health care organizations understand the importance of keeping accurate health records for maintaining patient data integrity. Data-driven decision making and digital health technologies are hallmarks of high-performing health systems (Community Health Ontario, 2018). Electronic health records have been adopted across sectors, and the Local Health Integration Networks (LHINs) have driven important initiatives to link up data between sectors (Community Health Ontario, 2018). This has not only provided a more seamless care, but also unlocked data to better understand the needs of the population and required health services at the local level (Community Health Ontario, 2018).

Ontario however continues to lag on the portability of digital health records, and in engaging patients and clients in using digital health technologies (Community Health Ontario, 2018). For example, we still do not have the ability to share patient records seamlessly and consistently between sectors and providers, or with the clients themselves (Community Health Ontario, 2018). Additionally practitioners utilizing digital health records to provide and document care may not realize the unique challenges, hazards and concerns of digital file systems and the threats they may pose to health care (Trader, 2016). There are struggles to keep patient records coherent and to maintain unified documents across multiple applications (Trader, 2016). This poses threats to patient care as patient records may be missing essential information pertaining to their care. There are also the financial and reputational costs of cybersecurity breaches, privacy breaches and violations to the Personal Health Information Protection Act that can impact patient outcomes, result in lost revenue and increase liability cases (Siwick, 2017; Trader, 2016).

There will be more cybersecurity breaches, data integrity and quality management issues as sectors continue to move towards digital health technologies (Siwick, 2016). Hospital and health systems must be prepared.

Inflation	Shortage Abundance	Economic

Risk Statement: Health-sector price inflation has been well above the rate of general inflation for core medical services. Inflation rates may continue to rise as hospitals compete for limited drug supply and/or medical supply (Canadian Institute for Health Information, 2011).

Background: Price inflation has been a significant factor influencing the increase of hospital costs, and while it is outside the control of health system decision-makers, it is still a factor when negotiating contracts (Canadian Institute for Health Information, 2011). Much of this inflation is associated with increases in remuneration, however hospitals have also seen increased costs for drug and medical supplies (Canadian Institute for Health Information, 2011). Prescription drug expenditures have been growing at an annual average rate of 10.1 percent per year (Canadian Institute for Health Information, 2011). This is partly due to increased volumes along with changes in the mix of drug types (Canadian Institute for Health Information, 2011).

Additionally, the decisions Physicians in canada have been making has directly impacted the costs to healthcare, as they have the authority to prescribe drug prescriptions and diagnostic tests (Canadian Institute for Health Information, 2011). Healthcare products and services are increasing in technical complexity, and are costing hospitals more money per patient case (TXCIN, 2019).

The health-sector may continue to be exposed to inflation rates higher than other sectors. The hospital may need to strategize methods to secure supply in order to avoid competition at an increased cost.

Risk Statement: Within a fragmented care delivery model, providers are paid for volumes and performance rather than patient outcomes. This may generate little financial incentive to coordinate or merge with other care providers to deliver patient centered care (TXCIN, 2019).

Background: The massive overhaul of the health-care system in Ontario came into effect in June under the Connect Care Act (Frketich, 2019). The restructuring was announced in February of 2019 when Health Minister Christine Elliott confirmed that a new super agency called Ontario Health would absorb the functions of the 14 Local Health Integration Networks (LHINs), and the six existing agencies (Grant, 2019). As Baker and Axler (2015) summarize in a report tiled Creating a High Performing Health System for Ontario: Evidence Supporting Strategic Changes in Ontario, "integration and care transitions would advance patient experiences, reduce mortality and morbidity, and decreased patients' length of stay in hospitals" (p. 15). Integration is a new strategy being used in Ontario to pursue better quality, seamless patient experiences and more cost-effective systems (Community Health Ontario, 2018). After years of funding based on volume, funders have realized that more services does not necessarily mean better health, it is about integrating services for improved outcomes (Community Health Ontario, 2018).

However, in a roundabout way the treatment decisions physicians make control hospital costs when managing patient care (Canadian Institute for Health Information, 2011). Physicians receiving remuneration under a fee-for-service model are paid for volumes rather than patient outcomes (TXCIN, 2019). This generates little financial incentive for physicians to coordinate with others to deliver more efficient care, outcome driven care (TXCIN, 2019).

Physicians play a large governing role in driving decisions within the hospital and in the greater health system. The hospital may be faced with resistance to mergers unless providers gain greater incentives to move towards integration.

| Fee for Service Funding Model | Unnecessary Testing Choosing Wisely | Economic |

Risk Statement: Rather than Choosing Wisely, reimbursement under a fee-for-service model may generate strong incentives to perform higher volumes of tests and services, regardless if those services contribute to a broader effort to manage care, or improve patient outcomes (TXCIN, 2019; Choosing Wisely Canada, n.d.).

Background: The Ontario healthcare model has been focused on funding outputs rather than outcomes (Community Health Ontario, 2018). However funders are seeing that more services does not necessarily mean improved health (Community Health Ontario, 2018). As a result, there is a growing focus on outcomes in healthcare spending decisions (Community Health Ontario, 2018). This shift is evident across the system. In Ontario, primary care has evolved from primarily fee-for-service systems of independent physicians to more advanced group-based practices built on patient enrolment and comprehensive care (Ontario Ministry of Health and Long-Term Care, 2019). Physicians are remunerated through enhanced fee-for-service (FFS) funding models. For example, if a solo physician commits to provide comprehensive primary health care and a block of after-hour services each week to enroll patients, they may receive capitation payments through the Comprehensive Care Model (CCM), in addition to their FFS payments (Ontario Ministry of Health and Long-Term Care, 2019). Additionally, if groups of physicians (three of more) form a Family Health Group (FHG) to provide comprehensive primary health care, and after-hours services to their assigned/enrolled patients, they will also receive capitation payments in addition to FFS payments. (Ontario Ministry of Health and Long-Term Care, 2019). Lastly, physicians are also eligible for bonuses and premiums based on when they enrol patients (Ontario Ministry of Health and Long-Term Care, 2019).

Regardless of outcomes, reimbursement under the fee-for-service (FFS) model may generate stronger incentive to perform a high volume of tests and services, regardless of whether those services improve quality or contribute to a broader effort to manage care (TXCIN, 2019). There is a national voice for reducing unnecessary tests and treatment in health care through Choosing Wisely Canada, (n.d.), and there is a growing trend to integrate services that may result in an outcome based funding model (Community Health Ontario, 2018).

The Hospital may face challenges to introduce outcome based funding models through integration, if the fee-for-service model generates stronger incentives to remain volume based.

Aging Population	Gridlock Flow	Environmental

Risk Statement: The aging population and increase of patients with chronic diseases and comorbidities may increase demand and lengthen inpatient admission days, impacting flow throughout the hospital causing gridlock status (TXCIN, 2019; Canadian Institute for Health Information, 2011).

Background: Canada is undergoing a demographic shift as the baby boom cohort (Canada's largest population group) is beginning to turn 65 years old (Canadian Institute for Health Information, 2011). The Ontario population is also aging as "the number of seniors aged 65 and over is projected to almost double from 2.4 million, or 16.9 percent of [the] population, in 2018 to 4.6 million, or 23.4 per cent, by 2046" (Ontario Ministry of Finance, 2018, p. 4). In 2025, the population of seniors aged 65 and over will have increased from 17.38 percent in 2019 to 19.4 percent, comprising of approximately 3.1 million (Ontario Ministry of Finance, 2018). That would be an increase of 733,000 seniors aged 65 and over that health system decision-makers would need to consider when planning for health care services in the future (Canadian Institute for Health Information, 2011). The challenge will be to find the appropriate use of hospital care, long-term institutional care and community care for older patients (Canadian Institute for Health Information, 2011).

The fundamental reality of population growth means that more money will be spent on healthcare as the population lives longer, get sicker, and lives while managing multiple comorbidities (TXCIN, 2019). There has been a recent push from inpatient to outpatient medical care, and as the aging population continues to accelerate, Canada will desperately need to push further and invest into at home care (Canadian Institute for Health Information, 2011; Russell, 2017). This would need to include everything from outfitting residences with assistance devices to help with cooking, or access virtual care programs monitored by health care professionals (Russell, 2017).

As Jane Philpott acknowledged, the aging population will have implications on health-care and raises concerns to the sustainability of our system (as cited in Russell, 2017, p.5). The hospital will be faced with strategic decisions to provide services that reduce frequent and return visits to the emergency department, avoid inpatient admission, and avoids gridlock bed flow.

Risk Statement: The aging population is being cared for by an increasing number of workers who themselves are growing older and retiring (Statistics Canada, 2019). As a result, employers may be forced to compete for staff from a limited pool of human resources (Canadian Institute for Health Information, 2011).

Background: It is widely understood that industrial countries such as Canada has an aging population that may have many consequences for the labour force (Statistics Canada, 2019). As Statistics Canada (2019) points out, the number of younger workers in health occupational categories increased by 77 percent from 1996 to 2016, however the number of older workers more than quadrupled +334 percent (Statistics Canada, 2019). That means that workers who are providing care to an increasingly older population are themselves aging and may soon require increased medical care (Statistics Canada, 2019). "Among female registered nurses and registered psychiatric nurses, 1 in 5 were aged 55 and over in 2016, compared with 1 in 10 in 1996" (Statistics Canada, 2019, p. 4). To give context, the health occupations with the largest shares of workers aged 55 and over in 2016 were specialist physicians (31%), dentists (30%), general practitioners and family physicians (29%), and nursing co-ordinators and supervisors (26%). This spread of percentage of employees aged 55 and over displays the professions at risk of facing high numbers of retirees.

High volumes of physician retirees are not favourable as physician remuneration has already been subject to inflation, as average weekly wages grew faster than any other health and social service workers during the past decade (Canadian Institute for Health Information, 2011). Additionally, between 1998 and 2008, hourly paid hospital employees wages index increased by an average of 3.4% per year (Canadian Institute for Health Information, 2011). In comparison to increases in general economy, health sector wages grew at an increased annual rate as there continues to be an increased demand for health professionals in hospitals, and employers as governments compete for a limited pool of human resources (Canadian Institute for Health Information, 2011).

The hospital may face human resource shortages as increased numbers of staff retire. Strategies may need to be put in place to recruit and retain younger staff in preparation.

Changing Government Regulations

Stagnant Dynamic

Political

Risk Statement: The upcoming provincial election in 2022 may impact current legislation that pertain to healthcare delivery models (Cohn, 2019). In addition, time and resources dedicated to establishing the Ontario Health Team may not be utilized for future development.

Background: Cohn, (2019) a reporter for the Toronto Star is quoted stating "Rarely has an Ontario premier fallen so far, so fast, so soon" (p. 1). In the June 2018 provincial elections, Ontarians were motivated by the impulse to defeat the previous Liberal government after nearly fifteen years in power (Cohn, 2019). After a string of five public opinion surveys showed that the province turning sharply against Doug Ford, it was clear that former PC supporters having profound second thoughts (Cohn, 2019). Ford's "favourability rating" is currently -53.5 percent (Cohn, 2019). That is 20 points lower than the rock bottom rating Kathleen Wynne had prior to the June 2018 election that essentially wiped out the Liberals (Cohn, 2019).

As stated in the above risk Resistance to Mergers the massive overhaul of the health-care system in Ontario came into effect in June under the Connect Care Act (Frketich, 2019). The restructuring announced in February of 2019 confirmed that a new super agency called Ontario Health would be in charge of the entire health-system (Grant, 2019; Frketich, 2019). The extensive time and resources that have been spent preparing and planning proposals to form the Hospitals Ontario Health Team may be at risk if the upcoming 2022 provincial election results in changes to the Connect Care Act.

Changing Sector Coverage	Public Private	Political

Risk Statement: Public-sector health care spending in Canada has continued to rise. Its growth has raised questions about the fiscal sustainability of public health care, as over the last decade the public sector accounted for 70% of the total health care bill. Changes in political viewpoints and population influences may result in a shift toward private sector delivery with reduced public sector funding (Canadian Institute for Health Information, 2019).

Background: As stated in the above risk Resistance to Mergers the massive overhaul of the health-care system in Ontario came into effect in June under the Connect Care Act (Frketich, 2019). The restructuring was announced in February of 2019 when Health Minister Christine Elliott confirmed that a new super agency called Ontario Health would be in charge of the entire health-system (Grant, 2019; Frketich, 2019). Although the word private has not been uttered yet, "the sweeping restructuring of Ontario's health-care system has that word on the lips of some of the government's most vocal critics" (Frketich, 2019, p.1).

Regardless, Canada's health care system is funded by both public and private sector funding; government and private insurance and out-of-pocket payments respectively (Canadian Institute for Health Information, 2011). Over the last decade, the public sector accounted for about 70 percent of the total health care bill (Canadian Institute for Health Information, 2019). "Public-sector health care spending in Canada has continued to rise, and this growth has raised questions about the fiscal sustainability of public health care" (Canadian Institute for Health Information, 2011).

Despite the Conservatives denial of tipping funding toward privatization, in an attempt to tackle hallway medicine the Ford government did open up home care for competitive bidding, which resulted in the private chain companies very quickly taking over almost all of home care (Crawley, 2019; Frketich, 2019). As demands increase and instability in public-finding grows, there is a risk that more public dollars will be pulled out of front-line health-care delivery, and placed into the pockets of for-profit corporations (Horwath, as cited in Frketich, 2019).

Gun Regulations	Restriction Possession	Political

Risk Statement: Evidence shows reducing access to guns through regulations saves lives and decreases the burden of injury (Rocca, 2019). As gun laws remain unchanged, patients are at risk of accidental harm or acts of violence (Rocca, 2019). This may place a greater demand on the hospital to provide safe and timely care in the event of a mass casualty.

Background: October 2018, the American College of Physicians (ACP) clarified its stance on gun control and public health by offering nine evidence-based strategies to help reduce firearms-related injuries and death by keeping guns out of reach from those at risk for harming themselves or others (Lichtin & Scott, 2019). This led to a tweet from the National Rifle Association criticising ACP's position stating that "someone should tell self-important antigun doctors to stay in their lane" further initiating the #ThusIsOurLane movement by Clinicians who have cared for victims of gun violence (Lichtin & Scott, 2019, p. 1).

The City of Toronto has been working to combat gun violence as data from the local police shows the city has been battling more shooting to date than in recent years (Cousins, 2019).

The 2019 statistics on gun violence shows that it is a public crisis and national tragedy; one that demands action from leaders in political power (Dowling, 2019). In April 2019, healthcare professionals aimed to gain the attention of political leaders by rallying throughout the country as a "national day of action." (Rocca, 2019). Their purpose, to influence stricter gun control laws in Canada (Rocca, 2019). Dr. Najma Ahmen, a surgeon working out of St. Michaels Hospital at the time of the Danforth mass shooting stated "A now abundant and international body of medical evidence shows that reducing access to guns through regulations saves lives and decreases the burden of injury … We do not have to wait for another tragedy to act" (as cited in Rocca, 2019, p. 2).

Dr Alan E. Lichtin echoes his worry as gun violence being a worrisome cultural phenomenon when he states;

"people who are shot, depending on the part of the body, can require massive amounts of blood for transfusion. Blood is a resource that is not readily available in many locations. Blood banks are good about providing blood, but one gunshot wound to the liver, for example, can deplete a blood bank." (as cited in Lichtin & Scott, 2019, p. 2).

Gun violence (and suicide) can also stem from mental health issues, and can further perpetuate mental trauma as place greated demand on health systems (Lichtin & Scott, 2019). The hopes from healthcare organizations are to influence gun law control measures and to ban handguns and assault rifles all together (Rocca, 2019).

| Governance | Partitions Mergers | Legal |

Risk Statement: There is growing recognition that moving towards a patient-centered care model will require changes to governance structures as organizations merge (Community Health Ontario, 2018; Ontario, n.d.). These mergers may impact the hospitals financial health and increase liability cases (Community Health Ontario, 2018; Ontario, n.d.).

Background: Under the new legislation (Connected Care Act), the Ministry of Health and Long-Term Care has provided open invitation to providers across the full continuum of care to submit proposals demonstrating their readiness to become an Ontario Health Team (OHT) (Ontario, n.d.). OHTs are groups of providers and organizations that are fiscally and clinically accountable for delivering a full and coordinated continuum of care to a subset of the population in a geographical area (Ontario, n.d.).

Evidence has shown that breaking down existing silos and moving health structures towards integration would result in improved patient experiences, reduced morbidity and mortality and decreased patients' length of stay in hospitals (Baker & Axler, 2015). However as patients move along an integrated continuum of care, partners in the OHTs may have difficulty identifying liability in the case of an adverse patient outcomes. Mergers will require clear contractual relationships to ensure patients and providers are adequately and clearly covered through the Hospital insurance coverage.

If the Hospital becomes successful in forming their OHT, its financial health may be impacted as it pays corporate lawyers to establish clear contractual relationships, and may also result in increased insurance premiums as the Hospitals OHT provides services to a broader population, with a widened set of providers.

Rise in Malpractice Claims	Rare Common	Legal

Risk Statement: As practice and system of medicine evolves towards patient centered care, patient satisfaction has been determined as a very effective indicator for medical malpractice claims (Bhanu, 2010). As hospitals become equipped with the latest facilities, the availability of high quality information improves, patients become more aware of third-party payers (insurance companies), and patient expectations rise, we may see an increase in medical malpractice claims that may impact the hospitals financial health and staff wellbeing (Bhanu, 2010).

Background: The health system and the practice of medicine has evolved over the centuries as care delivery has moved away from the traditional concept of a noble profession and towards a service industry (Bhanu, 2010). Patients (as described in the above risk Patient as a Consumer) see themselves as consumers; as purchasers of health services (Bhanu, 2010; Meill & Ericson, 2012). Patients also have a vast repository of health information through the world wide web, have a higher expectation of the care they receive, and as predicted have been taking more ownership of their personal health (Bhanu, 2010; ThinkResearch, 2019). Lastly, patients have become more aware of third-party payers such as insurance companies and are more likely to pursue litigation for unsatisfying results (Bhanu, 2010).

Patient satisfaction is a commonly used indicator for measuring the quality of health care delivered (Bhanu, 2010). It also has an inverse correlation with medical malpractice claims (Bhanu, 2010). If patients are satisfied, the likelihood of the hospital and its physicians being served a statement of claims is reduced. Subsequently if patients are not satisfied, the likelihood of the hospital and its physicians being served with a statement of claims is increased. As a result, fearing malpractice lawsuits, many physicians significantly drive up healthcare costs by ordering unnecessary tests and treatments (TXCIN, 2019).

As Siwicki (2017) states, 2018 was the year of strategic patient experience. The hospital will need to educate both patients and clinicians on how to deliver safe, high quality care, maintaining patient satisfaction while not resulting in unnecessary testing (Siwicki, 2017).

Questionnaires

Up to this point in the study, horizon scanning as a foresight method was applied to identify risks to the Hospital, whereby the environment external to the hospital was scanned at a five year horizon in forces that impact healthcare. The aim has been to address the second research question *"How might we use foresight methods to identify risks in healthcare?"* Now that the potential future risks were identified, we could work on answering the primary research question *"How might the delphi method work as a foresight tool for identifying risks in an acute care setting?"* To recap, there are four necessary features that characterize the delphi method and allow it to develop consensus; anonymity, iteration, controlled feedback of the participants judgements, and statistical aggregation of the participants responses (Rowe & Wright, 2001). Firstly, the questionnaire was on an online platform, where respondents were anonymized, and secondly there were two rounds to the study that provided iteration.

The first questionnaire was titled "Risk Identification using the Delphi Method." An example of the first two pages of the questionnaire can be found in Appendix A - Methodology And Data Collection. The questionnaire comprised of both closed and open ended questions, set to seek both quantitative and qualitative responses to the seventeen risks; likelihood and impact scores and rationale respectively. The questionnaire contained eighteen pages and 52 questions, 51 of which were mandatory. Each page contained the risk name, risk statement with corresponding likelihood and impact questions that asked participants to rate their ratings on a five point Likert scale; 1-very low to 5- very high. Respondents were required to give a rationale to their risk rating. Three mandatory questions per risk resulted in 51 questions, as the study had identified seventeen potential future risks (3x17=51). On the last page participants were asked to list any risks that were missed. The open ended questions asked to collect the rationales for participants rating scores, would later be used as pivotal rich data for the next iteration or round of the questionnaire.

A second questionnaire was created for the second round titled "Risk Identification using the Delphi Method - Round 2." An example of the first two pages of the second questionnaire can be found in Appendix A - Methodology And Data Collection. The intent was to find convergence of opinion and quantification of earlier findings strictly through rating or ranking techniques (Powell, 2003).

Thus the second questionnaire contained eighteen pages and 35 questions, all of which were mandatory. The second and subsequent round was more specific, with the questionnaires seeking further quantified findings of the likelihood and impact ratings (Powell, 2003). Each page contained the same risk names, risk statements with corresponding likelihood and impact questions that asked participants to rate their ratings on a five point Likert scale with the additional option of selecting "no change." As respondents would be required to re-rate their likelihood and impact ratings based on their previous responses, a "no change" option was provided in case participants wanted to keep their original answers. The "no change" function was also meant to help the investigator easily identify if the respondents answers were different between iterations. As each risk had two mandatory question, the second round had 34 questions (2x17=34). The 35th question was mandatory as it asked participants to enter their anonymous identification for tracking purposes.

At this point there were still two necessary criteria to meet, in order to run a valid delphi method; iteration and controlled feedback. In the next chapter those two features are discussed as the management of the questionnaire is extrapolated. Additionally, analysis is conducted on the findings, the delphi method itself, along with three proposed strategies to operationalize horizon scanning and the delphi method at the Hospital.

Findings

In the previous chapter we provided an extensive review of the scanning that led to seventeen future risks, and spoke in detail about the two questionnaires that made up the delphi method. In this next chapter we look at findings from the rounds of the delphi questionnaire, the data analysis and synthesis techniques used, the final taxonomy of risks, along with an analysis of the delphi method itself, its applicability at the hospital in the future, and potential post study opportunities.

- Review and Analysis
- Findings
- Applicability
- Foundational Strategies
- Operational Strategies

Findings

Review and Analysis

In order to conduct the first round of the delphi, twenty five staff comprised of Senior Leaders (VPs and CEO) and Directors were sent invitation letters to recruit participants to the study. Out of the 25 invited participants, ten participated in the survey, however seven completed the full survey. Thus the sample size of the study was seven (n=7). The survey ran for twelve days and was taken offline. Of the seven respondents, five were able to complete the first found in one seating. Two started the survey and came back to complete it at a later time or date. For those who completed the survey in one seating, the mean time to completion was 0:33:12 and the median was 0:30:07. The first round of surveys ran for a longer period of time than anticipated, however as Rowe and Wright (2001) suggested, responses from five to seven experts with disparate domain knowledge would suffice. Once the participant spread (sample) met that criteria, the survey was taken offline.

Upon completion of the first round, the data was exported and synthesized. As Rowe and Wright

(2001) suggests, controlled feedback was provided to the participants to read and reflect upon prior to the completion of the second round. The feedback report contained the statistical aggregate of the risk ratings along with the participants rationales laid out in a manner where each page of the report contained the risk title, risk statement, and then the ratings with rationale sorted from highest risk to lowest. As Powell (2003) suggests "participants should also be given an indication of where their scores were placed in relation to the overall picture" (p. 379). Thus, the respondents answers were highlighted in colour which allowed them to see visually where their risk ratings ranked amongst the group of respondents, and if they were in consensus with the group or not. Lastly each page contained a bar graph visually displaying the likelihood and impact results. Typically, content analysis techniques are used to identify the major themes generated by the initial unstructured questionnaire (Rowe & Wright, 2001). However, for this study none of the respondents rationale were manipulated or summarized for the report. The respondents read the rationales just as the respondents had entered them. The intent was to avoid any potential of the investigator manipulating or biasing the results. Considering all measures were taken to maintain anonymity, this method

of providing raw rationale data to the participants did not reveal participants identities, and did not breach confidentiality. An example of the first two pages of a synthesized report can be found in Appendix A - Methodology And Data Collection.

Invitations to the second round of the delphi method were sent five days after the first one was completed and taken offline. This completed the fourth feature; iteration (Rowe & Wright, 2001). The sample participants from the first round were sent invitation letters along with a summary of the responses from the first round. Only the seven participants that completed the first round received an invitation to the second round. The intent was to ensure all participants of the second iteration had full awareness of the discussions around the risks and the rationales to the ratings. The survey ran for fourteen days and was taken offline. Total study time from the start of the first round, to the completion of the second round was 32 days. Of the seven respondents from the first round, five responded to the second round. Thus the survey had a dropout rate of 28.5 percent. For those who completed the survey in one seating, the mean time to completion was 0:10:09, and the median was 0:12.59. Fourteen of the risks had their likelihood and/or impact scores adjusted in the second round. The three risks with unchanged

scores were Resistance to Mergers, Changing Sector Coverage and Risk in Malpractice claims as respondents had consistent rationale. Upon completion of the study, each participant received the final futures risk registry, along with the final report of this study.

Findings

The findings of the questionnaire resulted in a likelihood and impact rating for each risk, along with robust rationales behind each participants choices. Out of the seventeen risks rated upon, eleven reached consensus and formed the futures risk registry, which can be found in Figure 8 on page 46. The method to objectively assess consensus is explained in the following paragraph. The rationales for the eleven risks that made up the futures risk registry are summarized below.

A copy of the final likelihood and impact ratings of each risk, along with the final risk rating can be found in Appendix A - Methodology And Data Collection. Ratings in white are ones that respondents chose not to changes from the first round to the second. Ratings highlighted in yellow are the risks that were changed by the respondents from the first round to the second. Ratings highlighted in grey are from the two respondents that did not participate in the second round.

Their answers from the first round were carried over into the second, and were accounted for when analysing consensus.

Consensus for each likelihood and impact rating was reached if four out of the seven participants agreed on the same rating. If three participants agreed on one rating, three others on another rating, and one on a third rating, then it was considered a draw and the higher rating out of the two was chosen. The rules on reaching consensus is provided in Figure 6 and an example of each risk rating outcome in Figure 7. The rationale for utilizing a draw option was that it was clear the participant's felt the risk was viable, however further clarity on consensus needed to be reached through a third round. The study was limited to two rounds, as a result risks with draws were rated with the higher rating; an example of which is seen in the risk *Rise in Malpractice Claims* in Figure 7. If the participants were unable to reach consensus or a draw on a likelihood or impact rating, the result was deemed as irreconcilable. An example of which is seen in the risk *Resistance to Mergers* in Figure 7. Final risk rating scores were obtained by multiplying the likelihood score with the impact score. Both likelihood and impact scores needed to reach consensus to have a final risk rating. Risk that had scores were separated into

four categories (if applicable), Low, Medium, High and Very High. Risks that were irreconcilable did not receive a final score, and were not placed on the futures risk registry. They can however be found in the Irreconcilable Risks in Figure 9 on page 53.

Rating Results		Consensus or Irreconcilable
4 participants agreed on one rating	=	**Consensus Reached:** Resulted rating score was the one which the 4 participants agreed on
3 participants did not agree		
3 participants agreed on one rating	=	**Consensus Reached through a draw:** Resulted rating score was the higher of the two ratings agreed upon
3 participants agreed on another rating		
1 outlier		
Any other combination of risk ratings	=	**Irreconcilable:** Unable reach consensus

Figure 6: Rules on Reaching Consensus

Risk Name	Aging Population		Rise in Malpractice Claims		Resistance to Mergers	
Rating	L	I	L	I	L	I
R1	VH (5)	VH (5)	H (4)	H (4)	VH (5)	VH (5)
R2	VH (5)	H (4)	H (4)	H (4)	H (4)	M (3)
R3	H (4)	VH (5)	H (4)	M (3)	M (3)	H (4)
R4	H (4)	VH (5)	M (3)	H (4)	M (3)	H (4)
R5	H (4)	H (4)	M (3)	M (3)	M (3)	M (3)
R6	VH (5)	VH (5)	M (3)	M (3)	L (2)	L (2)
R7	H (4)	H (4)	L (2)	H (4)	M (3)	H (4)
Consensus	H (4)	VH (5)	Draw H (4)	H (4)	M (3)	N/A
Risk Rating	Very High (20)		High (16)		Irreconcilable	

Likelihood (L), Impact (I) Very High (VH), High (H), Medium (M), Low (2), Respondent (R)
Figure 7: Example: Application of Consensus Rules

Futures Risk Registry

Agreed upon by means of the delphi method, whereby Senior Leaders of a community acute care hospital reached consensus on the potential of eleven out of seventeen risks that may pose a threat to the hospital in 2025.

Risk Name	Risk Statement	Risk Rating
Aging Population	The aging population and increase of patients with chronic diseases and comorbidities may increase demand and lengthen inpatient admission days, impacting flow throughout the hospital causing gridlock status.	Very High (20)
Human Resource Shortage	The aging population is being cared for by an increasing number of workers who themselves are growing older and retiring. As a result, employers may be forced to compete for staff from a limited pool of human resources.	High (16)
Data Integrity	Integration, unification and merging of health care services may impact data integrity and quality of digital patient health information systems, as clinicians and decision support teams struggle to keep patient records coherent, and to maintain unified files across multiple applications. Loss of data integrity may result in adverse events to patients, missed essential information pertaining to care, data breaches, violations to privacy legislation, missed revenue and inaccurate claims data.	High (16)
Changing Government Regulations	The upcoming provincial election in 2022 may impact current legislation that pertain to healthcare delivery models. In addition, time and resources dedicated to establishing the Ontario Health Team may not be utilized for future development.	High (16)
Rise in Malpractice Claims	As practice and system of medicine evolves towards patient centered care, patient satisfaction has been determined as a very effective indicator for medical malpractice claims. As hospitals become equipped with the latest facilities, the availability of high quality information improves, patients become more aware of third-party payers (insurance companies), and patient expectations rise, we may see an increase in medical malpractice claims that may impact the hospitals financial health and staff wellbeing.	High (16)
Gun Regulations	Evidence shows that reducing access to guns through regulations saves lives and decreases the burden of injury. As gun laws remain unchanged, patients are at risk of accidental harm or acts of violence. This may place a greater demand on the hospital to provide safe and timely care in the event of a mass casualty.	High (12)
Patient as a Consumer	Patients see themselves as consumers; as purchasers of health services. By providing greater information, access and autonomy, we are treating patients as in control, typically proactive and well-informed consumers. However patients may not have all the tools to make the best medical choices. As consumers in the driver's seat, patients may demand and receive inappropriate treatments and may inappropriately utilize healthcare services.	Medium (9)
Predisposed Ethnic Diseases	Results from the 2016 population census showed that 67% of the population the hospital serves are Asian; comprised of south, south east and south west Asians. This may place a greater demand on the hospital to acquire services that it does not currently provide in order to deliver timely care for culturally predisposed conditions. For example, south Asian people in Canada have higher rates of heart disease, double the rate of diabetes and are more prone to becoming overweight.	Medium (9)
Governance	There is growing recognition that moving towards a patient-centered care model will require changes to governance structures as organizations merge. These mergers may impact the hospitals financial health and increase liability cases.	Medium (9)
Predictive Data Analytics	Predictive analytics has become increasingly useful in operational management, personal medicine and epidemiology, however may result in ethical and moral hazards and increase liability cases as providers believe they are protected by a machine perceived as being accountable. Example: Artificial Intelligence (algorithms) helping to diagnose diagnostic imaging results.	Medium (8)
Technological Advancements to Healthcare	Advances in medical technology can both increase efficiencies in health care delivery, and also encourage unnecessary utilization of expensive treatments due to an existing fee-for-service model	Medium (6)

Figure 8: Futures Risk Registry

Within the following pages are the seventeen risks upon which consensus was reached. The risks are displayed in order from highest risk rating to lowest. Each risk contains its name, the corresponding STEEP+L force, and the final likelihood, impact and risk rating scores. Additionally the rationales provided by the participants in the study were sewn together and displayed with the risk to form a supportive statement for the final risk rating.

Aging Population		Environment
Likelihood **High (4)**	**Impact** **Very High (5)**	**Risk Rating** **Very High (20)**

Rationale: The baby boomer tsunami has been discussed for years. It is coming and is already having significant impacts to healthcare systems, as elderly patients are blocking acute inpatient beds due to lack of resources in the community. Hospitals are going to be paralyzed because they cannot move patients who should not be in the hospital. Ontario has one of the lowest bed counts per 100 thousand individuals, and solutions designed to reduce pressures in acute care facilities are not being implemented fast enough. If the focus is not shifted out into the community for sustainable solutions, hospitals will face increased lengths of stays and continue to create gridlock in hospitals and not provide the appropriate level and type of care to patients.

Human Resources Shortage

Likelihood High (4)	Impact High (4)	Environment
		Risk Rating **High (16)**

Rationale: Currently there is a shortage of Registered Nurses (RN) due to static enrollment and competition among resources. People gravitate to centres that provide the most fulfilling work experiences. With the application of economic supply and demand principles, healthcare professionals will pursue careers in areas they know have good job opportunities. There is also a shortage of Personal Support Workers (PSW) as they are difficult to retain due to the laborious and risky scope of work for low pay. Healthcare has tried to save on staffing costs by pushing for more Registered Practical Nurses (RPN) and PSWs as they are paid lower wages, however the cost of living has risen and the salary of an RPN and PSW is not sustainable. Theses factors have resulted in a lack of local expertise and skill in community spaces needed to reduce the ALC population, creating gridlock in Hospitals. Hospitals will need to be magnets for talent in order to recruit and retain staff.

Data Integrity

Likelihood High (4)	Impact High (4)	Technology
		Risk Rating **High (16)**

Rationale: We have been talking about health record integration for many years and still have not been able to move the needle on it. This risk would require significant Provincial leadership and investment to link electronic health records (EHR) and protect data integrity; resources that most likely will not be allocated. Thus, there is doubt that this risk will improve by 2025. Service providers will continue to work towards integration and provide seamless and appropriate care, which as a result of having multiple EHRs will lead to disparate records, transcriptions errors, patient safety risks, liability claims and so forth. There are currently issues integrating data from different systems. This risk is expected to continue to be an issue in the future.

Changing Government Regulations		Political
Likelihood **High (4)**	**Impact** **High (4)**	**Risk Rating** **High (16)**

Rationale: The current government is pushing privatization which would have huge ramifications in the next election cycle. There are however three years left, and a lot of changes will be made before then. The Ontario Health Teams for example will be too far along to undo after the next provincial election. Organizations in the OHTs have been collaborating for years and will continue regardless of the change in the government. When it comes to an election though, the various parties approach healthcare delivery differently, and healthcare is often used as a platform to display change/contrast post elections. Changing government regulations would create a more unstable environment for healthcare, fostering uncertainty and lack of trust overall.

Rise in Malpractice Claims		Legal
Likelihood **Draw - High (4)**	**Impact** **High (4)**	**Risk Rating** **High (16)**

Rationale: We are living in an increasingly litigious society. Lawsuits are on the rise and are publicized incentivising individuals to sue. As patients become more informed and aware, risk does present itself in a likelihood of increased claims. Increased cautiousness will slow efficiencies and prevent common sense and clinical judgement from prevailing. If claims increase, insurance costs will also rise impacting Hospitals financial health.

Gun Regulations		Political
Likelihood **High (4)**	**Impact** **Medium (3)**	**Risk Rating** **High (12)**

Rationale: There seems to be little political appetite to actually change gun laws for fear of losing the right wing vote. The provincial government is not looking to make any changes, and if the conservatives are elected they will not make changes on a federal level either. Similar to healthcare, gun regulations are a highly contentious topic pre and post election. Therefore, given the fast rising use of gun violence in the GTA, the risk is high. Additionally. the risk of an all mass casualty event seems to be on the rise, and the Hospital is in an area that is becoming more densely populated at a fast rate. Our risk for a severe event involving an active attacker or a terrorist attack will only increase moving forward. Solutions are not visible on the horizon.

Patient as a Consumer		Social
Likelihood **Medium (3)**	**Impact** **Medium (3)**	**Risk Rating** **Medium (9)**

Rationale: Healthcare providers report now that consumers are more informed and apt to drive their care and make demands based on information that is not necessarily based on evidence, for example google. Physicians and nurses are not equipped to have "push back" conversations in busy, fast paced healthcare settings like hospitals. Therefore patients may demand testing when they do not require any. It is easier and more efficient to do as the patient asks. If the volume of patients outweighs capacity, quality and safety are jeopardized. Also, Physicians want to protect themselves from potential liability cases if they do not listen to patients advocating for themselves. Costs, inappropriate use of human and fiscal resources and the application of best practice will be challenged with this risk. Providers will need to continue improving on not conducting unnecessary tests on patients, and push back using choosing wisely and best practice algorithms to back them up.

Predisposed Ethnic Diseases

Social

Likelihood Medium (3)	Impact Medium (3)	Risk Rating Medium (9)

Rationale: Hospitals are now moving towards a population health approach with prevention as part of the solution. The hospital is aware that the community it is serving is ethnically diverse, and leaders are talking about the implications and inherent risks this poses. A multi-year clinical service plan has been developed to support decision making processes. Education is key and wrap around services such as utilizing pharmacists and primary care to lessen the burden in hospitals in the future. The hospital will continue rolling out its current strategy targeted at prevention of visits, admissions and readmissions to keep the likelihood at a medium. The hospital will need to be intentional about the services it offers to be able to mitigate the need and anticipated growth in each of these ethnic communities.

Governance

Legal

Likelihood Medium (3)	Impact Medium (3)	Risk Rating Medium (9)

Rationale: Mergers and governance is key to strategic direction overall for organizations. This would be a significant uncertainty that would need to be accounted for in order to be able to provide a service that others cannot, and that we can adapt to. There are big impacts on shared governance models, and with the mandate to move to OHTs, change will be needed and broad. The Hospital as the biggest player may have the least risks in terms of governance changes in the OHTs. Other jurisdictions have regional health authorities without adverse outcomes. Thus, Ontario can apply learnings from other jurisdictions across Canada and the world. One caveat is that even though there is an appetite for patient centered care from nurses and allied health professionals, not one hospital in the GTA truly practices patient-centered care. Until we get radially innovative, we will remain as our current provider centred care.

Predictive Data Analytics		Technology
Likelihood Low (2)	**Impact** Draw – High (4)	**Risk Rating** Medium (8)

Rationale: Overall this is a positive, but the downside is that we make mistakes because we become too heavily reliant on artificial intelligence (AI) and technology. If the analytics are wrong, the severity will be high. However providers will not rely solely on AI, as the technology will just be one tool in their toolbox. Healthcare providers are typically skeptical of AI replacing sound clinical judgement. Predictive analytics will have a larger influence on the health care system in the future, but the publicly funded system is slow to change. Thus this risk does not pose an immediate or even medium term issue.

Technological Advancements to Healthcare		Technology
Likelihood Low (2)	**Impact** Medium (3)	**Risk Rating** Medium (6)

Rationale: There is no evidence that providers are truly choosing wisely in the ordering of available tests. The current system is driven by fee for service models for physician groups. As long as providers are paid a fee for service to read and report on tests, there will continue to be a rise in utilization. This will be very difficult to change. As a case costing Hospital, the Hospital monitors its costs for each treatment closely to ensure the best practices and appropriate treatments are being proposed. Technology is also expensive, and because of that expense, the Hospital does not invest until it absolutely needs it. The treatment to patient presentation needs to be monitored on an ongoing basis to reduce risks to human and fiscal resources moving forward.

Irreconcilable Risks
Remaining risks that participants did not reach consensus on. The irreconcilable risks would be revisited in subsequent rounds if time permitted until consensus was reached

Risk Name	Risk Statement
Inappropriate Utilization of Health Services	Patients who cannot access family doctors or community care providers in a timely manner may choose to seek treatment from higher cost providers (such as hospital emergency departments), which may result in inappropriate utilization of healthcare services.
Evolution of Disorders/Self Destruction	The patients we serve are living in an environment where technological advancements are co-created without a fulsome understanding of their co-destructive consequences. For example, adolescents experiencing negative psychological symptoms due to social media, or rise in patients suffering from lung injury due to e-cigarettes. Disorders impacting patients are evolving and may lead to negative outcomes, as the hospital may not currently provide the services in order to deliver timely care to patients.
Inflation	Health-sector price inflation has been well above the rate of general inflation for core medical services. Inflation rates may continue to rise as hospitals compete for limited drug supply and/or medical supply.
Resistance to Mergers	Within a fragmented care delivery model, providers are paid for volumes and performance rather than patient outcomes. This may generate little financial incentive to coordinate or merge with other care providers to deliver patient centered care.
Fee for Service Funding Model	Rather than Choosing Wisely, reimbursement under a fee-for-service model may generate strong incentives to perform higher volumes of tests and services, regardless if those services contribute to a broader effort to manage care, or improve patient outcomes
Changing Sector Coverage	Public-sector health care spending in Canada has continued to rise. Its growth has raised questions about the fiscal sustainability of public health care, as over the last decade the public sector accounted for 70% of the total health care bill. Changes in political viewpoints and population influences may result in a shift toward private sector delivery with reduced public sector funding.

Figure 9: Irreconcilable Risks

Applicability

The analysis and applicable strategies are broken down into four categories and discussed in the next section. Firstly, this section discusses the tangible futures risk registry that can be used by any comparable organization. Next, both the horizon scanning and the delphi conducted in this study are compared with the Hospital's current IRM Program. Also, discussion on opportunities of both techniques are outlined for comparable acute care hospitals to adopt. Lastly, strategic options are provided that risk teams may adopt to operationalize the findings of this study.

Future Risk Registry

The outcome of this study was a list of eleven risks agreed upon by Senior Leaders of an acute care hospital located in Ontario with approximately 330 beds. The horizon scanning was conducted for the healthcare arena and tailored for audiences such as hospital staff in leadership positions, risk management teams, and health care insurers. As a result, the completed registry can be applicable for any comparable organization and/or stakeholder that fits the audience profile. As the Hospital's risk registry will be subject for renewal in the first quarter of the 2020/21 fiscal year, the risks

resulting from this study will be suggested and discussed. If the Hospital decides to utilize the risks on the final list, then each risk will be assigned to an executive lead, a board committee, and teams will strategies and implement action items to mitigate the risk. Utilizing the risks from the future risk registry would be of benefit to the Hospital considering it was vetted and created by its senior leaders. Additionally, as discussed utilizing a future risk registry that has been developed by horizon scanning the external environment, will be of benefit to the Hospital's longer-term objectives regarding strategic directions and risk management (Charest, 2012).

Foresight

To recap, the Hospital's current risk identification sources are the incident reporting system, previous risk registries, HIROC's taxonomy of risks and hospital leaders (focus group sessions). The Hospital's current IRM program contains a quarterly cycle, that starts with the identification of risks and formation of the risk registry in the first quarter of each fiscal year. The process involves focus group sessions facilitated by risk team members with interdisciplinary stakeholders. The sessions, held over a two month period are comprised of an initial education session whereby participants review

the HIROC IRM documents, then participate in a discussion of risks and issues. Once all the risk data is collected, the risk team identifies trends and themes and establishes a draft risk registry. The risks are brought back to each of the teams to be rated. The final draft is then presented to SLT for approval. Once approved the risks are assigned executive leads and are presented to each of their corresponding boards; for example the Quality Board would be accountable for any patient safety risks, or the Planning and Development Board would be accountable for any infrastructure risks. The risks are revisited each quarter with interdisciplinary teams, whereby new emergent risks may be added to the registry.

In the study risks were identified by conducting independent external horizon scanning over the course of two months. Once the seventeen risk were identified, the draft futures risk registry was formed and participants were engaged to rate on the risks via the delphi questionnaire. In comparison to HIROCs (2017) taxonomy of risks that is referenced and imbedded in the Hospital's routine IRM process, the literature review conducted for this study offered a wider external scan of forces, as it encompassed future trends that may impact the Hospital from various sectors. However, due to limited study

time, the scan and risk identification were completed by a single person. Thus the scrutiny and assessment of the literature review was biased based on one individual's sense making and background knowledge. It was not vetted and did not contain the filtered analysis of the team of expert leaders, and also did not contain the robust knowledge of the historical claims and risk registry data that HIROCs taxonomy of risks provides. The scanning also required dedicated time and concentration as the process is labour intensive.

The benefit of the external horizon scan is that it ensures the hospital is aware and prepared for both internal and external risks. As Choo (1999) states, scanning supports the Hospital to strategize its future course of action. For applicability purposes within a Hospital setting, risk management teams can set up and connect with external sources to conduct scanning on a routine basis. This strategy will put processes in place to maintain knowledge and awareness of the environment subject to the Hospital. Some examples would be to follow social media channels for updates on local news, emergency events and services, ministry updates and legislative changes (Bloome, 2019). Other examples would be to subscribe to websites of interest, join communities of practice and set google alerts to track topics of interest that may

bring insights to trending risks (Bloome, 2019). The outcome would be awareness of the external environment at all times as a result of a sustainable operationalized processes that routinely scan the horizon. Summaries of emergent trends can be sent out to the hospital or leadership staff through monthly risk newsletters, or posted on an internal dashboard. The knowledge on future trends may empower leaders to incorporate external future factors when thinking of risks to the Hospital, and may ultimately richen the discussions around risk.

Another strategy would be to imbed a risk rating matrix into incident reporting systems, whereby Managers who follow up with the incidences can rate the likelihood and impact of the incident reoccurring. Additionally, incident reporting systems can be adapted to include risk identification forms, whereby frontline staff can input potential risks to the Hospital that have not yet occurred. Considering incident reporting systems are accessible to all staff, this strategy may have the potential for risk teams to obtain rich and informed feedback from all Hospital staff regarding risks, that they would not have been able to obtain otherwise. Dashboards that trend ratings for risks that have potential to reoccur can be created in the incident reporting system for risk teams to monitor.

Strategies such as continual horizon scanning and newly established inputs of data into the incident reporting systems, may result in expanded awareness of potential future risks. Risk teams may incorporate the newly gained knowledge when discussing and identifying trends through their Hospital IRM programs. For example, risks teams may discuss news articles or upcoming legislation changes, and leverage the participants experiential knowledge to filter through and identify any potential risks. Risk team may also generate discussion around influential external STEEP+L forces when identifying risks; especially ones with potential to impact the hospital in the near and far future. Modifying the discussions and framing around risks to external realms may empower stakeholders to start (or continue) thinking beyond the Hospital, into external environmental future risk spaces.

Delphi

The delphi proved to be an interesting technique to identify risks for the Hospital. The four necessary features that characterize a delphi were not difficult to uphold, and in fact provided an opportunity that sprouted interesting feedback. However, the largest contributor to receiving qualitative responses was the sheer fact that the participants were required to

provide the rationale behind their ratings. This differs from group settings where participants are given the option to speak, and/or may not get the opportunity to provide their rationale, and/or may be faced with social pressures of conformity and noise. Additionally, in comparison to focus group sessions, the online anonymous questionnaire allowed the individuals to consider each risk based on merit alone, rather than based on dominant individuals ideas; a potentially invalid criteria (Rowe & Wright, 2001). The iterative feature of the study, along with the summary report (controlled feedback) gave the participants the opportunity to change their risk ratings in the second round, without fear of losing face in the eyes of others in the group (Rowe & Wright, 2001).

The delphi also provided an opportunity to collect data without running the risk of the facilitator influencing the outcomes. Risk management teams may not have staff who are trained in the art of facilitation. The risk identification may be different among teams based on how the facilitator engages and drives the discussion. Utilizing a survey method such as the delphi removes the facilitator from the interaction, and has a greater potential of receiving consistent results irrespective of who the facilitator was that ran the study.

Choosing the appropriate subjects was the most pivotal part of the study, however there was no exact criteria listed in the literature on delphi participant selection (Hsu & Sandford, 2007). The instructions on participant selection was limited to ensuring participants were knowledgeable about the subject at hand. (Hsu & Sandford, 2007). The participants of the study were comprised of Senior Leaders and Directors, who are experts in the various fields of healthcare; clinical operations, finance, information technology, transformation, and so forth. The participants provided a great mix of Hospital representation, however the sample size was much smaller than the size of participants in the Hospital's current IRM process. This was partly due to the fact that invitations to participate in the study were only sent to SLT and Directors, and did not include the Managers, Clinical Leaders or Professional Practice Leaders. It may also be partly due to the fact that Hospital staff are routinely invited to complete new surveys, and may be experiencing survey fatigue. There is also a potential that completing a survey is more labour intensive than participating in a sixty minute focus group session. The invitation to the study was also sent from the institutions email, which may have resulted in recipients deleting the email to avoid phishing or ransomware. Survey invitation may have also gotten lost in staff members inboxes

as they may be inundated with high volumes of emails. Regardless of the reason, the response or attendance rate to the study was 28 per cent, a number lower than what the Hospital generally sees when conducting its routine IRM program. In comparison, the 2019/20 fiscal first quarter focus group sessions included minimum 90 participants; a much larger sample size than the seven participants in the study.

Conducting the risk rating through the delphi on a survey platform provided an opportunity to bring the voices of varying interdisciplinary teams into one space. For example, within the Hospitals current IRM program, teams such as operational units, facilities, information technology, strategy, and so forth are brought together separately. The teams are not generally in one focus group session at the same time. The delphi provided the advantage of having interdisciplinary teams to review each others points of view and rationale to the risk ratings. Essentially it brought the different disciplines in one virtual room together, breaking down silos.

Considering the study was completed within 32 days, participants experienced a shorter downtime between the two engagement sessions for risk identification. For example, if participants completed the first round on the first

day, they had an approximate lag time of two weeks between the first and second rounds. Participants who completed the first round on the last day, experienced a lag time of five days between the first and second rounds. The total study time was shorter than the usual two months, however, it would be difficult to deduce the stakeholders preference without their input. Considering the delphi was labour intensive, I would suspect the participants would have appreciated a longer lag period as they may have a number of competing priorities to navigate, prior to dedicating time to complete the second round. An applicable strategy would be to keep the questionnaire open for a longer period of time, however hospitals may have schedules for how long surveys may stay live for; as is the case for the study Hospital. The shorter stakeholder engagement and data collection period would be a big advantage to risk teams who report to the Board quarterly (every three months), as it provides more time (approximately 1 month) for the teams to prepare the packages (presentation and briefing note) for SLT approval, then for Board approval. This study only conducted two data collection rounds. Had it continued on the third to seek further clarification and consensus on risks, the total study time would have been extended as a third round would have been initiated. Risk teams that report

their registries to the Board on a quarterly basis would need to limit the study time to two months in order to complete their Board packages in time.

The literature did not indicate any firm rules for how many participants make up an adequate sample size, or how facilitators of the delphi method identify when participants have reached consensus (Powell, 2003). Prior to initiating the second round, it was decided that the study required a minimum of five participants, and if more would require an odd number of participants to avoid a draw. This would enable a democratic approach to reaching consensus, whereby the rating with the most majority would be the final rating; in this case four out of seven. Considering the study had a 28.6% drop out rate, it was decided to allow a draw option (explained in the Findings section) given there was some consensus and more importantly it was clear that the respondents agreed that there was a risk.

Consensus was assessed in the second round, resulting in the final list of eleven risks; one very high, five high and five medium (Figure 10). However if consensus was analysed on the first round, there would have been two additional risks to the final taxonomy. First one would have

been *Inappropriate Utilization of Health Services* which had reached a likelihood consensus of Medium (3) an impact consensus of Draw-High (4), resulting in a risk rating of High (12). The second would have been *Evolution of Disorders/Self Destruction* which had reached a likelihood Draw of High (4) and an impact draw of High (4), resulting in a risk rating of High (16). It is difficult to deduce why these two risks established consensus in the first round, then were irreconcilable in the second round.

There are a few approaches in assessing when consensus is analyzed during the study. One could be to remove the items that have reached consensus in the first round, from the second round of surveys. Another could be to keep the analysis of consensus to the final round to give the participants an opportunity to rethink their responses, regardless if consensus was reached.
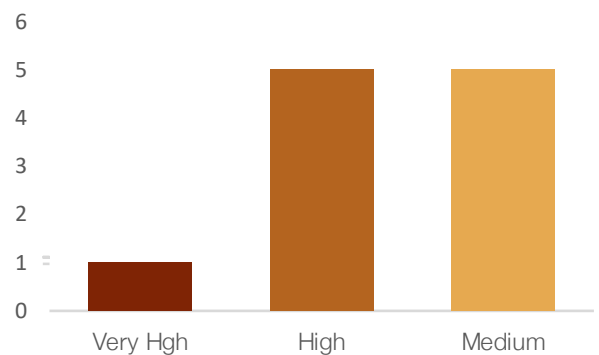
Futures Risk Registry by Rating

Figure 10: Risks by Rating

Another option would be to conduct a third round of the delphi to seek clarification on why consensus was reached in the first round, and not in the second. It would be up to each principal investigator to evaluate when to pause the cycle of convergence and divergence to assess the final outcome. If this study had more time, a third round would have been run to re-examine the two risks *Inappropriate Utilization of Health Services* and *Evolution of Disorders/Self Destruction*. Lastly, had the second round collected the rationale from participants as to why their ratings changed from the first or the second, this study would have gained more insight as to why the two risks had reached consensus in the first round and irreconcilable in the second.

Study completion rates were also assessed as thirty percent of the participants from the first round did not complete the study. It may be that the study, along with the seventeen risks may have been too many to complete. Two of the participants completed the first round in two sittings, and one participant from the second round completed the survey in two mins and did not change any of the answers. In comparison to the Hospital's current process, the delphi is more labour intensive as participants in the first round are required to read and understand each

 risk, rate them and write out their rationales. For the second round, participants are required to read the summary report, reflect their positioning in comparison and then re-rate their risks according to their reflections. This process would be a shift for participants and would require concentration time in comparison to the current process, where risks and rationales are presented to stakeholders, and the discussion is held verbally.

Conducting a review of the delphi responses during an in person interdisciplinary meeting may remove the expectations of participants needing to read through the summary report, and may improve dropout rates for subsequent rounds. Teams could participate in subsequent survey rounds during the in person meeting, or invitations can be sent out for participants to complete independently. The former may lead to an interactive and engaging meeting and may reduce dropout rates. However, it may also lead to skewed results as participants may be subjected to social and group pressures. The later may remove the barrier of dominant individuals overtaking or leading the discussion, however the dropout or response rate may increase.

Participation in risk identification from all staff, particularly front line staff who know, live and

work through the tangible risks would be extremely beneficial. Sending a survey to all staff to rate the identified risks, and provide rationale would be very valuable. All staff would also be given a chance to identify additional risks that were not identified through all previous processes. Providing an avenue for risk identification to the front lines would completely integrate risk identification throughout the Hospital; as is the intent of fully integrated IRM programs. The sample size would likely be larger as the survey would be sent out to the whole organization. Hospitals would need to consider their survey schedules if their organizations are able to only run one survey at a time.

The next section explores foundational strategies, ones that can be adopted as routine functions for the Hospital and risk team, and three operational strategies for the Hospital and risk teams to consider to integrate the use of the delphi in their IRM programs. Additionally, the next section looks into how the outcomes of this study can be utilized by comparable acute care hospitals.

Foundational Strategies

The outcomes of the strategic analysis conducted in this study uncover three main foundational strategies, which can be embedded into the Hospital's risk management program. The first foundational strategy *Understanding the Environment*, whereby the risk team can engage in routine external horizon scanning through news channels, subscriptions, alerts, resource updates (including HIROC), and community practice groups. The knowledge gained in conjunction with the awareness of internal Hospital strategies can be incorporated in a monthly horizon risk newsletters to all staff, or on a risk dashboard. The second foundational strategy *Asking the Experts*, whereby the risk team can embed a risk rating matrix into the Hospital's incident reporting systems for staff to identify the likelihood and impact of incidences of reoccurring. More importantly, a new risk identification form can be created in the incident reporting system for staff to report on potential risks. The last foundational strategy *Discussing the Future*, whereby the risk team can incorporate external horizon scanning into the risk discussions and into the formations of the risk registry. Please see an illustration of the Foundational Strategies in Figure 11 on page 62. Thereafter, three secondary strategic operational plans are suggested that the Hospital can adopt into their current IRM process when developing their first quarter risk registry for the fiscal year.
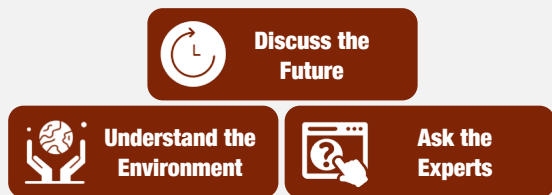
Figure 11: Foundational Strategies

Operational Strategies

Incorporate the Delphi

The first operational strategic plan *Incorporate the Delphi* closely aligns with the Hospital's current IRM program whereby the risk team conducts stakeholder engagements with SLT, Directors, Managers, and Clinical Leaders, to draft the initial risk registry, and meets again to discuss ratings. The added step is that once the risk registry is drafted, each team will receive an online delphi questionnaire to rate and provide rationale to the risks that pertain to their areas. When the teams are brought back together during the second in-person meeting, the findings of the delphi will be reviewed and discussed, and the attendees will participate in a second round to re-rate the risks with rationale. The results will be reviewed during the meeting and re-rated until consensus is reached. The hope is to end the meeting with a draft risk registry that was established with all participants' input.

One advantage of this strategy is that it does not stray too far from our current process and would not require any approvals from SLT. Thus, implementation would be highly feasible. From the participants perspective, they would still attending the two meetings they do in the first quarter. The change is that they are participating in a survey between the two meetings and during the second. Another advantage is that this strategy seeks consensus by involving all team members in the process of rating risks; unless a team member is unable to attend the second meeting.

A disadvantage to this strategy is that the teams from each discipline remain siloed. Meaning, the teams are brought together based on discipline such as, facilities, operations, information technology, and so on. This results in risk rating that does not include a systemic lens. For example, human resources may rate their risk low, however the care area would have rated the risk high depending on their perspective of the risk. Lastly, this strategy would not further integrate risk management and identification into the front lines as it would only include staff in leadership positions.

On a 2x2 effort/value matrix, this strategy would be rated as Low Effort and Medium Value (Figure 12). The effort would be low considering it would follow the same process as we currently follow, and the survey will be sent to limited staff. Meaning the synthesis would not be as labour intensive. The value would be medium as the risks would be rated with all the participants feedback, however the participants would comprise of only senior level, managerial and leadership staff, and be rated by each team resulting in siloed approach.

Steps

1. Conduct in-person focus group session to review owned knowledge from *Understanding the Environment*, and *Asking the Experts*, along with *Discussing the Future* to collect data from participants regarding risks to the organization.

2. Analyze the risk data, identify themes and establish the draft risk registry.

3. Send online delphi questionnaire to focus group teams to rate risks with rationale.

4. Conduct in-person focus group session to review the rationales and re-rate the risks through a second round of delphi on an online platform.

5. Reach consensus with each risk team and finalize draft risk registry

Advantages

- Minimal change from current process, highly feasible to implement.

- Does not require SLT approval.

- Includes opinions of all members of the team during rating.

Disadvantages

- Disciplines remain siloed.

- Ratings do not have a systems lens.

- Does not integrate risk identification beyond managerial level.

Figure 12: Incorporate the Delphi on 2x2 matrix
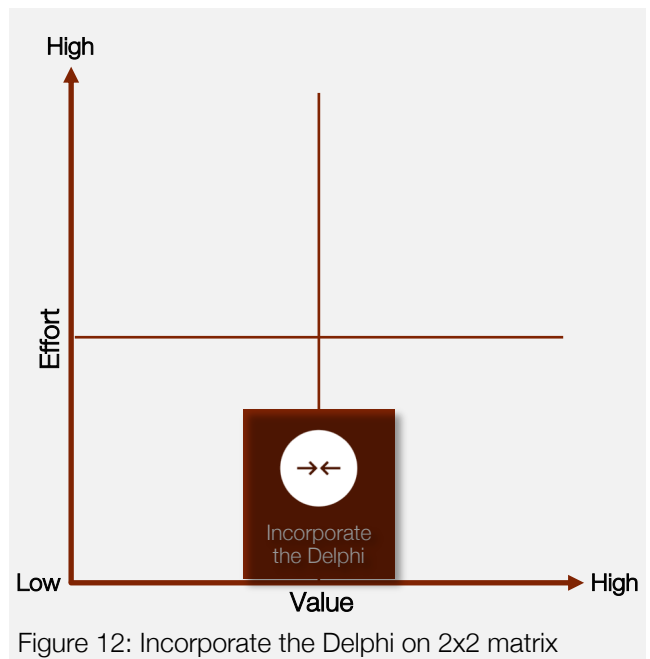
Fully Digital

The second operational strategic plan *Fully Digital* is radically different than the Hospital's current IRM program, in that it removes the in-person focus group sessions. It however further integrates risk identification by including all staff in the process. This strategy would require SLT approval, meaning the risk team would not be able to operationalize it without approvals. Within this strategy, the risk team would create the draft risk registry by using the foundational inputs stated in the above foundational strategies *Understanding the Environment* and *Asking the Experts*. The risk team would then establish and send out the first round of the delphi to all staff in the organization to rate risks with rationale, and identify any additional risks that have not been identified. Responses will be summarized and sent back only to SLT, Directors, Managers, Clinical Leaders and Professional Practice Leaders with the second round of the delphi. Responses of the second round will then be summarized and sent back to the same leadership team members from the second round along with the third round of the delphi. Depending on how much time the risk team has, the delphi can run until consensus is reached.

An advantage of this method is that the risk

registry would be established by the input of all staff within the organization. It may help create a risk aware and averse organization as all members will be given the chance to think and speak about risks to the Hospital. The delphi going out to all SLT, Directors, Managers, Clinical Leaders and Professional Practice Leaders at once during the second and subsequent rounds breaks down the silos that exist in the current process. Within this strategy, all members within management or leadership roles will have a chance to rate all the risks. The benefit of this is to have a risk registry that has been rated with a system wide assessment of likelihood and impact scores. Thus it adopts a systems approach to identifying and rating risks. Lastly, the Fully Digital strategy would provide a hospital wide pulse check on risks.

One disadvantage of this strategy is that it misses out on the valuable insight and discussions gained through in-person focus group sessions. Although the risk team will save up to 40 hours of time by not facilitating in-person focus group sessions, analyzing and synthesizing results from potentially 3000+ staff will take dedicated time and resources. Also, removing the in-person focus group sessions which secure participants time may result in a lower response (participation) rate than usual,

and may result in a high drop out rate as the synthesized data may be labour intensive to review. Lastly, as stated above, the strategy would be a radical change from the current process and would require SLT approval.

On a 2x2 effort/value matrix, this strategy would be rated as high effort and medium value (Figure 13). The effort is high as the synthesis between rounds will be labour intensive and will require new learnings from the risk team. The value is medium considering there are a number of advantages of fully integrating the risk registry program with all staff, and adopting a systems lens to identifying and rating risks. However there is a missed opportunity to seek fulsome feedback as in-person focus group sessions will no longer be held.

Steps

1. The risk team establishes the draft risk registry and the first round of delphi with the owned knowledge from *Understanding the Environment*, and *Asking the Experts*.

2. The first round of the delphi is sent to all staff to rate risks with rationale and suggest additional risks.

3. The second round of risk rating is sent only to SLT, Directors, Managers, Clinical Leaders and Professional Practice Leaders with a summary of the first round.

4. A third round of risk rating is sent to the

same group from the second round to further establish consensus.

5. Identify if consensus is reached. Seek clarification on any risks that have not reached consensus (time allotted) and complete draft risk registry.

Advantages

• Achieves a fully integrated Risk Registry.

• Takes a systems approach to identifying and rating risks.

• Obtains hospital wide pulse check on risks.

Disadvantages

• Misses valuable in-person discussions.

• Data synthesis requires dedicated time and resources.

• Risk of low response rate and high dropout rate.
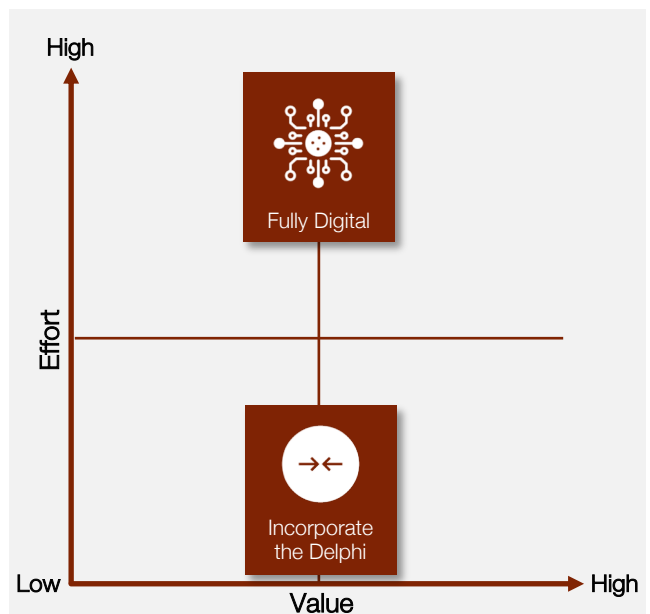
• Requires SLT approval.

Figure 13: Fully Digital on 2x2 matrix

Integrated and Transparent

The third operational strategic plan *Integrated and Transparent* is a happy medium, as it is fully integrated, adopts a systems approach and maintains an in-person meeting. This strategy would require SLT approval as it is a slight change from the current process. Within this strategy, the risk team would create the draft risk registry by using the foundational strategies *Understanding the Environment* and *Asking the Experts*. The risk team would then establish and send out the first round of the delphi to all staff in the organization to rate risks with rationale, and identify any additional risks that have not been identified. Responses will be summarized and sent back only to SLT, Directors, Managers, Clinical Leaders and Professional Practice Leaders. The leadership and managerial staff will then be brought together for an in-person risk rating meeting whereby the findings of the delphi will be reviewed and discussed, incorporating the third foundational strategy *Discussing the Future.* The attendees will participate in a second round to re-rate the risks with rationale. The results will be reviewed during the meeting and re-rated until consensus is reached. The hope is to end the meeting with a draft risk registry that was established with all participants input.

An advantage of this method is that the risk registry would be established by the input of all staff within the organization. It may help create a risk aware and averse organization as all members will be given the chance to think and speak about risks to the Hospital. The delphi results will be shared with all SLT, Directors, Managers, Clinical Leaders and Professional Practice Leaders and discussed during an in-person meeting. Within this strategy, all members within management or leadership roles will have a chance to rate all the risks, resulting in a draft risk registry rated with a system wide assessment of likelihood and impact scores. Thus it adopts a systems approach to identifying and rating risks. This strategy will also provide a hospital wide pulse check on risks without missing out on the valuable in-person discussions facilitated through the focus group meetings. Lastly, it promotes transparency as all input is received from all staff and all leaders are brought into one room to discuss risks at once.

The disadvantages of this strategy are minimal. Firstly SLT approval would be required as the strategy requires a change from the current process. Secondly, the synthesis of data from the first round will require dedicated time and resources. It however will not be as labour intensive as *Fully Digital* considering the subsequent rounds will be conducted in person.

Lastly, there is a potential risk for the Hospital's culture to resist transparency when discussing risks.

On a 2x2 effort/value matrix, this strategy would be rated as low effort and high value. All three strategies are plotted on a final 2x2 matrix in Figure 14 on page 68. Even though this strategy would require dedicated time and resources on analysing the initial results from the first round, the fact that the risk team would only need to conduct one in-person meeting would save time. The impact is high as this strategy results in a fully integrated IRM program, down to the front line level. It also promotes transparent conversation as all senior, managerial and leadership team members are brought together to discuss the rationale behind the risks, and re-rate them in person. A fully systems approach will also be adopted through a rating process that happens with the input of all team members at the same time. This would be the strategy that this study would suggest the Hospital to operationalize. It will also be a strategy that comparable hospitals can adopt into their IRM programs.

Steps

1. The risk team establishes the draft risk registry and the first round of delphi with the owned knowledge from *Understanding the Environment*, and *Asking the Experts*.

2. The first round of the delphi is sent to all staff to rate risks with rationale and suggest additional risks.

3. Synthesis of first round is sent to SLT, Directors, Managers, Clinical Leaders and Professional Practice Leaders for review.

4. Conduct in-person focus group session with SLT, Directors, Managers, Clinical Leaders and Professional Practice Leaders to review the rationales and re-rate the risks in-person through a second round of delphi on an online platform.

5. Reach consensus on risks with leadership and managerial teams and finalize draft risk registry

6. Identify if consensus is reached. Seek clarification on any risks that have not reached consensus. Complete draft registry for SLT/Board approval.

Advantage

- Achieves a fully integrated Risk Registry.

- Takes a systems approach to identifying and rating risks.

- Obtains hospital wide pulse check on risks.

- Provides opportunity for in-person valuable discussions.

- Promotes transparency.

Disadvantage

- Requires SLT approval.

- Data synthesis will require dedicated time and resources.

After a comprehensive review, this study results in a robust analysis of the applicability of horizon scanning and the delphi into Integrated Risk Management programs. Additionally three foundational strategies – *Understand the Environment, Ask the Expert* and *Discuss the Future* – are suggested, along with three operational strategies, one of which *Integrated and Transparent* results in the most value for the least amount of effort. In the next chapter we conclude the study and discuss post MRP opportunities

Integrated & Transparent is most Advantageous Operational Strategy
- Achieves a fully integrated Risk Registry.
- Takes a systems approach to identifying and rating risks.
- Obtains hospital wide pulse check on risks.
- Provides opportunity for in-person valuable discussions.
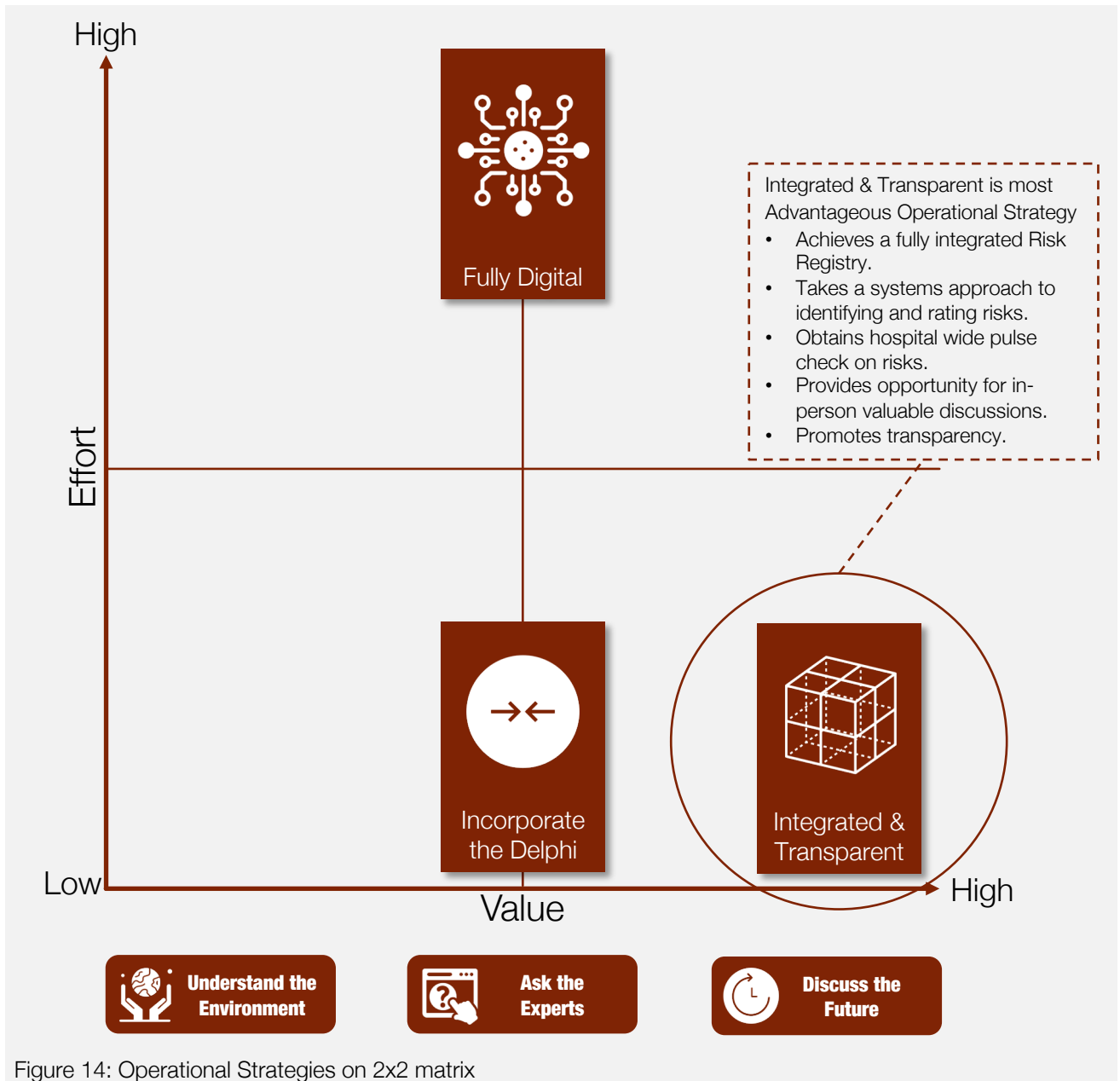- Promotes transparency.

Figure 14: Operational Strategies on 2x2 matrix

Conclusion

In the previous chapter we conducted a robust analysis on horizon scanning and the Delphi method, and offered three foundational and three operational strategies for risk management teams to adopt. In this next chapter we summarize and conclude the study and offer suggestions for next steps post MRP.

The formation of healthcare risk management was influenced by the medical malpractice crisis in the mid 1970s increasing insurance premiums, and by the findings from the 1999 Institute of Medicine study whereby it was estimated that 98,000 people died yearly in United States Hospitals as a result of preventable medical errors (Carroll, 2009). With the intent to reduce medical malpractice and liability claims, and to prevent adverse events, acute care organizations established risk management departments (Young, et al., 2001; Carroll, 2009).

Risks are future events that have not yet occurred (Sankararajan & Shrivastava, 2012). As such, risks that occur become incidences that require management. Incidences pose risks as they have the potential to reoccur. Yet when identifying risks, the Hospital leverages data sources that look retrospectively rather than into the future. The purpose of this Major Research Project was to explore the utilization of foresight methods in one Ontario Hospital's Integrated Risk Management program. It strived to answer the following research question; *"How might we use foresight methods to identify risk in healthcare?"*

The Hospital's current IRM program has a yearly cycle whereby risks are identified in the first quarter of each fiscal year, to make up the

corporate risk registry. Subsequent quarters are utilized to monitor and identify action items to mitigate risks, and add and close existing risks. The Hospital's risk team collects data for the risk registry from its retrospective incident reporting system, its insurance company (HIROC), and through focus group sessions with hospital leaders. The gaps of the current process are that most data sources look internally and retrospectively, information about risks are only collected by leadership staff, there is no method of obtaining information about risks from front line staff with experiential knowledge, and focus group sessions whereby risk data is collected are subject to social pressures.

This study tested two foresight methods to address the gaps of the Hospital's current IRM process; external horizon scanning, and the delphi method. Horizon scanning is described by Charest (2012) as active, ongoing and systematic assessment and monitoring of commercial, technological or other type of environment, with a scope to anticipate changes that are likely to occur. External horizon scanning gave the opportunity to identify risks to the hospital due to external factors, that may occur in five years time. Planning for 2025 provides the Hospital with an opportunity to strategically prepare for the environment it may eventually be in. Using Choo's (1999) four modes of

organizational scanning, with a social, technological, economical, environmental, political and legal lens, the study identified seventeen potential risks to the Hospital by 2025.

Once the draft risk registry was established with the seventeen potential risks, there was an opportunity to rate the risks using a method that would target the current gaps in the Hospitals IRM program. Thus the study strived to answer another research question; *"How might the delphi method work as a foresight tool for identifying risks in an acute care setting?"* As Linstone and Turoff (1975) explain the "delphi technique is in essence a series of sequential questionnaires or 'rounds' interspersed by controlled feedback, that seek to gain the most reliable consensus of opinion of a group of experts" (as cited in Powell, 2003, p. 376). The delphi was an online avenue of data collection that provided anonymity, and the opportunity for staff to think and re-thing through their ratings, thereby overcoming the disadvantages of in-person discussions subject to noise of dominance. The results were eleven risks, reached by consensus that made up the Futures Risk Registry found in Figure 8 on page 46. Once the study was conducted, it strived to answer the last research question; *"How might*

we embed foresight principles into routine risk identification exercises in health care?" An analysis of both foresight methods (horizon scanning and delphi) was discussed and foundational and operational strategies suggested, in order to embed the principles into routine hospital IRM programs.

The horizon scanning was deemed to be labour intensive and required dedicated time and resources. It was also subject to bias based on the scanner's (or scanners) sense making and experiential knowledge. Thus, scanning with a group of experts with varied knowledge may reduce bias influenced by sensemaking, and offer a balanced identification of potential risks. Horizon scanning also provided rich information that would be very beneficial to planning hospitals future strategies concerning risk management.

The delphi method offered the opportunity to collect data from participants regarding risks without the added pressures of the group environment. It also removed the chance of facilitator bias influencing the results. The online platform also supported a systemic approach to risk discussions as teams rated risks in one virtual space. The delphi itself was labour intensive for all parties, and as a result produced

a low participation rate. It was also difficult to judge how to identify consensus, as the literature did not provide enough direction.

Three foundational strategies were suggested to embed foresight principles into routine risk identification programs. First, *Understanding the Environment*, whereby risk teams can engage in routine external horizon scanning. Second, *Asking the Experts*, whereby a risk identification form can be created in incident reporting systems for all staff to report on potential risks. Third, *Discussing the Future*, whereby risk teams can incorporate external horizon scanning into risk discussions and into formations of risk registries.

Furthermore three operational strategies were suggested to embed the foresight methods (scanning and delphi) into the Hospitals Integrated Risk Management program; *Incorporate the Delphi, Fully Digital* and *Integrated and Transparent*. The third strategy was deemed the most advantageous as it required the least amount of effort for the highest impact. Operationalizing the strategy, the draft risk registry would be created using the foundational strategies *Understanding the Environment* and *Asking the Experts*. A first round of delphi would be sent to all staff in the organization, and the responses would be

reviewed and incorporating the third foundational strategy *Discussing the Future* during an in-person meeting with leadership staff. During the same in-person meeting, rounds of the delphi would be conducted during an interactive session to reach consensus on the risks. This strategy achieves a fully integrated risk registry, adopts a systems approach across all departments whereby all participants are rating on all categories of risks, obtains a hospital wide pulse check on risks, provides opportunity for valuable in-person discussions and promotes a transparent culture.

Next steps for this study would be to discuss the proposed strategies with the Hospital leaders to identify the appetite for adoption. Additionally the futures risk registry can be utilized by any comparable acute care hospital in Ontario with approximately 330 beds, whereby strategies would be put in place to mitigate the risks. Future research would be required to identify a survey platform that could be tested and trialed using the delphi as a consensus seeing tool during an in-person interactive group session. Additionally, it would be beneficial to identify studies that have tested the delphi during an in-person session, along with the outcomes. This study was conducted on participants from the same organization, however conducting a delphi

for risk identification and rating across the health sector with leaders participating from various organizations would bring a wealth of depth and knowledge to the results. Risks identified from a broader scope may even help influence legislation and policy changes that impact health provincially.

There is an opportunity to establish metrics that monitor and trend the level of threat the identified eleven risks on the Futures Risk Registry pose to the Hospital. For example, for the risk *Human Resources Shortages,* the Hospital can monitor metrics such as voluntary terminations within a year of hire, and/or number of upcoming retirees and/or number of current and projected vacancies in order to monitor the level of threat the risk contains, and the level of action necessary to mitigate the risk. There is also room to identify other foresight methods that can be tested and utilized in hospital IRM programs, to widen the tool kit of risk management teams. Lastly it would be beneficial to scan in the external environment outside the realm of healthcare, and this study scanned STEEP+L forces that impacted healthcare. For example, instead of scanning for technological risks impacting healthcare, scan for potential technological risks in general.

To conclude, risks are identifiable by all levels and all staff members of acute care organizations. Risks can pose a threat from various internal and external sources, within the present and the future. In order to establish risk management programs that are entirely integrated, transparent, systemic and strategic, sustainable foundations need to be established that open avenues for risk identification from all staff. Additionally channels of ongoing internal and external horizon scanning need to be created, in all influential forces, with the ability to report out the findings and trend the threats. Lastly, an avenue to transparently and collaboratively reach consensus on risk needs to be offered, in order to establish a fully integrated risk registry. Embedding horizon scanning and the delphi are two foresight principles that can push IRM programs into high functioning realms. High realms that patients deserve, as their health is in safety of the health systems hands.

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Section A: Inappropriate Utilization of Health Services

Risk Statement: Patients who cannot access family doctors or community care providers in a timely manner may choose to seek treatment from higher cost providers (such as hospital emergency departments), which may result in inappropriate utilization of healthcare services.

A1. How likely will patients inappropriately utilization health services at the hospital in 2025?

Likelihood — Very Low | Low | Medium | High | Very High

A2. How severe would the impact be to the hospital if patients inappropriately utilized health services at the hospital in 2025?

Impact — Very Low | Low | Medium | High | Very High

A3. Please explain your rationale behind your ranking choices.

Section B: Patient as a Consumer

Risk Statement: Patients see themselves as consumers; as purchasers of health services. By providing greater information, access and autonomy, we are treating patients as in control, typically proactive and well-informed consumers. However patients may not have all the tools to make the best medical choices. As consumers in the driver's seat, patients may demand and receive inappropriate treatments and may inappropriately utilize healthcare services.

B1. As consumers in the driver's seat, how likely will patients demand and receive inappropriate treatments and inappropriately utilize healthcare services in 2025?

Likelihood — Very Low | Low | Medium | High | Very High

B2. How severe will the impact be to the hospital if patients demand and receive inappropriate treatments and inappropriately utilize healthcare services in 2025?

Impact — Very Low | Low | Medium | High | Very High

B3. Please explain your rationale behind your ranking choices.

Section C: Predisposed Ethnic Diseases

Risk Statement: Results from the 2016 population census showed that 67% of the population the hospital serves are Asian; comprised of south, south east and south west Asians. This may place a greater demand on the hospital to acquire services that it does not currently provide in order to deliver timely care for culturally predisposed conditions. For example, south Asian people in Canada have higher rates of heart disease, double the rate of diabetes and are more prone to becoming overweight.

C1. How likely will patient suffer and present to the hospital for treatment with redisposed ethnic diseases in 2025?

Likelihood — Very Low | Low | Medium | High | Very High

C2. How severe will the impact be to the hospital if it is treating high volumes of predisposed ethnic diseases such as heart disease, diabetes and obesity in 2025?

Impact — Very Low | Low | Medium | High | Very High

C3. Please explain your rationale behind our ranking choices

Section D: Evolution of Disorders/Self Destruction

Risk Statement: The patients we serve are living in an environment where technological advancements are co-created without a fulsome understanding of their co-destructive consequences. For example, adolescents experiencing negative psychological symptoms due to social media, or rise in patients suffering from lung injury due to e-cigarettes. Disorders impacting patients are evolving and may lead to negative outcomes, as the hospital may not currently provide the services in order to deliver timely care to patients.

D1. How likely will patient suffer from newly evolved diseases due to the technological environment they are exposed to in 2025?

Likelihood — Very Low | Low | Medium | High | Very High

RESPONDENT 1
Risk Identification Using the Delphi Method
Round 1 Results

Dear Participant,

Thank you very much for your participation in the first round of the risk identification survey using the Delphi method. Ten individuals participated in the survey. Seven of which completed the survey.

You will find your responses below highlighted in colour within each table. The responses are sorted highest risk rating to lowest. This gives you the chance to compare your response in relation to the rest of the respondent's ratings.

During the second (final) round you will be asked to re-rate your likelihood and impact scores based on the rationales provided by the participants. You have the option of sticking to your original answers from the first round by answering "No Change" to each question.

We look forward to reviewing your responses.

Sincerely,

Graduate Researcher:
Silva Nercessian, Graduate student
OCAD University

Principle Investigator & Faculty Supervisor:
Professor Suzanne Stein
Faculty of Liberal Arts & Sciences, Graduate Studies
OCAD University

"The Delphi method is a forecasting process framework based on the results of multiple rounds of questionnaires sent to a panel of experts. Several rounds of questionnaires are sent out to the group of experts, and the anonymous responses are aggregated and shared with the group after each round. The experts are allowed to adjust their answers in subsequent rounds, based on how they interpret the "group response" that has been provided to them. Since multiple rounds of questions are asked and the panel is told what the group thinks as a whole, the Delphi method seeks to reach the correct response through consensus"
Twin, A. (2019). Fundamental Analysis. Delphi Method. Retrieved from https://www.investopedia.com/terms/d/delphi-method.asp

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Section A: Inappropriate Utilization of Health Services
Risk Statement: Patients who cannot access family doctors or community care providers in a timely manner may choose to seek treatment from higher cost providers (such as hospital emergency departments), which may result in inappropriate utilization of healthcare services.

Likelihood	Impact	Rationale
Medium (3)	Very High (5)	The government has been talking about shifting care into the community for many years. I believe the financial pressures that our system is currently facing will finally lead to a breakthrough
High (4)	Medium (3)	Patients will become more demanding of expecting service in the moment and use less discretion regarding where those services could best be acquired. Use of valuable acute care resources, blocking of beds, use of emergency services for non urgent matters, impacts flow and care to the acutely ill.
High (4)	Medium (3)	If you're asking if people are likely to increase using hospital services because they don't or can't get primary care, this is likely to increase in the future unless we get some miraculous influx of primary care physicians over the next 6 years. This is unlikely. This will definitely put pressure on the hospital but the hospital addresses these pressures via green zone and other strategies hence my Medium response.
Medium (3)	High (4)	Likelihood of medium as a balance between the high population growth in the Markham catchment area offset by the OHTs and Care Beyond our Walls strategies being put in place. The hospital is now at capacity so if the influx of patients cannot be curbed there will be more patients in unconventional spaces which will impact quality and safety for both patients and staff.
Medium (3)	High (4)	The likely hood is based on precedence, even in the establishment of OHT's, educating both the public and provider will take time. The impact will be severe as hospital bed usage and costs will continue to soar with an ageing population.
Medium (3)	Medium (3)	This would impact emergency and urgent services the most. Many of the services needed in the community and in primary could not necessarily be addressed by the hospital so while emergency could be highly impacted, the overall impact would be modest.
Low (2)	High (4)	Changes to community care and resources will focus the right service to be delivered at the right time. So the likelihood should be low and if they do access services due to efficiencies created the impact could be high

Likelihood / Impact bar charts
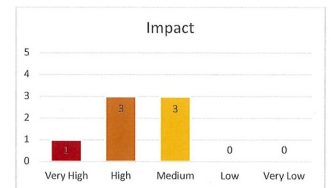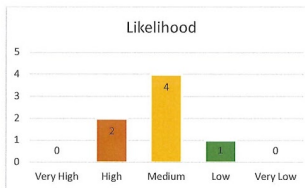
Legend: ■ Very High ■ High ■ Medium ■ Low ■ Very Low

Dear Participant,

Thank you very much for your participation in the second (final) survey round of the Delphi Method.

During this round you will be asked to re-rate your likelihood and impact scores. You are requied to use the respondent rationales from the first round results to base your answer. You have the option of sticking to your original answers from the first round by answering "No Change" to each question. The goal is to determine if the participants reach consensus after reviewing each others rationale.

By clicking the next button, you agree to have read the consent form, and agree to voluntarily participate in the study.

Section A: Respondent Number

A1. **Please enter your Respondent number provided to you in your response summary from round one (Example: Respondent 1)**

Section B: Inappropriate Utilization of Health Services

Risk Statement: Patients who cannot access family doctors or community care providers in a timely manner may choose to seek treatment from higher cost providers (such as hospital emergency departments), which may result in inappropriate utilization of healthcare services.

B1. **How likely will patients inappropriately utilization health services at the hospital in 2025?**

	Very Low	Low	Medium	High	Very High	No Change
Likelihood	☐	☐	☐	☐	☐	☐

B2. **How severe would the impact be to the hospital if patients inappropriately utilized health services at the hospital in 2025?**

	Very Low	Low	Medium	High	Very High	No Change
Impact	☐	☐	☐	☐	☐	☐

Section C: Patient as a Consumer

Risk Statement: Patients see themselves as consumers; as purchasers of health services. By providing greater information, access and autonomy, we are treating patients as in control, typically proactive and well-informed consumers. However patients may not have all the tools to make the best medical choices. As consumers in the driver's seat, patients may demand and receive inappropriate treatments and may inappropriately utilize healthcare services.

C1. **As consumers in the driver's seat, how likely will patients demand and receive inappropriate treatments and inappropriately utilize healthcare services in 2025?**

	Very Low	Low	Medium	High	Very High	No Change
Likelihood	☐	☐	☐	☐	☐	☐

C2. **How severe will the impact be to the hospital if patients demand and receive inappropriate treatments and inappropriately utilize healthcare services in 2025?**

	Very Low	Low	Medium	High	Very High	No Change
Impact	☐	☐	☐	☐	☐	☐

Section D: Predisposed Ethnic Diseases

Risk Statement: Results from the 2016 population census showed that 67% of the population the hospital serves are Asian; comprised of south, south east and south west Asians. This may place a greater demand on the hospital to acquire services that it does not currently provide in order to deliver timely care for culturally predisposed conditions. For example, south Asian people in Canada have higher rates of heart disease, double the rate of diabetes and are more prone to becoming overweight.

D1. **How likely will patient suffer and present to the hospital for treatment with redisposed ethnic diseases in 2025?**

	Very Low	Low	Medium	High	Very High	No Change
Likelihood	☐	☐	☐	☐	☐	☐

D2. **How severe will the impact be to the hospital if it is treating high volumes of predisposed ethnic diseases such as heart disease, diabetes and obesity in 2025?**

	Very Low	Low	Medium	High	Very High	No Change
Impact	☐	☐	☐	☐	☐	☐

Section E: Evolution of Disorders/Self Destruction

Risk Statement: The patients we serve are living in an environment where technological advancements are co-created without a fulsome understanding of their co-destructive consequences. For example, adolescents experiencing negative psychological symptoms due to social media, or rise in patients suffering from lung injury due to e-cigarettes. Disorders impacting patients are evolving and may lead to negative outcomes, as the hospital may not currently provide the services in order to deliver timely care to patients.

E1. **How likely will patient suffer from newly evolved diseases due to the technological environment they are exposed to in 2025?**

	Very Low	Low	Medium	High	Very High	No Change
Likelihood	☐	☐	☐	☐	☐	☐

Legend

Risk Rating	Colour
Low (1-4)	Green
Medium (5-10)	Yellow
High (11-16)	Orange
Very High (20-25)	Red

Responses	Colour
Consciously not changed from Round 1	White
Consciously changed from Round 1	Yellow
Carried over from Round 1	Grey
Irreconcilable	Dark Grey

Risk Name	STEEP+L	Rating	R 1	R2	R3	R4	R5	R6	R7	Consensus	Risk Rating
Aging Population	Environment	Likelihood	Very High (5)	Very High (5)	High (4)	High (4)	High (4)	Very High (5)	High (4)	High (4)	Very High (20)
		Impact	Very High (5)	High (4)	Very High (5)	Very High (5)	High (4)	Very High (5)	High (4)	Very High (5)	
Human Resource Shortage	Environment	Likelihood	High (4)	High (4)	High (4)	High (4)	High (4)	High (4)	medium (3)	High (4)	High (16)
		Impact	High (4)	Very High (5)	High (4)	High (4)	High (4)	Very High (5)	High (4)	High (4)	
Data Integrity	Technology	Likelihood	High (4)	High (4)	High (4)	High (4)	High (4)	Very High (5)	Medium (3)	High (4)	High (16)
		Impact	Very High (5)	Very High (5)	High (4)	High (4)	High (4)	Very High (5)	High (4)	High (4)	
Changing Government Regulations	Political	Likelihood	High (4)	High (4)	High (4)	Medium (3)	High (4)	Very High (5)	Medium (3)	High (4)	High (16)
		Impact	High (4)	High (4)	Medium (3)	High (4)	High (4)	High (4)	Medium (3)	High (4)	
Rise in Malpractice Claims	Legal	Likelihood	High (4)	High (4)	High (4)	Medium (3)	Medium (3)	Medium (3)	Low (2)	Draw - High (4)	High (16)
		Impact	High (4)	High (4)	Medium (3)	High (4)	Medium (3)	Medium (3)	High (4)	High (4)	
Gun Regulations	Political	Likelihood	High (4)	High (4)	Low (2)	High (4)	Low (2)	High (4)	High (4)	High (4)	High (12)
		Impact	High (4)	Medium (3)	Low (2)	Medium (3)	Low (2)	Medium (3)	Medium (3)	Medium (3)	
Patient as a Consumer	Social	Likelihood	High (4)	Medium (3)	Low (2)	Medium (3)	Low (2)	Medium (3)	Medium (3)	Medium (3)	Medium (9)
		Impact	High (4)	High (4)	Medium (3)	Medium (3)	High (4)	Medium (3)	Medium (3)	Medium (3)	
Predisposed Ethnic Diseases	Social	Likelihood	High (4)	Medium (3)	Medium (3)	Medium (3)	Medium (3)	Low (2)	High (4)	Medium (3)	Medium (9)
		Impact	Medium (3)	Medium (3)	High (4)	Medium (3)	Medium (3)	Low (2)	Medium (3)	Medium (3)	
Governance	Legal	Likelihood	High (4)	Medium (3)	Medium (3)	Medium (3)	Medium (3)	High (4)	High (4)	Medium (3)	Medium (9)
		Impact	Medium (3)	Medium (3)	Medium (3)	Medium (3)	High (4)	Medium (3)	High (4)	Medium (3)	
Predictive Data Analytics	Technology	Likelihood	High (4)	Low (2)	Low (2)	Low (2)	Low (2)	High (4)	Medium (3)	Low (2)	Medium (9)
		Impact	High (4)	High (4)	Medium (3)	Low (2)	Medium (3)	High (4)	Medium (3)	Draw - High (4)	
Technological Advancements to Healthcare	Technology	Likelihood	Very High (5)	Medium (3)	Low (2)	Low (2)	Low (2)	Low (2)	Medium (3)	Low (2)	Medium (6)
		Impact	High (4)	Medium (3)	High (4)	Medium (3)	Medium (3)	High (4)	Medium (3)	Medium (3)	
Inappropriate Utilization of Health Services	Social	Likelihood	High (4)	High (4)	Medium (3)	Low (2)	Low (2)	High (4)	Medium (3)	Irreconcilable	Irreconcilable
		Impact	Medium (3)	Medium (3)	High (4)	Medium (3)	High (4)	Medium (3)	High (4)	Medium (3)	
Evolution of Disorders/Self Destruction	Technology	Likelihood	High (4)	High (4)	Medium (3)	High (4)	Medium (3)	Medium (3)	Very Low (1)	Draw - High (4)	Irreconcilable
		Impact	Low (2)	Medium (3)	Medium (3)	Medium (3)	High (4)	High (4)	High (4)	Irreconcilable	
Inflation	Economy	Likelihood	Very High (5)	High (4)	High (4)	Medium (3)	Low (2)	High (4)	Low (2)	Irreconcilable	Irreconcilable
		Impact	Very High (5)	High (4)	High (4)	High (4)	High (4)	Very High (5)	High (4)	High (4)	
Resistance to Mergers	Economy	Likelihood	Very High (5)	High (4)	Medium (3)	Medium (3)	Medium (3)	Low (2)	Medium (3)	Medium (3)	Irreconcilable
		Impact	Very High (5)	Medium (3)	High (4)	High (4)	Medium (3)	Low (2)	High (4)	Irreconcilable	
Fee for Service Funding Model	Economy	Likelihood	High (4)	Medium (3)	High (4)	Medium (3)	Low (2)	Low (2)	Very Low (1)	Irreconcilable	Irreconcilable
		Impact	High (4)	High (4)	Medium (3)	Medium (3)	High (4)	Medium (3)	High (4)	High (4)	
Changing Sector Coverage	Political	Likelihood	High (4)	High (4)	Medium (3)	Low (2)	Low (2)	Very High (5)	Medium (3)	Irreconcilable	Irreconcilable
		Impact	High (4)	High (4)	High (4)	Medium (3)	Medium (3)	Very High (5)	High (4)	High (4)	

Item 4: Final Likelihood and Impact, and Risk Ratings