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Lean Daily Management Systems: Applications in the Health Care Industry

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Résumé

Ce mémoire répond aux deux questions de recherche suivantes, à savoir quelles sont les composantes du système de gestion au quotidien Lean et de quelle manière il peut être déployé par les organisations de santé qui ont déjà adopté le Lean. Après une brève introduction au Lean dans le secteur de la santé, la revue de la littérature porte sur les différents aspects du système de gestion au quotidien Lean ainsi que sur son déploiement. Afin de répondre aux questions de recherche, deux modèles conceptuels sont développés et sont analysés à travers trois cas : CSSS Haut-Richelieu-Rouville à Saint-Jean-Sur-Richelieu (Québec), l'Hôpital pour enfants de Toronto (Ontario), et l'Hôpital Saint-Boniface à Winnipeg (Manitoba). Les modèles conceptuels développés à partir de la littérature sont enrichis par l'analyse de cas multiples. Le principal résultat du mémoire est le modèle de déploiement en « T ». Ce modèle préconise de démarrer par la direction générale (mile-wide inch-deep) et ensuite déployer en profondeur le système de gestion au quotidien dans une direction (inch-wide mile-deep).

Mots clés

Lean santé

Système de gestion au quotidien Lean

Déploiement du système de gestion

Étude de cas

Abstract

This thesis addresses the two research questions of what constitutes the Lean Daily Management System, and how can it be deployed by health care organizations that have adopted Lean through different means. After a brief introduction to Lean in the health care industry, the literature review examines the different aspects of the Lean Daily Management System and its deployment. Two conceptual models, to answer the research questions, are developed from the literature review and are analyzed during the case study research. The rationalization of conducting three qualitative case studies and their data collection methods are addressed before presenting the three cases of CSSS Haut-Richelieu-Rouville in Saint-Jean-Sur-Richelieu (Quebec), the Hospital for Sick Children in Toronto (Ontario), and St. Boniface Hospital in Winnipeg (Manitoba). A multiple-case analysis is conducted afterwards to examine the different perspectives of these three health care organizations. The conceptual models developed from the literature review are augmented as a result of the multiple-case analysis. The revised deployment model is coined the T-model; it endorses a mile-wide inch-deep deployment at the upper management level before transitioning to an inch-wide mile-deep deployment within particular units.

Key Words

Lean Health care

Lean Daily Management System

Management System Deployment

Case Studies

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List of Abbreviations

DMAIC	Define-Measure-Analyze-Implement-Control
KPI	Key Performance Indicator
LDMS	Lean Daily Management System
PDCA	Plan-Do-Check-Act
PDSA	Plan-Do-Study-Act
RIE	Rapid Improvement Event
VSM	Value Stream Mapping

Dedication

This thesis is dedicated to my spouse, Mena. I give my deepest appreciation for all the encouragement you gave and the sacrifices you made during this graduate program. Thank you for your love and support.

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This thesis could not have been written without all this support.

Thank you,
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CHAPTER 1: INTRODUCTION

The history and value proposition of Lean have been comprehensively covered in the literature (Allway & Corbett, 2002; Holweg, 2007; Ptacek & Sperl, 2012; Sehested & Sonnenberg, 2011). Within the context of the health care industry, Lean is relatively new but there is a lot of hype around it due to the value that it offers (Black & Miller, 2008; Hadfield et al., 2006; Toussaint & Berry, 2013). Most successful Lean implementations show savings and improved service level; yet patient and staff satisfaction are often not systematically measured due to the inherit complexity in these institutions (Graban, 2012; Lee, 2010; Mazzocato et al., 2010; Scott et al., 2000; Young & McClean, 2008). There are already a number of cases where the successful implementation of Lean yielded measurable results (Burgess & Radnor, 2013; Kollberg, Dahlgaard, & Brehmer, 2007; Radnor et al., 2012).

However, there are still obstacles that restrict the spread of Lean in the health care industry. One of the main obstacles is the bureaucratic nature of hospitals in terms of funding (Radnor et al., 2012; Scott et al., 2000). There are also sociotechnical aspects that lead to concerns of the effects of Lean on job characteristics and pay grades (Joosten et al., 2009). One of the first steps in the Lean journey is to define the customer and what they value. Defining the customer in the health care industry is considered by some to be a hurdle (Radnor et al., 2012). Although it can be agreed that the patient is the customer, what the patient values is a matter of extensive debate. The general rule is to define value as what the customer is willing to pay for (Weinstock, 2008), but in dealing with health care patients, there is a debate whether speedy responsiveness or a thorough medical review is of greater value (Young & McClean, 2008). Graban (2012) recommends three criteria to define patient value-add activities: willingness to pay for the activity, the activity changes the patient's health, or it changes their state in the health care institution. Any activity that does not add value to the patient is considered waste (Hadfield et al., 2006). Lean identifies eight areas of waste

(Black & Miller, 2008; Radnor et al., 2012; Weinstock, 2008); when added up, most health care institutions only have 5-20% of value-add activities while world-class institutions that serve as the benchmark operate at roughly 40% of value-add activities (Hadfield et al., 2006). These are some of the issues that will need to be addressed for health care to become more Lean.

Lean improvements usually take the form of implementation projects that vary depending on their objective, scope, and timeline; Plan-Do-Check-Act (PDCA) projects typically range from one to four months (Hadfield et al., 2006; Jolayemi, 2008), Rapid Improvement Events (RIEs) or Kaizen Blitzes have a smaller scale and a shorter length (Radnor et al., 2012; Singh et al., 2008), and wiki-kaizen improvements are sometimes called "get it done" or "just do it" improvements (Ptacek & Sperl, 2012). Eventually, as organizations mature in their Lean transformation, there is no longer a distinction between Lean and non-Lean initiatives (Landry & Beaudoin, 2014).

Mann (2010, 2014)[1] discusses how a management system is needed to sustain these improvements which Ohno (1988) refers to as isolated islands. A management system would empower the Lean transformation and strengthen its cohesiveness within an organization. It is what enables the breaking down of old patterns and the installation of less wasteful ones. Therefore, the role of the management system is to guide and enable the organization's Lean transformation; it creates the framework for continuous improvement and acts as the "policy bridge" between upper management's strategic plans and the implementation of daily undertakings to achieve them (Jackson & Jones, 1996).

This research explores the daily aspect of the Lean management system in the literature and focuses on how health care institutions deploy the Lean

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[1] Mann's third edition of "Creating a Lean Culture: Tools to Sustain Lean Conversions" was published October 22, 2014. It includes additions to the second edition, such as an added chapter on engaging executives in Lean initiatives. Due to the late publication and lack of significant differences, the second edition will be referenced throughout this research.

Daily Management System (LDMS). However, it does not attempt to provide evidence of its effectiveness or successful deployment. It will be demonstrated in the research that there are different cycles within the Lean management system that range from daily to monthly. This thesis focuses on its daily aspect as was highlighted by Mann (2010). It does not address higher-level aspects of Lean management systems such as policy deployment or kaizen projects although it touches upon them. LDMS could therefore be considered an element within the Lean Management System that leads and manages the Lean transformation.

This paper answers the following research questions:

- What elements constitute LDMS?
- How can health care organizations that have adopted Lean through different means deploy LDMS?

Conceptual models were developed to address these two questions through a multiple-case analysis of institutions that have already adopted LDMS. Three hospitals were selected as case studies; CSSS Haut-Richelieu-Rouville in Saint-Jean-Sur-Richelieu, Hospital for Sick Children in Toronto, and St. Boniface Hospital in Winnipeg. These hospitals have taken different approaches and are at different points in their Lean transformation. St. Boniface Hospital and the Hospital for Sick Children were largely influenced by the ThedaCare methodology (Barnas, 2011), while CSSS Haut-Richelieu-Rouville embraced Toyota Kata (Rother, 2010). On the other hand, St. Boniface Hospital had undergone an extensive amount of Lean transformation before deploying LDMS in comparison to both the Hospital for Sick Children and CSSS Haut-Richelieu-Rouville.

The case studies shed light on the context within which each hospital deployed LDMS. Each hospital's methodology is examined individually and collectively in order to develop a guideline for other health care institutions that are considering deploying LDMS. The analysis examines each LDMS tool

in use, their interrelatedness, and how they function within the context of the health care institution. The analysis also shines a spotlight on some innovative solutions and how they were developed in response to real-life circumstances. As a result of the multiple-case analysis, the initial conceptual models developed from the literature review were augmented to reflect the insight these cases provided.

The Lean Daily Management System (LDMS) is not extensively covered in academic literature. As a consequence, professional work, as in published books, is utilized. In addition, particularly regarding the deployment of such a management system, the literature is scarce. Therefore, related management ideologies such as Total Quality Management (TQM) are studied. In order to develop a more rounded analysis, research on the service industries in general is used in the literature review.

The aim of this thesis is to develop a framework that can be used by health care organizations that have already embraced Lean methodologies. How far an organization is along the Lean pathway will determine how the framework can be employed, as certain facets of the framework may already be applied in a mature Lean organization.

CHAPTER 2: LITERATURE REVIEW

"The Toyota production system, however, is not just a production system. I am confident it will reveal its strength as a management system" (Ohno, 1988:15).

Absent from most Lean guidebooks is the management system to sustain it (Mann, 2010) . After a brief introduction to LDMS [Section 2.1], the first research question of what constitutes LDMS is addressed [Sections 2.2 & 2.3]. The second part of the literature review [Section 2.4] addresses the second research question on how to deploy LDMS in a health care organization that has already adopted Lean. Two LDMS conceptual models are presented [Sections 2.3 & 2.4] to create a framework to answer the two research questions. The models are later examined in the case studies.

2.1 LEAN DAILY MANAGEMENT SYSTEM (LDMS)

LDMS is the management structure to the Lean transformation; it controls the improvement process and prohibits the improvements from being ignored or worked around (Black & Miller, 2008). It dips into the Lean toolkit to enable organizations to improve their management processes and serves as the glue that holds Lean improvements together. It grows stronger as more improvements are implemented. Radnor et al. (2012) reference the disjointed activities that sometimes result from these improvement implementations, while Ohno (1988) addresses the notion of such isolated islands and the need to create a system that ties them together to sustain them.

The focus on processes is the key to a sustainable LDMS because if the process design is effective, it will lead to the desired results (Barnas, 2014; Rother, 2010). The process focus entails frequent gages against expected intermediate results, so the problem solving and improvement processes can start before the end results are finalized. There is extensive research on such process-orientation in the literature (Bertolini et al., 2011; Busilacchi &

Rondeau, 2014; Kohlbacher, 2010). In the health care industry, additional factors need to be taken into account when analyzing the process. Process governance and communication are examples of issues that need to be addressed in an environment where patient care in its totality is rarely planned or measured (Briš & Keclíková, 2012; Pradhan et al., 2001).

2.2 LDMS ELEMENTS

There is extensive literature on the tools that LDMS utilizes, but the literature also warns of the risk and implications of focusing on the tools that target change on the process level without affecting the system as a whole (Burgess & Radnor, 2013). According to Zarbo (2012), the goal is to create a work environment where the leader is able to walk away, and the empowered staff are able to sustain themselves in pursuing continuous process improvements.

For Mann (2010), LDMS is composed of the following three elements: Leader Standard Work, Visual Communications Board, and Tiered Accountability Meetings. He also argued that discipline should be added as a fourth element of LDMS. It is not considered so in this research because it is all encompassing and cannot be isolated as a distinct element. However, discipline is a requirement of every organizational member in every aspect of Lean, not just the management system that sustains it. Harbour (2002) goes a step further and recommends building discipline into an organization before even starting the Lean journey.

2.2.1 LEADER STANDARD WORK

"Leader Standard Work is the first line of defense for the focus on process in Lean management. When the leader follows his or her standard work effectively, the rest of the Lean management system has a good chance of operating effectively" (Mann, 2010: 24).

According to Ohno (1988), there cannot be improvement in the absence of standards. Nelson (2011) indicates that standard work should be in place for

all key job positions and should be available for others to see. The first reaction by managers when asked to standardize their work tends to be that this would stifle all creativity and create a very rigid top-down approach to management (Sehested & Sonnenberg, 2011). But in reality, Leader Standard Work provides structure and consistency for managers; the literature demonstrates that organizations actually exhibit more creative and effective process improvements as a result of it (Toussaint & Berry, 2013).

Standardizing any kind of process allows us to examine it and find problems or opportunities for improvement; the same principle applies to the management process (Sehested & Sonnenberg, 2011). Mann (2010) discusses the effect of Leader Standard Work on how managers communicate, handle problems, and inspire continuous improvement. It removes the arbitrary factor in the management process (i.e. individual responses and reactions to problems) and instils a systematic approach to management. Once Leader Work is standardized, LDMS becomes process-dependent, rather than leader-dependent. Leader Standard Work also enables the transition of leaders between roles and departments without loss of knowledge (Barnas, 2014).

The closer the leader is to the process, the more comprehensive the Leader Standard Work should be (Mann, 2009). The general format of the Leader Standard Work consists of different groupings of activity types. Barnas (2014) recommends the outline to cover gathering information, addressing problems and guiding improvement activities. Leaders should develop their own Standard Work and take into account the realistic amount of time each activity would take (Graban, 2012). According to Mann (2010), managers should have their Standard Work on their person at all times and systematically review their completed and uncompleted tasks. Leader Standard Work should also be used to communicate with senior leaders regarding process management as well as personal development (Mann, 2010).

2.2.2 VISUAL COMMUNICATIONS BOARD

"The purpose for visual control in Lean management is to focus on the process and make it easy to compare expected versus actual performance" (Mann, 2010: 53).

Rich et al. (2006) describe how Lean thinking enables organizations to reap the benefits of open information, whereas deliberate displays of team performance have historically been considered a method of gruelling employees into working harder (Mann, 2010). According to Rich et al. (2006), these Communications Boards should be located in common areas to showcase meaningful trends and target information for all employees, not just leaders. The metrics displayed serve as indicator signals that help employees learn more about the process, its standards, and its improvements.

The boards enable teams to take on more of a self-management responsibility as they continuously monitor performance, resolve problems, find opportunities, and take action to implement improvements (Barnas, 2014). An added benefit in the health care industry is that they facilitate communication among part-time and night-shift staff and allow nurses to easily switch departments to help out in times of need; they enable them to quickly comprehend the situation and make good decisions (Rich et al., 2006). When designing the Visual Board, there are certain elements that should be included; such as daily metrics and indicators, improvement activities, and ideas for future improvements (Saskatoon Regional Health, 2013). Figure 2.1 is a sample of what the Visual Communications Board looks like, with the different elements organized according to the key metrics they pertain to.

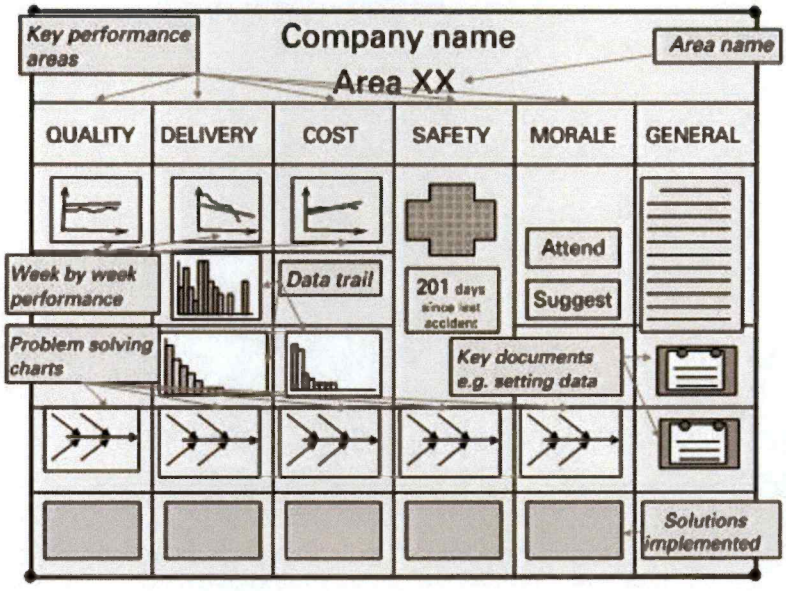

Figure 2.1: Sample Visual Communications Board (Rich et al., 2006: 87)

The general rule is that everything on the board must trigger an action (Womack et al., 2005). According to Mann (2010), the Visual Board facilitates the comparison of the actual versus expected performance at the process level to highlight areas for improvement. Resulting action items to rectify the performance feed into the Leader Standard Work. Even though Visual Boards should be consistent throughout the organization, imposing the same format on each board is not recommended because what matters is that the Visual Board enables the team to effectively manage their processes.

Staff members and managers alike may have concerns with the Visual Board because it is essential to instil the confidence and trust of patients who may not understand these boards and perceive such open communication as signals of major issues (Barnas, 2014). However, Mann (2010) stresses the need to use this tool in contrast to a more sophisticated IT system, because everybody should have access to the same information as it occurs. The Visual Boards are also so simple and inexpensive that it permits managers to alter them swiftly as the conditions and requirements change.

2.2.3 TIERED ACCOUNTABILITY MEETINGS

Sometimes called Daily Huddles or Stand-Up Meetings; these are short five to fifteen minute meetings conducted at the beginning of the day in common areas and are open for all to attend (Barnas, 2014; Nelson, 2011). The format speeds the sharing of information, common goals, and priorities; it also enables leaders to control the direction and pace of change. The meetings are supported by the data displayed on the Visual Board and rely on the Leader Standard Work processes (Mann, 2010).

Mann (2010) discusses having at least three tiers of Daily Meetings; working along the three-tier organizational hierarchy that addresses strategic, managerial and operational authority (Aldrich & Herker, 1977). The first tier is to run the business activities, and is conducted by the team leader for the staff. These meetings, conducted in front of the Visual Communications Board, enable peer-to-peer interactions that lead to team building, knowledge sharing, and leadership development (Barnas, 2014). The supervisor or manager conducts the second tier of meetings for the team leaders; where the performance of key processes is discussed with the objective of improving business. The third tier is the value stream meeting that prioritizes processes to improve, and is conducted by the manager or director (Mann, 2010). Although he emphases the daily aspect of LDMS in naming them Daily Accountability Meetings, Mann's (2010) description of a tiered structure for these meetings led the researcher to rename them Tiered Accountability Meetings.

Barnas (2014) proposes a different but similar approach in conducting Status Sheet Reports in addition to the Daily Huddles. These one-on-one meetings are conducted along a similar tiered structure. The two approaches can complement one another if the operations and improvement aspects were separated, as in the case of ThedaCare (Barnas, 2011, 2014). The Status Sheet Report is used to focus the discussion on the status of operations so as to anticipate issues and address them in a timely manner, while the Daily

Huddle involves the frontline staff and generates continuous improvement opportunities.

Figure 2.2 is a sample of how the Status Sheet Report would be organized around key metrics. Using the Status Sheet in these meetings ensures that all relevant aspects are addressed. The questions are qualitative to create a dialog rather than convey performance indicators between tiers. More aggregate Status Sheets would be used in higher-level meetings. The participants and talking points differ among the three tiers but the general principle of pull communication, where the participants bring up issues in a two-way communication mode, is the same (Barnas, 2014). Such discussions among organizational members play a paramount role in its adaptability and member's learning and sense-making process (Jordan et al., 2009).

Unit: Family Birth Center							Rev 22 12/22/13
Daily Measures	**M**	**T**	**W**	**T**	**F**		**Notes**
Safety						M	Huddle Topics
What extra safety precautions or staffing measures are in place to keep our staff and patients safe today?							
Anything happen yesterday that we didn't anticipate?							
What supply or equipment issues do we have to work through today?							
Quality						T	Huddle Topics
Immunization Screens Complete_____ Induction Consent_____ Code Cart Sheet_____							
What would put us at risk for a patient, family, or provider complaint?							
K' Board Coaching: What standard work have or will you observe today?							
What have you learned from your observations of standard work and the coaching that came with it?							
People							
Tell me about the staffing and experience mix for today and oncoming shifts? What is the plan to support development of today's team?							
What were the high stress incidents in the last 24 hours? Any staff to debrief with?							
Customer Service: Access & Delivery							
What is our projected MESH variance and plan?							
How will you right size your team today either up or down?						T	Huddle Topics
What is your plan for the next 3 admits?							
How is TBC capacity and staffing?							
What will cause barriers to flow today?							
Cost							
How are assignments affect our productivity target?							
How will today's work impact our managed expenses? (OT, bonus, extra shifts, TNN, VBACs, sick, lunches, staying past shift end, flexing, RSO, PERIOP, etc)						F	Huddle Topics
What can be done during downtime today?							
Wrap up: Priorities, Improvements & Celebrations							
Who has done an extraordinary job recently that we should celebrate?							
What is your priority today? What is worrying you?							
How can I help you today? (Share leadership schedule for day)							

Figure 2.2: Status Sheet Report (Barnas, 2014: 35)

2.2.4 INTERRELATEDNESS OF THE ELEMENTS

Mann (2010) describes the interrelatedness of the three elements and suggests the model in figure 2.3; it has the three elements evolving around the process at hand. Mann's (2010) depiction of the three elements was augmented in figure 2.3 by indicating Tiered rather than Daily Accountability Meetings.

According to Mann (2010), the process is standardized mostly through Tiered Accountability Meetings. The Visual Communications Board captures the now standardized process performance and enables its improvement over time. The newly improved process is then included in the Leader Standard Work, which prevents the process improvement from sliding back into its old shape. The three elements continue to feed into one another in a closed loop, all while keeping the process as the central focus of the system.

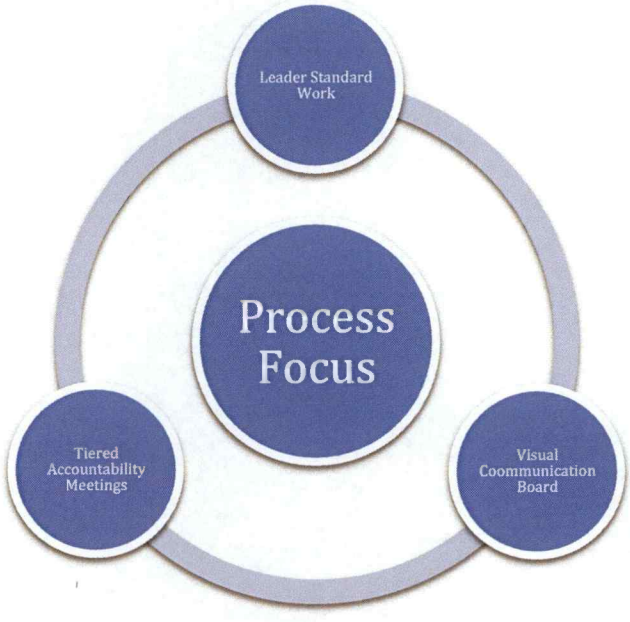

Figure 2.3: LDMS Elements – Adapted from (Mann, 2010: 8)

2.3 LDMS UTILITIES

Supporting the three LDMS elements are the functions that enable them to be used to their fullest potential. Five such supporting elements have been

identified from the literature review; Genchi Genbutsu, coaching, problem solving, escalation chain, and key performance metrics. They are referred to as supporting element utilities. Utility is defined as the state of being useful or beneficial; it can be used to describe being able to perform several functions ("Oxford Dictionary," 2014). The following five elements are considered utilities because of the state they create collectively; they cannot be isolated from one another.

2.3.1 GENCHI GENBUTSU – GO AND SEE

"Genchi Genbutsu" is the act of conducting "Gemba walks"; this is the closest utility to the value-add process itself (Sehested & Sonnenberg, 2011). According to Gerst (2013), the concept of Gemba is part of every management system that emphasizes quality. Sehested & Sonnenberg (2011) describe how Ohno, accredited with the development of the Toyota Production System, first conduced Gemba by drawing a circle on the floor and standing in it for at least an hour, observing everything around him. He not only developed a better understanding of the work processes, but he also demonstrated his interest to his employees. Today, Lean Sensei are sometimes hired as consultants to conduct the Genchi Genbutsu with the organization's leaders, to help them recognize what they should be looking for (Liker & Convis, 2011).

There are some limitations to Genchi Genbutsu such as its toll on resources and the possibility of staff performing differently because they are being observed. However, research indicates that the benefits outweigh the limitations because of the usefulness of the data that can be gathered (Castle & Harvey, 2009). The effectiveness of Genchi Genbutsu is partly dependent on the Visual Communications Board (Mannon, 2014), as it showcases the baseline to observe for performance measurement and continuous improvements.

All levels within the organization should be observed and Leader Standard Work should be audited (Barnas, 2014). Processes should be observed by leaders as well as staff; leader visibility on the front line stimulates the need for change, and staff observations of their peers enable them to see the processes from an entirely new perspective (Castle & Harvey, 2009).

According to Mann (2010), Genchi Genbutsu should be conducted at frequent pre-established times, usually once a week. The visits should be structured and deliberate in terms of which processes to observe, what to ask about, and what to look for (Ahmed, 2014). Even as leaders become more knowledgeable about the processes, it is important for them to continue their visits because it would allow them to continue to improve and view the processes with a new set of eyes.

2.3.2 COACHING

Coaching is the means that enables people to tap into their own unleashed potential (Lloyd, 2005), and develop their leadership skills (Hicks & McCraken, 2010). Lean is dependent on the leadership structure of the organization; just like leaders must be well trained to be effective, they must also be actively involved in training their staff (Liker & Convis, 2011; Studer, 2012).

Training allows the organization to share the gains by introducing its employees to tested procedures (Zarbo, 2012). It also creates a reinforcement structure that feeds into the continuous improvement dynamic by building onto the Standard Work element (Soltero & Boutier, 2012). Understanding and accommodating the type of knowledge to be shared is necessary to develop an effective model of knowledge management and sharing (Kamhawi, 2010). Most knowledge in Lean is tacit (Spear & Bowen, 1999); it focuses on the "how" questions and not just the "what" and "when". The issue with sharing tacit knowledge is that it is difficult to externalize and communicate; thus the best way to convey it is through

experience and reflection (Mahroeian & Forozia, 2012). This makes training through coaching far more effective than in a workshop setting (Baden & Parkes, 2013).

Coaching in a problem solving context enables the coach to impart tacit knowledge on how to develop solutions, rather than how to implement them (Liker & Rother, 2013). The key is for it to be immediate and effective (Rother, 2010; Soltero & Boutier, 2012). Coaching staff to solve problems also provides them with a sense of ownership of the changes and develops a personal interest in sustaining them (Singh et al., 2008). Coaching scenarios vary from helping to achieve objectives to enabling effective teamwork (Harvey et al., 2002). The five questions of Toyota Kata is one popular framework that helps drive the desired behaviour and address the true cause of the problem (Rother, 2010). Knowledge inertia, developed from the routine application of problem solving procedures, has been examined in the literature (Liao, 2002).

Rother (2014) discusses establishing a "nested coaching" arrangement; it enables the funnelling of the high-level target condition into a direction that is actionable at the frontline. He gives an illustration of a middle manager coaching frontline staff members on the improvement process, while a superior coaches the middle manager on the coaching process itself. The objective is to instil improvement into the frontline staff's thinking process while steering it in the correct direction; top management sets the direction while supervisors and middle managers set the next target condition to gradually drive the organization towards its vision. Rother (2014) describes Coaching Kata and Improvement Kata to develop practice routines to enhance coaching in a problem solving setting.

It is important to recognize that the Lean mindset is an evolutionary one; it has been the subject of extensive research (Hines, Holweg, & Rich, 2004). Through ongoing coaching and practice, continuous improvement may become the new habit of organizational members (Vincent, 2014). Reverol

(2012) recommends daily coaching sessions of 15 minutes rather than longer less frequent sessions to create the continuous improvement habit through ongoing practice.

There are several options when deciding on who coaches. The first decision to make is whether it will be internal or external. Managers, trainers, Lean experts, or peers could be chosen to coach; and the choice is not necessarily limited to only one (Allan, 2013; Liker & Rother, 2013). However, the key advantage of using internal resources, is that knowledge is internalized (Barnas, 2014). An extension of the coaching system is mentorship, which is how Toyota sustained their improvements and made them embedded routines (Liker & Rother, 2013). Another issue that should be considered is that different coaches may lead similar problems to be solved in different ways, but that enforces the need for coaching all organizational levels to ensure that the entire organization is on the same bandwidth (Anderson, 1993).

Rother (2014) describes how coaching cycles and iterations lead to the achievement of the target condition, and formally positions the distinct roles of coach and learner. He also describes the role of the Advance Group in guiding the organizational transformation. Extensive skill development is needed for the Advance Group to be able to facilitate the transition. The Advance Group's role evolves through the phases of the implementation plan as more managers develop the skillset to coach their areas of control. Also referred to as the Steering Committee or Change Agents, there might be more than one group, depending on their role and responsibility (Atkinson & Nicholls, 2013; Chneski, 2007; Graban, 2012). It is also important to recognize that the pace of the implementation plan should never exceed that of the internal coaching proficiency (Rother, 2014).

2.3.3 PROBLEM SOLVING

Problem solving in multidisciplinary teams allows for the discussion to reach agreement among a widely varied group of individuals, and allows the changes to be enforced through their relations (Barnas, 2014; Brache & Bodley-Scott, 2006; Freeman et al., 2000; Michael et al., 2004; Pethybridge, 2004). There is extensive literature on the formation of effective teams in the health care industry in particular (Lee, 2010; Tanco et al., 2011; Tapping et al., 2012).

According to Mann (2010), a rapid response system is required because solving problems swiftly sustains the continuous improvement momentum. It is also important that those affected by the change know how the changes will be made and who is responsible for them (Spear & Bowen, 1999). The whole-system approach to problem solving is one that stresses the need to make decisions that add value to the system as a whole (Ptacek & Sperl, 2012), which is why prioritizing those problems that affect the whole system is crucial.

Graban (2012) & Barnas (2014) suggest visualization when starting the problem solving process. It not only enforces the understanding of the process and the problem exhibited, but also acts as a communication tool that can be used to demonstrate the problem and what the solution should look like (Mann, 2010). A3 and Value Stream Mapping (VSM) are staples in the Lean toolkit. VSM enables the visualization of the current state and the future state processes and sets priorities within them (Hines et al., 2011; Nelson, 2011; Pojasek, 2001; Smeds, 1994; Tapping et al., 2012).

For each identified problem or opportunity, an A3 is recommended to guide the problem solving process through identification, root cause analysis, countermeasures, implementation, and performance monitoring according to the initial objectives and problem statement. Its simplicity and availability to all organization members are the keys to its successful utilization in health

care (Ghosh, 2012). The A3 process is rooted in the scientific method to problem solving; it is based on the Plan-Do-Study-Act (PDSA) cycles (Bassuk & Washington, 2013; Toussaint, 2013). Validating the problem root cause through hypothesis testing is the scientific approach to problem solving (Graban, 2012; Sarkar et al., 2013); this scientific approach is the reason why standardization does not stifle creativity in problem solving (Spear & Bowen, 1999). The objective of A3 is not to focus on the end results, but the process by which the end results can be met; it is the management mechanism that guides the problem solving process (Hopkins, 2009).

Breaking the problem into simple steps allows the problem solving team to start devising one or more improvements to these steps (Singh et al., 2008). As more solutions are implemented, more problem layers will be shed, and eventually a much better understanding of the problem will enable the realization of the ideal solution (Rother, 2010). Band-Aid solutions that only address the symptoms of the problem are not acceptable because they will only be hiding the real waste rather than exposing it (Mazzocato et al., 2010). Sometimes called first-order problem solving; such Band-Aid solutions do not enable organizational learning. It is the second-order problem solving that adds value to the collective development of the organization and its members (Tucker & Edmondson, 2003). A feedback loop to ensure the solution truly resolves the problem is necessary; the literature often refers to the "catchball" process of vetting possible improvements throughout the organization structure along vertical and horizontal lines to ensure agreement on the proposed solution (Tennant & Roberts, 2001; Toussaint & Berry, 2013).

As processes are observed with new sets of eyes through Genchi Genbutsu, and the staff is coached on how to use the scientific method of problem solving, a complete circle is formed around the process's continuous improvement (Ahmed, 2014; Toussaint & Berry, 2013). In reverting back to the model developed by Mann (2010) in figure 2.3, the three elements

previously discussed center around the actual process and its improvement. The utilities previously discussed form a full circle around the three elements and are one step further removed from the actual process.

2.3.4 ESCALATION CHAIN

The escalation chain refers to the elevation of a problem up the command chain in order to be resolved. The procedure for initiating the Chain of Command within the decision-making process is an element of the organization's hierarchy and reporting structure (Crumpton, 2013). There is research that aims at developing structures and organizational environments that circumvent the decision-making process escalation up the command chain; however, that would destroy the "conceptual lens" that escalation provides (Pojasek, 2001). As important as it is to coach the staff to become more autonomous and better problem solvers, it is important that the managers continue to be part of the problem solving process (Mazzocato et al., 2010). According to Sehested & Sonnenberg (2011), even though upper management is removed from the daily process management, they still need to be involved enough to become more process oriented, and prioritize those processes that create value for patients. As they become more systematic in their approach to the management process, it feeds into their Leader Standard Work and the ensuing continuous improvements.

Developing an escalation process within the problem solving process would remove the cultural barriers that prohibit managers from escalating problems (Hansen, Nohria, & Tierney, 1999; Keil, Depledge, & Rai, 2007; Pojasek, 2001). Problems that require additional deliberation, use of non-standard skills or knowledge, or allocation of additional resources are the ones that tend to be escalated; the standardized escalation process must take into account the difficulty and type of problem (Szulanski, 2000). In addition, the escalation process should be designed to take into account that the interactions along the Chain of Command play a pivotal role in shaping the culture and organizational behaviour (Plsek & Greenhalgh, 2001).

2.3.5 PERFORMANCE METRICS

Lee (2010) portrays performance metrics as a common language that can be used throughout the organization. They are communicated from the bottom-up to indicate performance levels, and from the top-down to indicate what should be prioritised according to strategy. Aligning metrics throughout an organization involves tracing the process performance metrics along the global organizational objectives. This is the best way to align the organizational strategic objectives with its activities (Swank, 2003). According to Womack et al. (2005), the most common goals to align with metrics in the health care industry are quality, cost, delivery, safety, and engagement (QCDSE). Patient length of stay, infection rates, no-show rates, and waiting times are some examples of metrics that can be grouped within the global QCDSE metrics.

Mann (2010) describes True North metrics as a guide that reinforces strategic priorities. True North indicates the direction to take in pursuing Lean, just like travelers relied on the North Star to keep them headed in the right direction. True North represents the envisioned future state of the organization, translated into the common language that is the performance metrics (Barnas, 2014).

At the department level, it is recommended to choose three to five metrics to track on a daily basis, with the possibility of adding or removing one or two metrics every month (Womack et al., 2005). The metrics chosen should be addressed daily through the Visual Communications Boards, Tiered Accountability Meetings, and Leader Standard Work. Performance metrics, like the escalation chain, involve leaders on the top of the Chain of Command who are not usually involved in daily process management. Yet, the escalation chain and performance metrics utilities support the problem solving, coaching, and Genchi Genbutsu utilities by aligning activities on the process level with overall organizational goals (Radnor et al., 2012).

Research indicates that it is important to develop a policy deployment strategy to effectively deploy an operational implementation plan (Angelis et al., 2011). Hoshin Kanri is a common policy deployment model that is often associated with Lean transformations. It is a framework for management to control the focus of its deployment efforts and align its activities with its strategic goals and objectives (Asan & Tanyas, 2007; Swank, 2003). The literature indicates that Hoshin Kanri forms a continuous closed-loop that utilizes the "catchball" review process. The research also suggests integrating Hoshin Kanri into LDMS in order to share the common toolkit (Jolayemi, 2008; Liker & Convis, 2011; Toussaint & Berry, 2013).

Black & Miller (2008) describe Hoshin Kanri as a participatory approach that requires managers to assess performance based on adherence to policies rather meeting objectives. However, there is a debate whether this is the right path for health care organizations. While Management by Process links all the process-level activities in the pursuit of the overall strategic objective (De Toni & Tonchia, 1996), Lee (2010) argues that results are what matter in health care; it does not matter how many tests are run or patients are seen but how often do patients recover from their ailment.

2.3.6 LDMS CONCEPTUAL MODEL

Figure 2.4 attempts to answer the first research question of what constitutes LDMS. With the process at the core, the three elements that constitute the mechanisms to manage and improve the process form a closed loop around it. This model builds on Mann's three elements of Leader Standard Work, Visual Communications Board, and Tiered Accountability Meetings. It was adapted from the one proposed by Mann (2010: 8) by adding the five utilities that surround Mann's three elements.

The first loop surrounding the three elements consists of the supporting utilities that have a direct relationship with the process; problems are identified and resolved by those utilities. Genchi Genbutsu, coaching, and

problem solving are the result of the direct interaction between managers and the process itself. The largest layer of the two higher-level utilities is one step further removed from the process. Performance metrics and problem escalation are utilities that involve leaders higher up the organizational chart, who are not involved in the process on a daily basis.

The model depicts the interrelatedness of the elements along each organizational tier. If, for example, problem solving is structured in an organization at the middle management level, it will eventually lead to coaching and Genchi Genbutsu since effective problem solving inherently depends on these supporting utilities. However, it is important to ensure that each tier is represented when deploying this model to ensure that each organizational tier is involved.

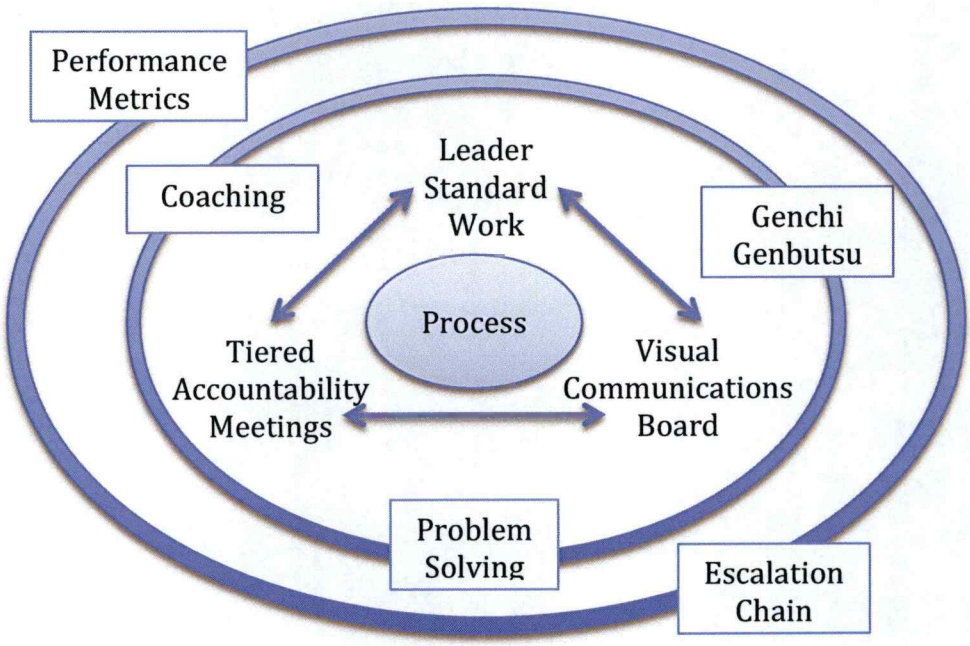

Figure 2.4: LDMS Conceptual Model

2.4 LDMS DEPLOYMENT

There are two health care organizations that are often cited in the literature because of their successful implementation models, in addition to being early adopters of Lean in the health care industry. The first is a case of Lean

deployment at Virginia Mason Medical Center (VMMC), their key to success was the commitment made to patient quality as the number one priority in every decision (Lee, 2010). Black & Miller (2008) write extensively about the journey VMMC took, and the results they demonstrated; the Virginia Mason Institute was created to share their experience ("Virginia Mason Institute," 2014).

The second case is ThedaCare; it is more relevant for this research, and this section draws from their experience. Their Business Performance System (BPS) was developed to sustain their Lean improvements. It is now shared with almost 300 hospitals worldwide that are inspired by their journey and methodology (Barnas, 2011, 2014; Mannon, 2014; Toussaint, 2013). BPS's successful deployment led to the creation of the ThedaCare Center for Healthcare Value which strongly influenced two of the three cases that will be later examined ("ThedaCare Center for Healthcare Value," 2014).

Starting with the conceptualization of the implementation plan, how the change will be directed from the top or bottom, and how LDMS will be spread throughout the organization are addressed in the following sections. A brief overview of change management and organizational readiness will also be addressed before presenting the LDMS deployment conceptual model, which is later explored through the case study research.

2.4.1 IMPLEMENTATION PLAN

Even though there is no extensive research on LDMS implementation plans, there is some literature on related management doctrines such as Total Quality Management (TQM). The literature offers a few guidelines and some examples of failed implementations (Ghobadian & Gallear, 2001), but there is no uniform deployment model (Moosa et al., 2010). Most of the research concludes that implementation is organization-specific (Ghobadian & Gallear, 2001). In general, implementation plans tend to consist of phases or cycles. As the organization moves along these phases, behaviours start to

change to the point in which the system is visible in formal and informal procedures, making it the new norm (Ahire & Ravichandran, 2001; Davis, 2009; Dennis, 2006; Jackson & Jones, 1996; Landry, Chaussé, & Paris, 2014).

Developing a process mindset (Atkinson & Nicholls, 2013) and a flexible implementation plan allows the organization to tread through the grey zone that Rother (2010) describes. There is extensive research on implementation strategies and their usefulness in different circumstances (Enz, 2012; Nutt, 1989), as well as on pitfalls that proper planning can circumvent (Boiko, 2013; Hrebiniak, 2006). In any case, altering implementation plans is more the norm than the exception (Radnor et al., 2012), as organizations often hit a plateau because of unidentified implementation issues (Barnas, 2014; Wellburn, 1996). Continuously assessing the implementation plan is therefore necessary to ensure it is on the right path (Moosa et al., 2010).

Project management techniques are suggested because their execution entails developing a target and working backwards from there (Cocks, 2010). Furthermore, project implementations emphasise the need for effective communication and teamwork (Michael et al., 2004). Designing and selecting projects to achieve strategy has been extensively examined in the literature (Brache & Bodley-Scott, 2006; Duarte et al., 2012; P. Morris & Jamieson, 2004; Pun & Gill, 2002). In implementing Lean Six Sigma projects, some literature cites the Define-Measure-Analyze-Improve-Control (DMAIC) model. Its value is that it requires the establishment of control before moving on to the next phase (Dahlgaard & Dahlgaard-Park, 2006; Mandal, 2012).

In determining the sequence of projects and deployment areas, a correlative approach is suggested (Ghobadian & Gallear, 2001). Recognizing the synergies that can be brought upon by continuous improvement efforts can help the organization improve their implementation plans and strengthen the integration of LDMS (Ahire & Ravichandran, 2001; Pun & Gill, 2002).

2.4.2 DEPLOYMENT FOCUS

In an environment as complex as a hospital, setting common tools and procedures and expecting them to be successfully implemented throughout the organization might be unrealistic (Spear, 2005). High-level management principles lack the specified definition needed to package and introduce them, which is why they are usually deployed over several cycles (T. Morris & Lancaster, 2005).

Duarte et al. (2012) categorize deployment approaches into company-wide (mile-wide inch-deep), focused (inch-wide mile-deep), and partial which targets particular issues throughout the organization. The mile-wide inch-deep approach is characterized with quick dissemination of knowledge. If applied from the top-down, it is also expected to yield high executive commitment. However, it entails higher risk and investment in resources in order to succeed. At the opposite end, the inch-wide mile-deep approach provides quick and tangible results that may serve as a proof of concept. A concern is that this focused approach may lead to the development of a silo effect, because narrowly compartmentalized improvements are sought rather than end-to-end process improvements (Duarte et al., 2012).

The inch-wide mile-deep approach is attributed with enabling appropriate priorities to be set and undertaken (Jacques, 1996). Scholtes (1999) links the deployment focus with developing key competencies in leaders; the inch-wide mile-deep approach involves building capabilities thoroughly by controlling the implementation space rather than developing ambiguous capabilities inadequately. On the other hand, other research indicates that a disadvantage of the focused deployment model is that it constrains leadership development because of the limited exposure organizational members have with the new strategy (Gates, 2007). The focused strategy deployment, or inch-wide mile-deep approach, enables individual as well as organizational learning (Duarte et al., 2012; Toussaint, 2014). It also enables LDMS' smooth adoption in subsequent departments; it creates experience

throughout the department and minimizes the threat and cost of failure (Ahire & Rana, 1995).

In terms of introducing the three LDMS elements within each deployment area; it is generally recommended to introduce elements sequentially rather than simultaneously (Ghobadian & Gallear, 2001). This is in line with the Lean mentality of continuous rather than radical improvement (Pun & Gill, 2002). Mann (2010) indicates that the best place to start is the Visual Communications Board, as that would enable them to start measuring variations and standardizing work. Tiered Accountability Meetings then help standardize the measured metrics. As more measures are standardized, Leader Standard Work can be done easily to document the common processes they involve.

2.4.3 MODEL CELL

LDMS can be deployed without significantly disrupting operations by utilizing a "model cell". A fully functioning LDMS in a controlled area is recommended to test strategies, learn what works, and showcase the evidence to the organization as proof of concept to gain organizational support (Swank, 2003). The proposed model cell is sometimes described as a "living model"; it is dynamic and evolving. Having such a model cell always be one step further developed than the rest of the organization provides the organization with a platform to visualize the evolution of LDMS and a standard to utilize in expanding it throughout (Valero, 2006).

Some literature recommends having a pilot area rather than a model cell; the pilot area refers to the first area where LDMS is deployed. A pilot area also enables the testing of strategies and demonstration of proof of concept (Bansler & Havn, 2010; Duarte et al., 2012). The distinction between model cells and pilot areas is that the model cell refers to an ongoing process where strategies are tested and the results are showcased, whereas the pilot area refers to the first area where LDMS is deployed just like a pilot project refers

to the first of many projects of the same kind. The pilot area is not continuously monitored and maintained, but is rather a one-time deployment approach. The implication of choosing a pilot area rather than model cell is that it is not an ongoing development method, which does not lend itself well to the inherit evolutionary nature of developing an organizational mindset (Bessant, Caffyn, & Gallagher, 2001).

Toussaint (2014) refers to the model cell and inch-wide mile-deep approach interchangeably; however, they are separated in this research according to the sequence of the decision made. After deciding on adopting the inch-wide mile-deep approach for example, an organization would still need to decide whether to adopt a model cell or a pilot area depending on the implementation plan. The model cell would allow for the continuous improvement of one area over a long period of time; it serves to showcase LDMS to the organization. The pilot area, on the other hand, would enable the organization to test strategies in a controlled time period and utilize lessons learnt to replicate that deployment throughout the organization.

Graban (2012) suggests choosing a department or patient pathway as the model cell based on the current state or needs analysis. The analysis will also help determine the scope of the change (Ahire & Rana, 1995). While VSM is recommended to help decide on which department to choose for the model cell (Barnas, 2014), some political issues, such as departmental rivalries, may need to be taken into consideration (Singh et al., 2008). Once LDMS is deployed at the model cell, a stabilization period should be allocated before utilizing the policies in other areas to test the sustainability of changes and allow some time for problems to surface (Smeds, 1994).

2.4.4 DEPLOYMENT APPROACH

The decision on whether to start from the top, bottom, or middle will dictate which layer of the LDMS conceptual model depicted in figure 2.4 to start with. Research indicates that the deciding factor of an organization's success

in adopting any management idea or initiative depends on how the "idea" is "translated" within the context of the organization, and how it is broken down into manageable elements (Dahlgaard & Dahlgaard-Park, 2006; T. Morris & Lancaster, 2005). Another requirement for any management system to be effectively transferred throughout the organization is developing the appropriate mindset (Bhasin, 2012). Therefore, before introducing LDMS elements, a conducive environment must be developed by employing the five supporting utilities previously described. The literature depicts several conditions and assessment models that may be used in the process (Alagaraja, 2014; Fryer et al., 2013; Hilton & Sohal, 2012).

The five supporting utilities are part of the Lean framework; so depending on how far along the organization is in its Lean transformation, these behaviours may already be exhibited (Hines et al., 2011). Assessing the organization's maturity level is therefore necessary to determine which utilities still need to be developed (Elshennawy et al., 2012; Jobin & Lagacé, 2014). How many and how often the organization implements Kaizen, PDSA, and Rapid Improvement Events (RIEs) should also be considered (Ptacek & Sperl, 2012; Sobek et al., 2012; Toussaint, 2013).

The bottom-up approach is sometimes suggested because of its inclusiveness (Durenberger, 2003). However, research indicates that in reality only a small percentage of organization members with certain personality traits get involved. The biggest concern with the bottom-up approach is gaining and demonstrating upper management commitment (Scherrer-Rathje et al., 2009). The pull or political stand that upper management provides is instrumental (Butcher & Atkinson, 2000), and failing to secure the required resources may jeopardize the deployment effort (Gaynor, 2013). Yet, input from the operational level at the frontline is still required to provide insight into organizational capabilities and complexities (Cocks, 2010; Landry et al., 2014).

On the other hand, the top-down approach is usually associated with funding and resources (Gaynor, 2013). Although sustaining the momentum and enthusiasm is challenging, a significant benefit of the top-down approach is its quick dissemination of knowledge (Duarte et al., 2012). However, it is imperative to realize that the continuous improvement mindset is evolutionary (Bessant et al., 2001). The evolving nature of the culture and mindset is difficult to manage solely from the top-down. The literature suggests an emergent approach where upper management develops an umbrella strategy without specifics that are left to emerge as the culture evolves throughout the phased implementation plan (Smeds, 1994).

With a top-down implementation approach, middle managers still play a seminal role in enforcing the change as well as probing the implementation plan (Currie, 1999). There is a debate in the literature on whether top management can handle the emergent strategies or whether middle management should play a greater role in developing them (Manville et al., 2012). Both top-down and bottom-up approaches may actually lead to the neglect of middle managers. They are expected to manage the transition without the necessary skillset or support they need to handle the change (Hines, 2010), while upholding the older system during the transition process (Rondeau & Bareil, 2009). Their roles may also change during the transition; they often experience heightened and broadened responsibilities (Delbridge & Barton). On another note, if they do not cooperate, their hampering may lead to the failure of the implementation plan (Danford, 2007). Middle managers are also in a unique position that makes them ideal candidates to become change agents. They play a bi-directional role in terms of disseminating and synthesizing information, as well as reconciling strategies with daily activities (Birken et al., 2012; Butcher & Atkinson, 2000; Nonaka, 1988; Salih & Doll, 2013; Spreitzer & Quinn, 1996).

The conceptual model in figure 2.4 depicts two levels of utilities that involve top and middle managers. While top managers have a great impact on

organizational culture (Studer, 2012), middle managers are better positioned to affect process change (Embertson, 2006; Salih & Doll, 2013). A top-down and middle-out approach in deploying LDMS would enable the organization to address both aspects simultaneously. The dynamics of the interaction between top and middle managers, during an implementation in the health care industry, should be taken into account (Raes et al., 2007).

2.4.5 CASCADING DEPLOYMENT

The ThedaCare BPS deployment across organizational units provides insight onto how organizations can organize the deployment effort (Barnas, 2011). Duarte et al. (2012) recommend starting with a focused strategy, then transition towards a company-wide cascading strategy. This would enable the organization to develop the competencies, in a focused area in the beginning, before applying them across the organization. Sehested & Sonnenberg (2011) describe alternative implementation strategies in terms of the sequence of departments or units. Strategies range from a "big bang" implementation of all units simultaneously to "domino" implementation of a comprehensive and complete system one unit at a time. Stepwise implementation may be considered an adaptation to the domino strategy. The principle guideline is incremental progression along the pathway one step at a time (Wincel & Kull, 2013).

The "cascade" deployment strategy involves the implementation of partial solutions in more than one unit. The cascade deployment is sometimes recommended for LDMS deployment because it is ultimately a cross-organizational involvement in minor steps at each area; it leads departments to be at different stages in their LDMS deployment (Sehested & Sonnenberg, 2011). In this sense, cascading refers to how LDMS is spread throughout the organization, not within a single department.

The Lean transformation is not linear (Burgess & Radnor, 2013; Wincel & Kull, 2013), its trickles down in stages throughout the organization. Systems

within the organization affect each other and co-evolve. Yet despite the unpredictability of fluid relationships, there is an inherent pattern that should be discovered (Plsek & Greenhalgh, 2001). These links and interdependencies need to be examined to map the phased deployment of LDMS (Sicotte & Paré, 2010). Formulating the cascading strategy will be contingent on determining such intradepartmental connections (Hannan et al., 2003).

The cascading implementation strategy provides ample opportunity for organizational learning; not only to develop and improve emergent strategies, but also learn from mistakes and share successes (Radnor et al., 2012). In addition, the relationships cemented through coaching and teamwork capture within them organizational learning that can be utilized in future endeavours (Carswell, 2012). The pace should increase as more implementations are completed. A control room is recommended to plan and track deployment activities (Black & Miller, 2008).The key to managing the deployment effort is to focus on the strategic vision and ensure that it guides all the separate initiatives in the right direction (Smeds, 1994).

The goal of the LDMS implementation plan is to advance from chaos, to control, to competency as the work is standardized, the quality increases, and the cost is reduced (Douglas & Judge, 2001). The progress of the deployment effort can be assessed by examining which phase a department is in, or by examining all departments within a single phase (De Toni & Tonchia, 1996). The Balanced Scorecard is sometimes recommended; it is used to link long-term strategies to short-term actions (Barnas, 2014; Kaplan & Norton, 1996). A complication of choosing such a framework in service sectors, and health care specifically, is that services cannot be measured as easily as outputs would be in a manufacturing setting (Asan & Tanyas, 2007; Zhang et al., 2012). The Lean Sustainability Assessment Framework for health care organizations is another recommended framework to assess the organization's development along its Lean path (Elshennawy et al., 2012).

2.4.6 ORGANIZATIONAL READINESS

Organizational Readiness is the state in which the organization is ready for change in terms of capability and commitment (Weiner, 2009). The definition of organizational readiness does not necessitate the organization to reach maturity; rather it requires the organization to be receptive to the impending change. In assessing organizational readiness, a distinction is made between context and facilitation measures (Helfrich et al., 2011). This chapter mostly touched on facilitation measures such as implementation team effectiveness and assessment. Another facilitation measure is communication; when and how leaders should communicate throughout the organization has been extensively examined in the literature (Atkinson, 2010; Mazzocato et al., 2010; Sehested & Sonnenberg, 2011; Smith, Barry, & Brubaker, 2008; Waring & Bishop, 2010). There is also extensive literature on change management models and strategies (Appelbaum et al., 2012; Levasseur, 2001; T. Morris & Lancaster, 2005; Parent & Bareil, 2014; Rondeau & Bareil, 2009).

Lee (2010) and Nelson (2011) illustrate this in discussing physicians' motivations for change, and their ability to provide additional leverage by playing a role in leading the change. Putting physicians in leadership roles will, however, require further investment in their training (Cherry et al., 2009; Henochowicz & Hetherington, 2006; Suneja & Suneja, 2010). It is also important to take into account the wide assortment of individuals within a health care organization in order to develop effective communication strategies (Cherry et al., 2009; Sehested & Sonnenberg, 2011; Studer, 2012; Zellars et al., 2000). The chicken or the egg dilemma is encountered as some argue that waiting for people to change their behaviour without concrete changes to push them would be futile (Shook, 2010), while others argue that change management tactics must precede implementation (Atkinson, 2010). Continuously adding small incremental steps that entice gradual behavioural changes is one compromise to this dilemma (Liker & Convis, 2011).

Public service organizations such as hospitals do not have the luxury of implementing change with the focus that a private company would have (McAdam, Hazlett, & Casey, 2005); stakeholder management is therefore instrumental because failing to meet their expectations of time and outcomes could lead to disaster (Nelson, 2011; Zhang et al., 2012). The patient's viewpoint must also be taken into consideration; in addition to involving patients in the problem-solving process (Barnas, 2014), deployment should start in areas most visible to them (Sehested & Sonnenberg, 2011).

Context measures, such as leadership, culture, and accountability (Helfrich et al., 2011) are beyond the scope of this research. These measures create the background on which the facilitation measures take place. An example of how these two types measures relate is building effective multi-discipline teams (facilitation) in a clinical setting (context) (Singh et al., 2008). There is extensive literature on organizational culture (Harlos et al., 2012; Taylor & Wright, 2004) and how it impacts change management (Bhasin, 2012; Fahey & Burbridge, 2008). Research has also be conducted on organizational change in health care organizations in particular (Scott et al., 2000; Zarbo, 2012). As the Lean culture continues to evolve, it is important that the organization internalize the knowledge gained from its successes and failures (Emiliani, 1998). The seminal role of leadership in creating a Lean culture is also well researched (Hines et al., 2011; Liker & Convis, 2011; Mann, 2009; Studer, 2012; Testani & Ramakrishnan, 2011).

An innovative infrastructure is one that supports and nurtures change (Black & Miller, 2008); well defined goals, trained leaders, and effective tools are some of the infrastructure elements (Studer, 2012). The most significant elements are transparency (Mannon, 2014) and accountability (Studer, 2012). Structured and periodic review of the culture and infrastructure can indicate whether the organization as a whole is ready and willing to accept change.

2.4.7 LDMS DEPLOYMENT CONCEPTUAL MODEL

The LDMS deployment conceptual model depicted in figure 2.5 addresses the second research question of how to deploy LDMS in a health care organization that has already adopted Lean. The model showcases how the different elements discussed in the previous sections interact. Even though the literature emphasizes that deployment is highly organization-specific, the model breaks down the deployment according to the main decision points. At each decision juncture, the model depicts the proposed alternative based on the literature review.

Starting at the top, the model proposes a phased implementation plan and an inch-wide mile-deep approach. In the first phase, a model cell is proposed to test and showcase the top-down and middle-out approach to employ the five supporting utilities. The top-down approach directly targets the escalation chain and key performance metrics, while the middle-out approach targets coaching, Genchi Genbutsu, and problem solving. Once the utilities are created, the three elements of LDMS; Leader Standard Work, Visual Communications Board, and Tiered Accountability Meetings can be implemented sequentially. Once the changes are settled in the model cell, the model proposes a cascading deployment throughout the organization.

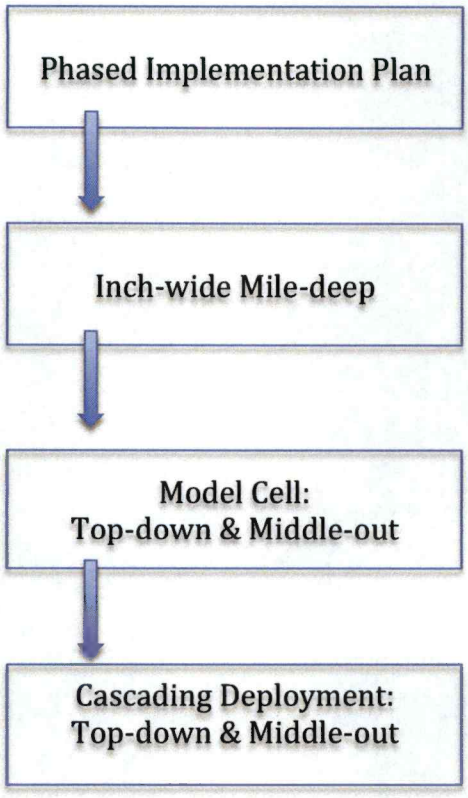

Figure 2.5: LDMS Deployment Conceptual Model

CHAPTER 3: RESEARCH METHODOLOGY

According to Yin (2009), conducting field research entails understanding exactly what the research aims to achieve. The objective of this research is to shed more light onto the theory from the literature review and provide a deeper understanding of LDMS and how to deploy it in health care organizations. This chapter discusses the reasoning behind choosing case study research, its design, and the data collection methods.

3.1 METHODOLOGICAL DESIGN

This thesis addresses the two research questions:

- What elements constitute LDMS?
- How can health care organizations that have adopted Lean through different means deploy LDMS?

These two questions lend themselves to exploratory research; which is typically applied when the research question and scope are not visibly defined (Yin, 2009). Drawing a clear line between deploying Lean and its management system is expected to be challenging because of the common tools and platform. Therefore, control and flexibility in the research design are necessary to accommodate the muddled boundaries of LDMS (Kothari, 2004). Eisenhardt (1989) makes the same argument as she discusses the overlap of data analysis with data collection; in that researcher impressions, which belong in the data analysis phase, start occurring during the data collection phase. As a result of the field research theoretical concepts may be corroborated, modified, or rejected. These developments are then inducted into augmentation of the two conceptual models developed from the literature review (Yin, 2009).

3.1.1 THE CASE FOR CASE STUDIES

Gillham (2010) argues that when attempting to produce generalizable findings, case studies allow the researcher to put things into perspective.

Case studies encompass the subject matter in its natural environment, particularly when examining management practices. According to Yin (2009), case studies are especially suitable when the line is blurred between the research topic and the context within which it is set. This makes the case study approach ideal for examining the deployment of LDMS. Given the nature of the research topic and questions, qualitative research methods are favoured because they allow the researcher to explore for meaning and deep understanding (Gillham, 2010). Qualitative data showcases relationships, interdependencies, and the context within which these relationships subsist (Eisenhardt, 1989).

Developing deep understanding entails understanding the sense making process of individuals, as well as system dynamics within the organization (Eisenhardt, 1989; Woodside, 2010). An estimated 95% of human thought is considered subconscious in that it cannot be articulated (Woodside, 2010). Given the limited ability to isolate human thought and derive it from the context it thrives in, the best approach would be to document it, illustrate the context, and bridge the pieces together by asking questions to understand the situation as a whole.

Cases have been used extensively in research to focus on current conditions and tell the story of what transpired, how, and why (Yin, 2009). Case research allows the researcher to explore complexities that cannot be quantified. By viewing the case from the inside out, from the perspective of those on the inside, case research reviews processes that lead to results, but does not test the significance of these results (Gillham, 2010). Common criticisms of case study research are the allegation of inherit bias, inability to address causal relationships, and inability to generalize findings (Flyvbjerg, 2006; Yin, 2009). In addressing these concerns, it is important to note the objective of conducting the case research; which is to be used as a framework that includes a winning formula. Case study research does not

provide a recipe because system intricacies and interdependencies are like organisms that cannot be mimicked (Woodside, 2010).

3.1.2 CASE RESEARCH DESIGN

Examining multiple cases addresses the concerns of generalization and allows the researcher to develop theory. Embedding cases, by having more than one unit of analysis within each case, will further reduce vulnerability and enhance the analytical framework. Given the departmental nature of hospitals, cases in hospital settings lend themselves well to embedded design. A concern would be if the research fails to bring the reader back to the global picture by over-emphasizing department-specific issues.

Replication logic to conduct embedded multiple case studies will need to be adhered to. The theoretical framework of the two LDMS conceptual models developed in the previous chapter was used to develop that replication logic. A case protocol to use in all three organizations was created; it refers to the research methodology that will be replicated consistently in all units of analysis. The case protocol instils reliability and validity onto the research (Yin, 2009).

Reference: Appendix (A) Case protocol

3.1.3 CASE SELECTION

The research for this thesis comprises of three separate case studies of the following health care organizations: CSSS Haut-Richelieu-Rouville in Saint-Jean-Sur-Richelieu (Quebec), the Hospital for Sick Children in Toronto (Ontario), and St. Boniface Hospital in Winnipeg (Manitoba). All three hospitals are currently deploying LDMS, and the different approaches they undertook inject the study with adequate variability. St. Boniface Hospital and the Hospital for Sick Children were influenced by the ThedaCare methodology, while Toyota Kata was the inspiration for CSSS Haut-Richelieu-Rouville's Lean transformation.

The hospitals are also in different stages in their Lean journeys; while St. Boniface Hospital conducted a large number of Rapid Improvement Events (RIEs) for years before starting to deploy LDMS; The Hospital for Sick Children and CSSS Haut-Richelieu-Rouville deployed LDMS at an early point in their Lean journey. In addition, since provinces are responsible for administrating and delivering health care services, examining hospitals in different provinces adds another layer of variation onto the research.

Sometimes called theoretical or analytical sampling, these cases represent different contexts that offer insights rather than comparisons (Eisenhardt, 1989; Yin, 2009). Within each hospital, two departments will be undertaken as units of analysis. Ideally, a clinical and a non-clinical department would be chosen for each case to examine different settings within the same context. Clinical and non-clinical departments differ in their *raison d'être*, modes of operation, and background of their members. However, the Hospital for Sick Children in Toronto has only very recently deployed LDMS in non-clinical departments, therefore that case will comprise of two clinical departments.

Roughly one week was allocated for the data collection phase for each case. As two of the three case studies are at hospitals outside the province of Quebec, the Quebec Ministry of Health through Pôle santé HEC Montréal - Centre de transfert Lean funded the researcher's expenses for these two data collection trips. One week proved sufficient for the data collection in terms of the number of interviewed organizational members. It is the researcher's opinion that more interviews would not have added more knowledge to the research. Because only a few organizational members have a vast experience with the deployed LDMS in each organization, only these members were able to embark a lot of information. The remaining interviewees were mostly asked about their personal experiences and opinions, which varied across the spectrum.

Initially, an attempt was made to conduct a pilot case at CSSS Haut-Richelieu-Rouville (Quebec) but the time restrictions during the data collection phase

did not allow the researcher to be able to review the findings and revamp the case protocol. Although the researcher attempted to follow the case protocol as much as possible, some amendments were made during the data collection period to accommodate certain time and availability restrictions.

3.2 DATA COLLECTION METHODS

The typical case study is structured along the situation, decision, implementation, then results narrative (Yin, 2009). According to Gillham (2010), the storytelling approach enables the researcher to depict an explicit as well as tacit understanding onto the reader. Having spent adequate time to experience the case from the inside, the researcher is expected to be able to at least convey, if not isolate, some unspoken case aspects.

When designing the research methodology, it is important to consider the representativeness of the data collected. Since different organizational members have different experiences, individuals from different hierarchical levels were included in the research. Also, different methods of data collection were utilized to collect different types of data; these data collection methods are complementary to one another. Some information could be obtained from observing participants conduct their daily duties, but other information can only be obtained from open discussions (Gillham, 2010).

Triangulation is an approach that attempts to achieve deep understanding by observing and probing the same participants at different time periods. For example, the same participant could be observed at different times of the day, or could be observed then interviewed on separate occasions. The objective would be to develop a deeper appreciation of that participant's reality and understanding of it (Woodside, 2010). Triangulation also enables substantiation; it addresses the credibility and data dependability concerns by using multiple sources and establishing a chain of evidence (Eisenhardt, 1989).

Before any data collection was initiated, approval from le Comité d'éthique de la recherche (CER) was granted. HEC Montréal requires any data collection that involves direct interaction with individuals to be vetted by CER prior to the data collection. CER guidelines for the research mostly address the selection and anonymity of research participants. The case methodology and data collection tools were assessed. In addition, the anonymity of participants from the three organizations had to be guaranteed to obtain the CER approval.

In terms of the actual data collection for each case, the two LDMS conceptual models developed in the previous chapter were used to design the research. The following data collection tools were then chosen because they capture individual as well as collective behaviours, attitudes and perceptions of the current state of LDMS within the unit of analysis.

3.2.1 OBSERVATION

This is the most direct way of obtaining information and developing an understanding of the subject matter (Gillham, 2010). During the observation, the researcher should focus on the processes performed and on the participant performing them. The participant's actions and interactions with peers and managers, their body language, as well as the place and social setting should all be noted (Hennink et al., 2011). Processes to be observed are those that include an interaction of the participants with each other or with an element of LDMS. Tiered Accountability Meetings provided the opportunity to observe the interaction between tiers and within the same tier at the frontline level; a total of nine such meetings were observed during the course of this research. How department members interact with each other was also observed in short informal discussions on certain aspects of LDMS.

Observations were made sporadically throughout the data collection week at different times throughout the day, with each observation session lasting

roughly 30 minutes. An average of four hours of observation, including Tiered Accountability Meeting observations, were conducted in each hospital. Following observations with interviews to discuss what was just witnessed provides a greater depth of understanding of the observed processes (Sanger, 2002). Typical questions to ask after observing a process pertain to the understanding of the details of the process, the logic behind it, whether the process was implemented as designed, and how it can be further improved (Woodside, 2010).

3.2.2 INDIVIDUAL INTERVIEWS

Conducting interviews in a conversational style provides the prospect for discovery of the case context and exploration of the meaning of common terms within the organization (Rubin & Rubin, 2005). Participants insert meaning and perspective during these conversations (Gillham, 2010). Asking questions pertaining to their experiences enables the researcher to reconstruct certain events without losing the personal aspect of actually being there (Rubin & Rubin, 2005).

There are several types of interviews depending on structure, depth, and formality. Deciding on the type of interview to conduct depends on the subject matter, as well as the rapport with the participant (DiCicco-Bloom & Crabtree, 2006). Given the researcher's objective of developing a deep understanding, structured interviews were not conducted. Open discussions were conducted with some interviewees, such as the main contact at each hospital. However, open-ended question-sets were developed for the remaining participants in order to remain focused. The questions covered the different aspects of the LDMS conceptual models. The main takeaway from each interview was to understand the interviewee's point of view, and its development, from the interviewee's experience with LDMS.

Two sets of question-sets were developed, a short list for frontline staff, and a lengthier one for managers and leaders who are expected to be more

involved with LDMS. In either case, active listening is necessary to probe for elaborate answers and modify the interview according to the participant's comfort level with the topic. Both sets of questions were lengthier than the allocated time could cover; however, the additional questions allowed for flexibility to address modifications during the individual interviews.

Reference: Appendix (B) Short Interview Guide

Reference: Appendix (C) Long Interview Guide

Initially, the objective was to conduct a large number of short meetings; 15 minutes for the frontline staff and 30 minutes for the managers. That would have enabled the researcher to meet with a wider base of department members. However, upon starting to schedule and plan these meetings, it became evident that making so many appointments would prove very difficult. Also, having conducted the data collection during the summer months, the availability of many department members was constrained.

Longer individual interviews were thus conducted with fewer participants. Most of the formal individual interviews were conducted with mangers of different levels within the analyzed departments. These meetings varied in length, with only a few 30-minute meetings; the majority were between one and two hours. Having such lengthy meetings provided the researcher with a comprehensive picture from each interviewee. A total of 25 formal interviews were conducted during the course of this research.

The number of formal interviews was evenly spread between the three hospitals, although the make up of the interviewees differed. A total of two executives, four directors, five middle managers, and six frontline staff members were interviewed. Some short and informal discussions were also conducted with some frontline staff members who do interact to some extent with LDMS but were not comfortable to be interviewed formally. These five-minute informal interviews were conducted during observation sessions, and the questions asked pertained to the process being conducted.

3.2.3 DOCUMENTATION

Reviewing historical project documents, reports, or presentations is one way for the researcher to better understand the historical context of the deployment effort (Yin, 2009). The objective is for the researcher to recognize the traces of the transformation, and identify the conditions and factors that led to the outcomes that transpired. Reviewing older presentations that were conducted at the beginning of the LDMS deployment, for example, enabled the researcher to better understand the mindset at that time, and trace its development as LDMS was deployed. Even though true project experiences would not be documented, asking interviewees to refer to the deployment timeline enabled the researcher to grasp the general mood and attitude back then (Schindler & Eppler, 2003). A wide assortment of documents was consulted for these case studies, such as presentation slides, training material, standard work documents, as well as templates and manuals.

3.3 PRESENTING CASE FINDINGS

Each case study is presented in a separate chapter. Each chapter starts with an overview of the context within which LDMS was introduced in terms of timeline and circumstance. The subsequent sections address the general theme of the deployment efforts, as well as an in depth description of the current state of the two units of analysis. Each case concludes with a short discussion of the findings and a highlight of the exhibited system in light of the two LDMS conceptual models.

Following the three cases, a multiple-case analysis is conducted in order to produce analytical generalizations (Yin, 2009). In order to search for patterns, the cases were dissected along the dimensions of the conceptual models in order to go beyond case-specific impressions (Eisenhardt, 1989). Two augmented conceptual models of LDMS and LDMS deployment are inducted as a result of the multiple-case analysis (Hennink et al., 2011).

Propositions were also developed to guide future research on the topic. According to Yin (2009), analytic generalization is what enables building theory from case studies. Eisenhardt (1989) points out the strength of building theory from case study research; the novel theory is more likely to be testable and empirically valid. A weakness is that capturing all the significant elements within a case is very complex; especially considering that many elements are expected to be beyond the scope of the research (Eisenhardt, 1989).

CHAPTER 4: CSSS HAUT-RICHELIEU-ROUVILLE

Le Centre de Santé et de Services Sociaux (CSSS) Haut-Richelieu-Rouville is comprised of a hospital, six residential and long-term care centers, four clinics, two youth clinics, out-patient clinics, a birthing center, and the headquarters of the Info-Santé de la Montérégie health line. It employs roughly 3,700 individuals, including 293 doctors and 113 managers ("CSSS Haut-Richelieu-Rouville," 2014). This chapter will start with an introduction on how the hospital started its Lean journey and embraced LDMS. The tiered structure of the Management System and its deployment in two departments is further discussed. The chapter will conclude with the hospital's outlooks in the near future, and a brief review of the case in light of the LDMS conceptual models. The case was developed from eight interviews with organizational members from different tiers, three hours of observation at the frontline level, and access to multiple current and older presentations that showcased the progress of the deployment effort. The data was collected over a span of four days in early July 2014.

CSSS Haut-Richelieu-Rouville's Lean journey first started in 2008 when then Quebec Minister of Health Yves Bolduc announced his intention for Quebec health care organizations to embrace Lean. The hospital first deployed Lean in its Operating Room, but according to leadership, the attempt to regulate patient flow was not sustained due to a lack of a management system to maintain the improvements.

In 2012, the Lean transformation was officially revived; the Operations Support Team *(équipe de soutien aux opérations)* was created, and the Executive Board formally committed to creating and sustaining a Lean culture. The Operations Support Team is a small team of three, along with their internal consultant or coordinator *(Conseiller en analyse et évaluation de la performance - responsable du soutien aux opérations)*, are responsible for every aspect of the Lean transformation at CSSS Haut-Richelieu-Rouville.

However, the main influencer was and continues to be the Operations Support Team's coordinator. Discussions with multiple organizational members indicated that the coordinator played a major role in analyzing needs, designing, and implementing the Management System *(système de gestion).* The coordinator continues to be personally involved in different departments that seek more support of the Operations Support Team. In addition, a number of committees are responsible for leading the transition; the strategic, advisory, executive, operational, management, and operational committees play different roles.

The Operations Support Team started with a middle-out approach by introducing 20 middle managers to the Management System. Utilizing the slogan "taking care of our people" *(on prend soin de notre monde)*, the team sought to create a connection between managers and executives to create alignment. In order to provide a sense of direction for improvement projects, the following five facets were defined:

- Security for patients and employees
- Compliance with applicable standards
- Zero errors
- 100% value-added
- One at a time flow

Today, these five facets are publicized throughout the organization on Visual Boards and presentations. However, the Operations Support Team coordinator quickly recognized the need to focus on top management for the changes to be sustained. Upper management's reflexes needed to be conducive to creating a sustainable Lean culture; otherwise, conflicting priorities could stifle continuous improvements. The team realized that effective problem solving in particular would prove very difficult without upper management support. Therefore, the deployment model they devised needed to address the issue of upper management reflexes. Even though the

middle-out approach was eventually dropped, it did create a proof of concept by generating small intermediary successes that made a stronger case for upper management's buy-in. Accordingly, the decision was made to deploy the Management System from the top-down by the end of 2012.

The Operations Support Team's vision of the Management System model involves top-down deployment of strategies and objectives, while simultaneously communicating organizational learning from the bottom-up in order to sustain the Lean culture. According to presentation slides, the intention of the Operations Support Team is for executives to define the orientation and strategic direction, for managers to identify concepts that can be translated into defined problems, and for employees to develop detailed solutions.

According to multiple organizational members, executive turnover over the last few years hindered the implementation because it decelerated the momentum building. Keeping employees engaged and involved proved to be very difficult during leadership changes due to conflicting priorities and additional time commitment needed for the new leadership to settle in. According to multiple accounts, CSSS Haut-Richelieu-Rouville is still relatively far from this vision of employee engagement and commitment to the development of the Management System.

4.1 TIERED STRUCTURE

The Management System *(système de gestion)* model divided the hierarchical structure of departments into four levels that build the formal escalation chain ("CSSS Haut-Richelieu-Rouville Organization Chart," 2014). Each nurse station has a (level-1) team leader or clinical lead *(assistante infirmière chef)*. The team leader reports to the manager (level-2) who in turn reports to the director (level-3); the director may be responsible for more than one department, such as *Direction médecine* or *Direction chirurgie*. Directors

indirectly report to the executives (level-4) such as *Direction des resources humaines*, as well as to the President (*Directeur général)*.

The Operations Support Team was able to gather executives' support by examining department service levels, showcasing them in comparison to the perceived service level, and addressing the implications of these gaps and how they could be mended. Once executives realized that the performance levels were not where they expected them to be, they were more open to embracing the Lean mentality. Changing their mindset entailed focusing on the process performance rather than the results, so measures such as waiting time were used as indicators that affect patient satisfaction.

The Operations Support Team took inspiration from the Kata approach of identifying current and target states, then experimenting to tackle obstacles along the path. The five questions of Kata, as developed by Rother (2010), were used by the Operations Support Team and coached to other organizational members. A3 thinking and the PDCA framework are the main tools used for Lean projects. In what can be described as a mile-wide inch-deep approach, the executives were first coached on the scientific approach to problem solving. The Operations Support Team's expectation was that the Lean mentality could then be passed down to directors when they were introduced to it in 2013.

In 2013, with the help of the Sensei, upper management and the Operations Support Team first selected 12 Key Performance Indicators (KPIs) to represent the mission statement and its facets. Through continuous communication and consensus building with executives and directors, the five True North global performance indicators were then developed; health, security, quality, mobilization, and resource utilization. In order to align these True North metrics, the Operations Support Team ensured that department-level KPIs feed into higher-level KPIs.

The vision for the Management System is to have ongoing communication between the tiers. The following description of its workings has not yet been exhibited throughout the organization, as of the data collection period of July 2014. However, several organizational members from various levels have been able to describe the general structure. Department-level KPIs must be tracked throughout the day by nurses at the frontline. Using simple KPIs that are easy to calculate ensures that patient care is not jeopardized in the process; information is tracked throughout the day as part of the administrative duties. The ongoing measurement of these process KPIs is meant to ensure the sustainability of the process performance (Pojasek, 2009).

From the Operations Support Team's point of view, having the frontline staff be responsible for collecting this data serves two purposes. It ensures that the data being used is the most up-to-date information. Secondly, having the frontline staff gather the data that the executives are monitoring ensures that they are aware of the executives' strategic objectives and that they consistently strive to achieve them. The team leader is then responsible for updating the (level-1) Visual Communications Board and compiling the performance indicators onto a sheet to share with the manager during their daily meeting.

The (level-2) manager then compiles them into weekly indicators on another sheet *(formulaire de suivi hebdomadaire du chef)* to share with the director. The structure of the Management System calls for the (level-3) director to compile them into monthly indicators. However, this has not yet been enforced, as it does not consistently take place. The objective is for directors to trace performance indicators against the target objectives they set, keep track of these gaps, and use the monthly meetings with the Executive Committee as an opportunity to prioritize projects, discuss progress, and generate new action items. Although the current IT system is able to support

and manage the flow of information needed for this, these actions are also not consistently performed.

The (level-4) Visual Board in the Control Room *(salle de suivi des opérations et du déploiement stratégique)* is comprised of two sections: global indicators and project status. There are plans to add another section for patient flow indicators. The global indicators are showcased in an easy to read graphical format that depicts actual against target performance levels as in figure 4.1. The global performance metrics are displayed within their True North lanes, the intention was for them to be updated monthly in preparation for the Executive Committee meeting.

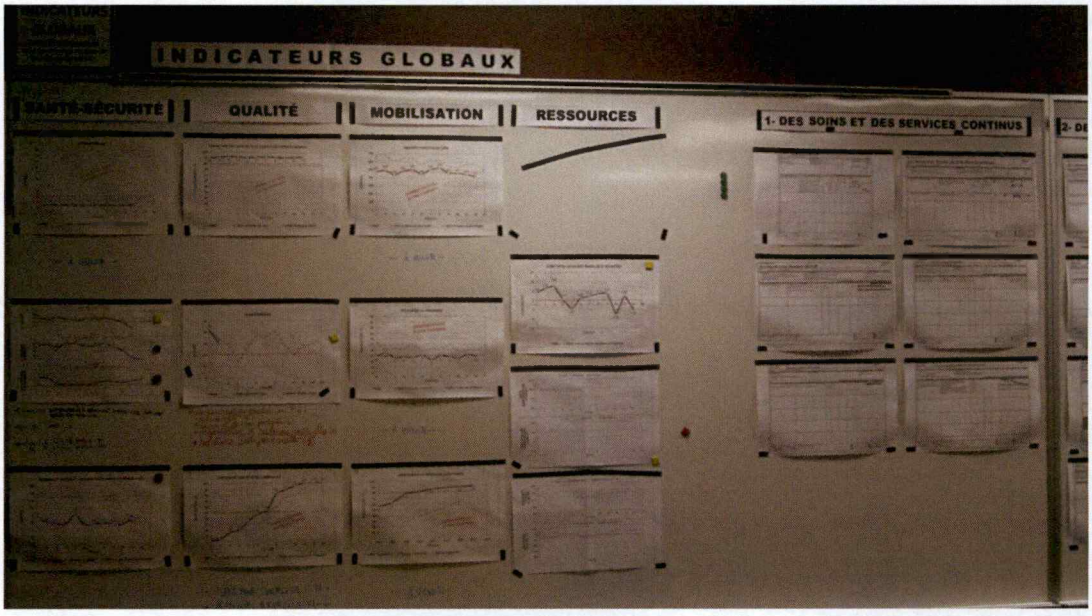

Figure 4.1: Visual Communications Board in Control Room

Primarily, it is the directors that fill A3 forms and advocate improvement projects. Problem identification at the frontline level was attempted in one department (Home Care) using a suggestion box, but the Operations Support Team is awaiting further demonstration of its effectiveness. The team's view is that once Lean behaviour is demonstrated throughout the tiers, improvement opportunities can be derived from the bottom-up. Until then, it is best to manage these improvement initiatives in order to ensure that departments do not lose their focus and alignment with strategic objectives.

The Operations Support Team's intention was for the Management System to be used as the control factor of the PDCA cycles of these projects. By deploying the Management System in departments soon after Lean improvements are implemented, the Management System serves to sustain the improvements. In deploying Lean and the ensuing Management System in different areas, there was no formal rollout plan that dictated which value streams to address first; departments were selected based on their visibility at the upper management level. When deploying the Management System in a department, the Operations Support Team introduces the Management System elements as a comprehensive system that builds on the different utilities developed during the Lean project implementation.

While the Management System was initially introduced to the executives in a mile-wide inch-deep approach, it was later introduced at the department level at an inch-wide mile-deep approach. The Visual Communications Boards and Daily Meetings are standardized. The board consists of three main sections; team management, daily monitoring, and continuous improvement. The meetings are conducted along the structure of the board. Leader Standard Work was also introduced at the same time, but most organizational members did not embrace it. While realizing its potentials, some members cite a lack of time as a hindrance; others could not visualize how it could be applicable in a health care environment. They indicated that the health care environment is naturally chaotic and cannot be anticipated, so attempting to control it by standardizing leader activities would be unrealistic.

4.2 ORTHOPAEDIC CLINIC (CLINIQUE ORTHOPÉDIQUE)

In 2011, there were many complaints filed against the department for its exceptionally long waiting times on planned visits. The Operations Support Team coordinator, who did not have a team until 2012, sought to drive performance improvements by coaching the manager continuously using the Kata methodology that Rother (2010) prescribes. This was the first

experiment with Lean management; although it can be described as the pilot project, the logic of testing strategies and spreading the deployment was not taken into consideration at that point. By analyzing the quotas and availabilities of the doctors, the Operations Support Team coordinator was able to level patient appointments and streamline patient flow. According to multiple organizational members, the Operations Support Team coordinator did most of the analysis and countermeasure development, although support was provided from the frontline staff in terms of collecting key indicators, such as waiting time, which helped with the diagnosis.

Gradually, the Management System was introduced to the department while countermeasures were deployed. The Operations Support Team coordinator brought in the department members for a presentation on the system, its objectives, and how they can be achieved. According to multiple department members, the Visual Communications Board and Tiered Accountability Meetings were readily adopted. However, as of the time of the data collection in July 2014, according to multiple conversations, Leader Standard Work has not yet been adopted. Only the clinical lead adopted the planning and scheduling control tasks of the Leader Standard Work at some point after its introduction, and used it in updating the Communications Board before the Daily Meeting, and in conducting the Daily Meeting.

Every morning at 8 A.M., at the nurses' station, the clinical lead *(assistante infirmière chef)* updates the Visual Communications Board in figure 4.2 with KPIs collected throughout the previous day. Nurses and clerks at the frontline are responsible for keeping track of these KPIs; a responsibility that some expressed only added to their already long list of daily activities. Individual interviews indicate that while some felt it was initially difficult to find the time, the responsibility eventually became easier as it became part of their routine. Upon observing the (level-1) Daily Meeting, the frontline staff seems accustomed to this routine; they huddled at the precise time it was scheduled to start, dove into the huddle immediately, and appeared

attentive and energized.

The (level-1) meeting *(réunion)* takes place as soon as the board is updated at 8:05 A.M. and lasts for roughly 10 minutes. These meetings follow the same structure every day; the clinical lead goes through each element of the three main Communications Board sections and addresses the key metrics, where they stand in comparison to their objectives, and how these gaps can be bridged. The two-way communication between the four nurses (frontline staff) and the clinical lead enables team members to openly discuss any issues or difficulties they are experiencing. From observing their interaction, the clinical lead plays a facilitating role during the meeting by probing the team for their input on any problems, possible recommendations, and unintended consequences that may occur by adopting these recommendations.

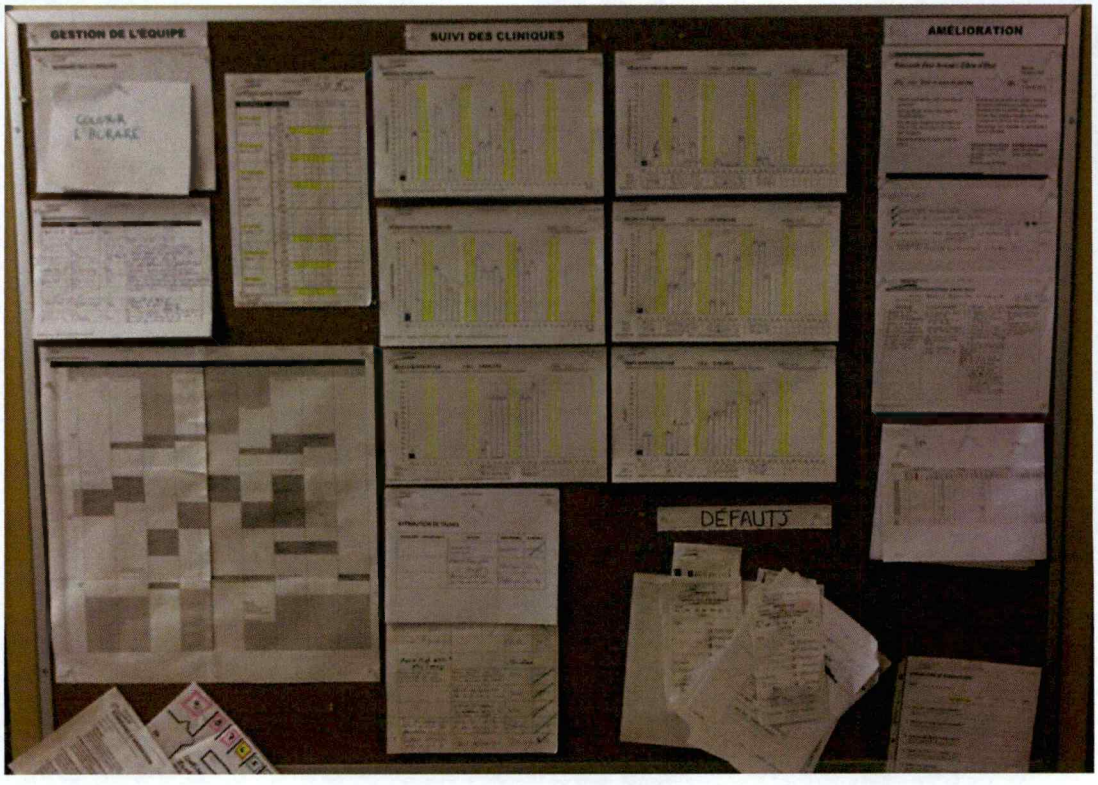

Figure 4.2: Orthopaedic Department Visual Communications Board Level-1

The Daily Meetings are conducted at a very fast pace. A lot of information is passed back and forth in a manner that would not be possible if not for the

structured approach to conducting these meetings. However, from observing the Daily Meetings, it seems that interruptions are bound to happen when the team groups in front of the Visual Communications Board in the middle of the department. Phone calls and other organizational members passing by repeatedly interrupted the team leader. The distractions were addressed swiftly and the meeting was resumed within a few seconds.

According to observations and individual interviews, department members abide by the described structure of the Management System, in terms of conducting meetings and utilizing the Visual Communications Board. They expressed being pleased with what the system offers in terms of alignment and enhanced communication. According to some department members, the team did not develop many action items when the Management System was first deployed. This is partly because they did not recognize how these action items would affect their responsibilities and daily activities. However, with the passage of time, the team became more proactive in identifying obstacles that inhibit them from performing to their best ability.

The Communications Board *(tableau de bord)* in figure 4.2 serves as the meeting agenda; it creates the structure of the meeting and provides all the essential information needed to make it productive. The meeting touches on the board's three sections from left to right. The clinical lead first discusses matters of team management starting with the daily plan, as well as general or specific information regarding problems from the previous day. After that, key metrics that were accumulated from the previous day are highlighted, along with any gaps between the actual performance and their set targets.

Depending on how much time is left, which usually does not happen according to multiple organization members, improvement initiatives are discussed and feedback is requested from the team. The unavailability of experiment results, a consequence of having a slow experimentation process, further impedes having daily improvements. The intention of the Operations Support Team was to have department members spend some time every day

on continuous improvement efforts, as indicated in old presentations slides. However, not discussing continuous improvement initiatives on a daily basis hinders their development.

Even though improvement initiatives are conducted in the department, they are not initiated by the frontline. The Operation Support Team decided to establish connections from executives to directors first in order to maintain focus and align activities until it is determined that the frontline would be able to generate and conduct these improvements. Improvements are therefore mostly derived form A3s filled by directors. The "bon coup" section in the Visual Board is to celebrate outstanding team member performance in such initiatives.

Later in the morning at around 10 A.M., the 15-minute (level-2) meeting *(rencontre)* takes place between the clinical lead and the manager who heads several teams. A sheet *(formulaire de suivi hebdomadaire du chef)* is used to communicate KPIs to the manager in order to discuss the status of operations in relation to their objectives and how these gaps may be bridged. Frontline nurses and clerks fill the sheet with metrics that were tracked throughout the previous day's shifts. According to the Operations Support Team and department members, having a meeting rather than just submitting the sheet enables the manager to better understand what is happening in the department. The meeting provides the manager with the story and the data that supports it. The structure of these meetings is in line with what was previously described as the Operations Support Team's intended tiered structure.

The (level-3) meetings between the manager and the director last for 30 to 45 minutes, and are conducted weekly. The same sheet *(formulaire de suivi hebdomadaire du chef)* is used to conduct these meetings. Both the manager and the director have boards set up in their offices but are not used as (level-2) and (level-3) Visual Communications Boards; they are intended for their personal use.

There has been a development that occurred after the data collection period in July 2014. Due to budget cuts, the clinical lead position was eliminated as of October 1st, 2014. As previously indicated, this role was instrumental to the Management System structure. This development led to some confusion and chaos at first. However, according to the Operations Support Team coordinator, the nurses at the frontline assumed the responsibility of conducting the (level-1) team meetings, and the deployed Management System remains on track as of November 29th, 2014.

Department members from all tiers indicated that these meetings are very beneficial and that they have felt their effect on enhancing effective communication within the department. According to department leadership, having the same KPIs used throughout the tiers enables the manager and director to track changes, spot trends, and communicate easily with all department members. There is a disagreement, however, on the effectiveness of the particular indicators used. Some department members argue that only metrics that directly affect patient care should be used. Therefore, department leadership expressed their desire for the Operations Support Team coordinator to help in this review process.

The tiered structure of the Management System is also respected in regards to the problem escalation chain; staff problems must go through the manager before landing on the director's desk. Most of the problems that are escalated all the way to the director are those that require funding or have Human Resources implications. While this escalation process is not standardized throughout the hospital, it is the norm in the Orthopaedic Department. Department leaders recognize that having problems go through each level provides it with the opportunity to be resolved closer to the actual process, but the onus usually falls on the manager to resolve problems.

According to department leaders, Genchi Genbutsu is conducted; they engage with the frontline and take note of what is indicated on the Communications board. However, according to department member

accounts, the visits are brief and the interaction is regarding general issues. Although the Operations Support Team has seen recent improvement in the process after the data collection period in July 2014, this indicates that department management are mostly made aware of issues only when problems are escalated through the tiered meetings.

The system put forth by the Operations Support Team does allow for coaching to take place during interactions between the different tiers, especially the Tiered Meeting structure. But it does not seem that all individuals are taking advantage of the opportunity; organizational members disagree when asked on the coaching that they receive. The Operations Support Team coordinator extensively coached the team leader and manager when the Management System was implemented in the department. The coordinator coached them on the Management System elements, mindset, and toolkit such as the PDCA framework. The manager and clinical lead were coached to use the five questions of Kata in coaching their subordinates, as indicated by multiple department members. However, some department members believe more coaching is needed throughout these tiers to better equip them to lead the department.

The Operations Support Team affirmed from the start of the deployment effort, through their presentations, that process continuous improvement and personnel development are two sides of the same coin. Yet, a systematic structure of coaching department members is still missing and desired by the department leaders. Coaching largely falls on the shoulders of superiors, so the manager is responsible for coaching the team leader, who in turn is responsible for coaching team members. The concern arises if some organizational members do not feel confident in their abilities; therefore fail to embark their knowledge onto the next level. Some department members expressed that they felt they were not given sufficient time to adjust to the new norms of the Management System while developing their know-how; they expressed that more guidance would have made the transition easier.

The Operations Support Team thus faces the issue of where to draw the line in implementing the Management System. The team coordinator is contemplating setting clear boundaries and an "exit strategy" as a result of the recurring requests for support. The Operations Support Team does not have sufficient capacity to expand the breadth of the Management System while remaining involved in departments that already have a Management System.

Department members of different levels recognize the structure that the Management System created, and how it enabled effective communication and as well as problem definition and resolution. In addition, the main effect of the Accountability Meetings is that they utilized a new common language of True North metrics. Department members felt that they did not have that before, as the size and structure of hospitals do not make them conducive to open communication. Department members of all levels recognize the changes in their behaviour when it comes to problem solving and communicating with each other. One member compared the Management System to a "barometer" that guides productive and effective problem solving because of the aligned True North metrics.

4.3 SCHEDULING DEPARTMENT (GESTION DES REMPLACEMENTS)

The department is responsible for staffing both clinical and non-clinical positions in all CSSS's departments. The decision to implement Lean projects and the subsequent Management System at the department was also a top-down decision due to scheduling issues that manifested and ultimately increased the visibility of the department to the Executive Board. A consulting company was contracted for the implementation of Lean projects in December 2011, but the Operations Support Team implemented the Management System. The Management System was introduced in a similar fashion to how it was introduced at the Orthopaedic Department.

There are two factors that differentiate the Scheduling Department from the Orthopaedic Department. The first is that the Scheduling Department has considerably more interactions with members of other departments. Scheduling Department members readily state that not having all CSSS Haut-Richelieu-Rouville departments utilizing the same Management System impedes their productiveness. The second factor is that non-clinical departments are by nature supporting departments; clinical department members do not always feel compelled to adhere to the Scheduling Department's time restrictions.

An electronic system is used to create the schedule for different departments on a four-week timeline. However, there are always holes in the schedule due to employee illness or change of plans. The Management System helps department members fulfil these scheduling requirements. The board in figure 4.3 showcases the visual depiction of these scheduling requisitions for the current and ensuing four weeks. Department members and leaders use this visual depiction to prioritize daily activities according to the number of urgent scheduling requisitions. This board can thus be considered the (level-2) Visual Communications Board and is located inside the department manager's office. The department manager or team leader typically updates the board on a daily basis.

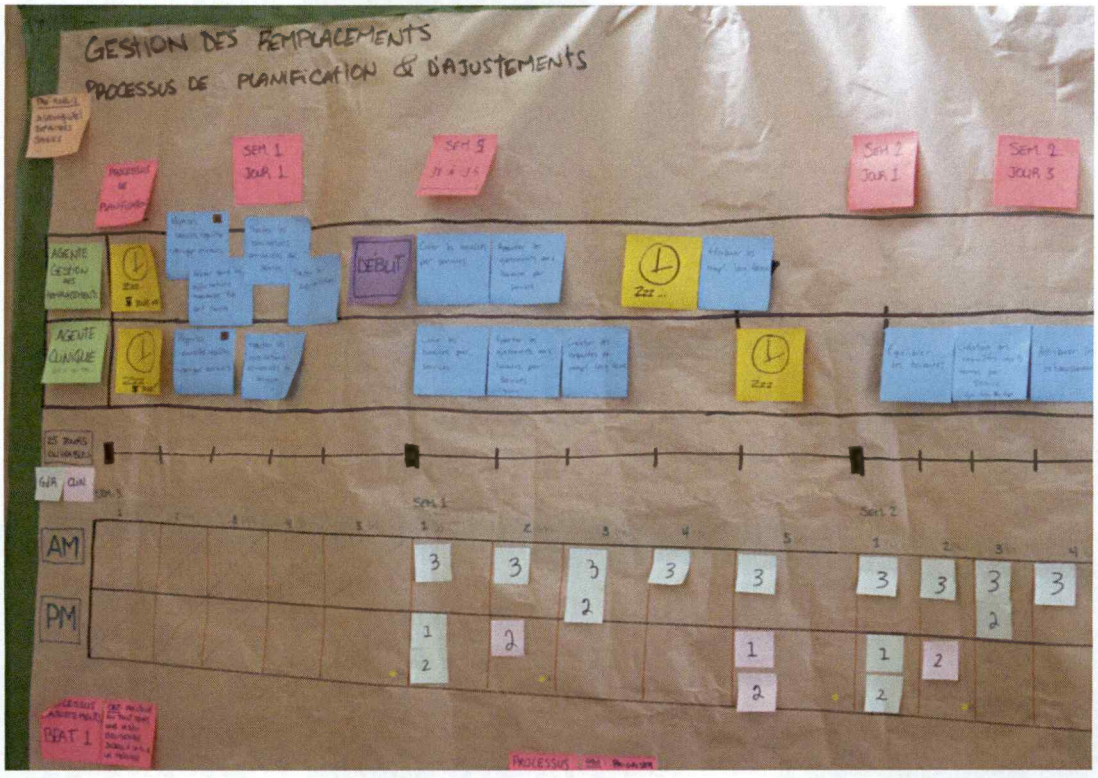

Figure 4.3: Scheduling Department Manager Board

Everyday at 8 A.M., the team leader conducts the (level-1) meeting in front of the (level-1) Visual Communications Board in the middle of the department. The (level-1) board is very similar to the one demonstrated in figure 4.2. The meeting is structured along the same sections and sequence. However, the team leader updates the board during the meeting as scheduling agents indicate how much they were able to accomplish the previous day.

The meetings usually last for 30 minutes. While the Operations Support Team insists that it too long for a start-up meeting, department leadership does not feel able to conduct the meeting in less time. This could partly be attributed to the meeting facilitator addressing issues rather than simply identifying them. According to department members, settling on 30 minutes took some practice; some meetings would last up to an hour and a half when they were first conducted. Attendance was also a major concern back then; but with time, meeting duration and attendance has stabilized. Similar to the Orthopaedic Department, the team management and daily monitoring

sections on the board are always addressed, but department members cite a lack of time to address the continuous improvements section. The same issue of unavailability of experiment results is also a factor in this department.

The scheduling agents have a standard list of daily activities that must be done in sequence. The list is numbered, and team members update their team leader on their progress by simply indicating the last completed activity number. They also advise their team leader on the number of scheduling requisitions they were able to fulfil. If the team is collectively behind on its list of activities, or there are too many unfilled requisitions, then the team leader knows to intervene and address underlying issues of capacity, for example.

From observing the meeting, the team leader updates the forms on the Visual Communications Board while continuously probing frontline staff members to bring up issues, concerns, and suggestions. If a problem is brought up, the team leader asks for feedback from the rest of the team on its significance and possible solutions. The team leader takes note and often needs to further examine the issue before deciding on the optimal course of action.

Perhaps updating the board during the meeting is another reason why the (level-1) meetings take so much time. However, when asked about a situation when the information on the Communications Board would be helpful, they indicated that they only utilize the Communications Board to conduct these daily meeting. Therefore, updating the board is really the only time when department members identify and discuss their collective performance.

The (level-1) Visual Communications Board is not used as a data collection method because scheduling requisitions are readily available on the electronic booking system. An advantage the Management System provides is to enhance transparency by showcasing areas where more team support is needed. Agents who have filled their assigned schedule openings are able to

identify which team members can use their help. The manager's board in figure 4.3 is updated during the (level-2) meeting, even though that process has not yet been formalized. In addition, higher-level meetings (levels 3 & 4) have not yet been structured as of the November 29th, 2014.

Unlike the Orthopaedic department, problems can be escalated by the team leader or by the team members directly to the manager. Some department members do not feel comfortable bringing up problems during the group meetings. The frontline scheduling agents escalate operational problems to the team leaders, while strategic and developmental problems are escalated directly to the manager. Department members view this approach as more efficient; to direct the problem to the person responsible for solving it directly. However, there is still an expectation of being coached by superiors, which implies that problem exposure through the escalation chain needs to be addressed. However, department members feel that they are not at that stage yet.

From the perspective of department members, the Management System works as a parallel system to their primary electronic booking system. The Leader Standard Work *(agenda de travail standard)* was initially developed when the Management System was first introduced, but the lack of time to continuously assess conformance and make adjustments resulted in it being disregarded. Interestingly, some department members are still sceptic of the value of the Management System as a whole. Some consider it an imposition because the daily meetings take them away from their duties. Also, given their slow electronic booking system due to old servers, they feel their productivity is being restrained by the system.

4.4 FUTURE OUTLOOK

Ultimately, the goal of the Operations Support Team is to play a small consultative supporting role in the continuous improvement of each department. This implies that department leaders will need to take on most

of that responsibility. From the Operations Support Team's perspective, Lean and A3 thinking has not yet been fully imparted throughout the departments where the Management System has been deployed. The coordinator continues to help get all directors sufficiently proficient in the scientific approach to problem solving so that they may take on more of the responsibility of coaching the managers who can then coach the team leaders. The current structure allows for these interactions, but organizational members conclude that discipline is lacking.

A designated Board Room for each department is currently in the works to house all the initiatives within the department and generate a collective mindset of continuous improvement as a result. In addition, starting December 8th of 2014, the Operations Support Team coordinator will be focusing on establishing a systematic connection between (level-3) directors and (level-4) executives throughout all 16 areas of the organization. The team expects that partnering with directors will help develop clear guidelines of responsibility and accountability.

The Operations Support Team coordinator continues to be at the face of the Lean transformation throughout the organization. Although the coordinator continues to be coached by a Sensei, having the entire Lean transformation and Management System based on the position of an individual rather than a collective group makes it fragile. As the literature review indicated, problem solving as a team effort enhances the process, as decisions need to be debated among a group of people from various backgrounds.

With the expected passing of Bill 10 *(loi 10)* to reduce health agencies and administrative boards (CBC News, 2014), it is yet to be seen how the creation of *(Centre intégré de santé et de services sociaux)* CISSS Montérégie and this industry restructure will affect the management of Quebec hospitals. One predicted consequence is the elimination of several managerial positions throughout the province. The effects of the revised plan to integrate CSSS Haut-Richelieu-Rouville into CISSS Montérégie-Est have not

yet materialized ("CSSS Haut-Richelieu-Rouville News," 2014; Le Courrier du Sud, 2015). Whether changes occur in terms of personnel or standardized CISSS operational guidelines, they are expected to affect CSSS Haut-Richelieu-Rouville's Lean transformation. In either case, ensuring that the changes made at the leadership level are not diluted will be instrumental for the continued deployment of their Management System and the creation of their Lean culture.

4.5 CASE CONCLUSION

The case of CSSS Haut-Richelieu-Rouville can be summarized in terms of the two LDMS conceptual models developed in the literature review. Figure 4.4 depicts the elements and supporting utilities exhibited in CSSS Haut-Richelieu-Rouville in bold, while those not yet exhibited are faded. Of most interest is the meticulousness of the tiered approach; its structure achieved alignment and enhanced communication by most accounts. Based on the literature, there are still areas of improvement. Most notably, middle management supporting utilities were not demonstrated in the case; therefore, the entire managerial level is not actively participating. For example, building a systemic coaching structure around the current problem resolution methodology would further enrich the Lean mindset. Also, giving the frontline staff more responsibility in terms of initiating and managing continuous improvements would develop their problem solving skills, and provide them with a stronger sense of ownership and accountability.

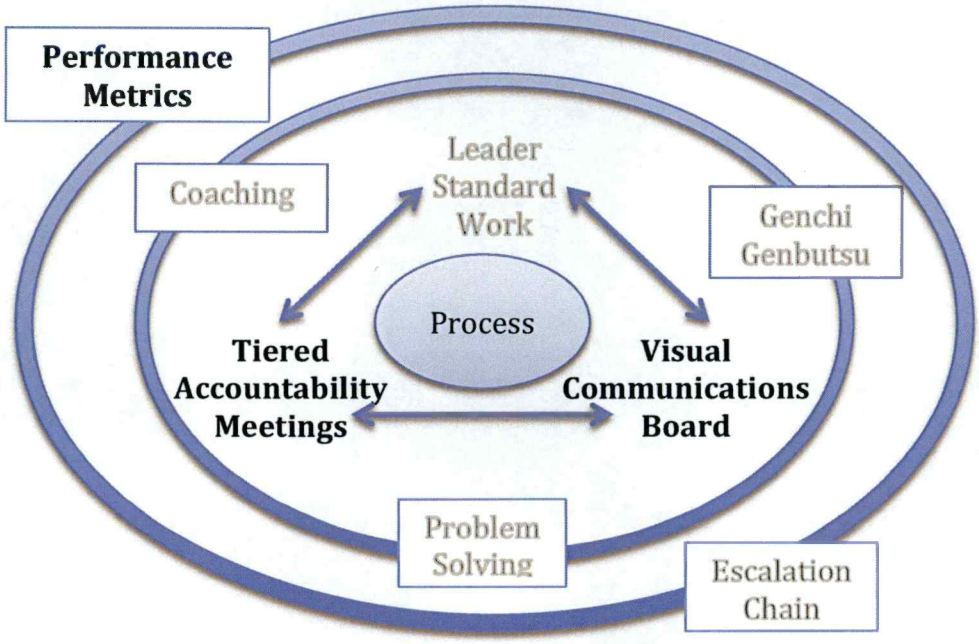

Figure 4.4: CSSS Haut-Richelieu-Rouville Management System

In terms of the deployment of the CSSS Haut-Richelieu-Rouville Management System, it can be summarized in figure 4.5. Using the LDMS deployment conceptual model as the framework, deviations from that model are depicted on the right hand side. The conceptual model elements that do not apply to the case of CSSS Haut-Richelieu-Rouville are faded on the left hand side. An emergent plan can describe the evolving and ever-developing deployment methodology. The mile-wide inch-deep approach was undertaken in deploying the Management System at the executive and director tiers. However, an inch-wide mile-deep approach was undertaken in deploying the Management System within each department or direction. The Orthopaedic Department was the pilot area in that it was the first department to deploy the Management System; the deployment started by coaching middle managers before the top-down approach was adopted.

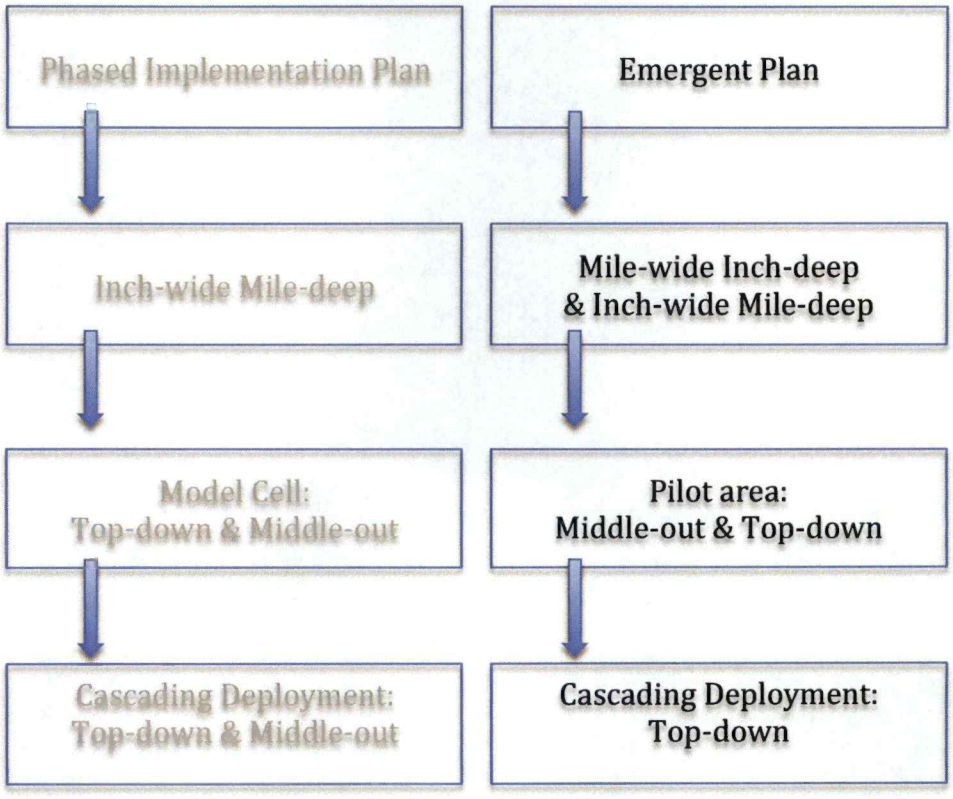

Figure 4.5: CSSS Haut-Richelieu-Rouville Management System Deployment

CHAPTER 5: HOSPITAL FOR SICK CHILDREN

The Hospital for Sick Children (often referred to as SickKids) is Canada's largest paediatric academic health center. It consists of 23 inpatient and 100 outpatient units, roughly 8,000 hospital employees and 2,000 employees at the SickKids Research Institute. The hospital has a rich history of innovativeness, and has adopted Lean thinking to improve efficiency while effectively changing the organizational culture (Tsasis & Bruce-Barrett, 2008). Data collection for this case research was conducted over four days in the beginning of August 2014. Three hours of observation and eight formal individual interviews were conducted with organizational members of different levels. In addition, access to old presentations and training guide was provided to the researcher.

After a brief introduction to the context in which the Daily Continuous Improvement Program (Daily CIP) was developed, the chapter explores the program and its implementation design. Other than one non-clinical department in which the Daily CIP was implemented very recently, the program has only been extended to inpatient clinical departments. Therefore, two clinical departments will be examined in this case. After outlining the expected program progression in the near future, the chapter will conclude with some final remarks on the case in light of the LDMS conceptual models developed in the literature review.

In 2010, a five-year strategic plan to guide the hospital's continuous improvements in patient care was created with six identified Avenues to Excellence:

- Lead in world class quality and service excellence
- Enable our people
- Innovate
- Maintain financial health

- Build sustainable infrastructure
- Enhance child health systems ("SickKids," 2014)

Building on that foundation, Project Horizon was created to envision the ideal state of paediatric health care and create the pathway to achieve it. In 2011, the Hospital for Sick Children participated in the Emergency Department Process Improvement Program (ED PIP), sponsored by the Ontario Ministry of Health. Also known as SPEED, the program involved improving the patient discharge process. According to upper management, after their work with KPMG Consulting on that Lean initiative, a management system to sustain the improvements was the next logical step for the hospital.

In early 2012, KPMG organized a visit of representatives from four prominent Canadian hospitals to ThedaCare facilities in Appleton, Wisconsin. Barnas (2014) describes the hospital's introduction to the management system as well as the success they have seen so far. According to several organizational members, the hospital culture is very conducive to change and challenging the status quo. They described a general appetite to adopting what was learnt from the visit to ThedaCare; organizational members were enthused to participate and be involved. They also indicated that leadership support from the start also played a key role in channelling and framing organizational readiness. These factors collectively set the scene for the adoption of a management system.

Today, the Hospital for Sick Children has a team of seven individuals responsible for all innovation, improvement, and training initiatives. The objective of training is to supply Lean Six Sigma Green and Yellow Belts in different positions throughout the hospital. The notion is to be able to depend on their general understanding and leadership skills during innovation or improvement initiatives. Innovation involves bringing user

centered design techniques to complex problems that are heavily behaviour based.

Improvement initiatives have a controlled size and scope; they rarely cross department boundaries. These projects transpire as improvement ideas or A3s from a particular area's management system, known as the Daily Continuous Improvement Program (Daily CIP). This research will focus on the Daily CIP and the work done by the Improvement Team. Some areas had already gone through Lean projects before being introduced to the Daily CIP. Those areas have seen the highest success rate in terms of adopting the management system, according to the Improvement Team. In such cases, in addition to continuously improving their current conditions, the Daily CIP serves as a measure to control the gains from these projects.

5.1 PILOT AREAS AND STEPWISE APPROACH

Following the visit to ThedaCare facilities, upper management at the Hospital for Sick Children decided to implement a similar system and start with a couple of pilot areas in March 2012. According to organizational members, having two pilot areas provided more variation and a better representation of different situations than one pilot area would. Their plan was to learn what works, build a base system, and enable the pilot teams to customize the system to complement the hospital environment. Neurosurgery and Paediatric Medicine were chosen as the pilot areas because they were high performing departments that were already visible to upper management.

The Improvement Team determined the structure of the Daily CIP in its use of Accountability Meetings and Communications Boards, for example. The pilot teams' role was to refine the design of the system and test it at the hospital. The Improvement Team was mostly influenced by what they saw at ThedaCare. In addition, some members had experiences in other industries from consulting at KPMG, so were able to utilize some of that knowledge in designing and implementing the system.

According to the Improvement Team and several organizational members, the successful implementation of the Daily CIP in the two pilot areas created a movement within the Hospital for Sick Children; other departments became eager to be part of this new direction. In addition to creating organizational knowledge, these pilot areas created alumni; they are individuals who went through the change and were thus often called upon to share their experiences.

The implementation plan entails a 20-week program to deploy the Daily CIP in a department or area, after which the Improvement Team steps back and completely hands over the reigns to department leaders. The Improvement Team continues to monitor the area's development through the Steering Committee meeting every two months when the progress of the department along its 2-year plan is discussed.

The program is deployed in waves of four departments at a time. The interdisciplinary team from each department, spearheading the Daily CIP implementation, receives extensive coaching during the implementation program. The Improvement Team's plan was to train them to become coaches for their areas once the system is implemented. There have been five waves since the pilots were conducted in 2012. The order of departments chosen for each wave was and continues to be determined by negotiating the resources each department can commit to the Daily CIP. This approach ensures that only departments that are fully committed to sustaining the program are involved. From the first wave, post deployment results of the Daily CIP deployment showed promise; employee engagement had increased and two of the key organizational performance metrics, hand hygiene compliancy and medical reconciliation rate, had improved drastically as well.

Each department has an assigned quality leader, who may preside over several areas. The position of the quality leader existed before the Daily CIP was introduced, but the role has evolved since then; they can now be thought of as a liaison with the Improvement Team because of their focus on bridging

the gaps between performance and target levels. The Improvement Team recognized from the onset that it was necessary to have well trained managers and quality leaders for the departments to become self sufficient in their improvement activities.

The Improvement Team mostly involves the middle management level with the goal of developing their problem solving skills, which they can then coach to the frontline staff. The program structure is highly standardized, which facilitates its deployment throughout the hospital. The Improvement Team planned the timing of the rollout waves, with a couple of months between the end of the previous and start of the next wave, to take into account expected changes in behaviour.

5.2 DAILY CIP

The program is introduced to the interdisciplinary team sanctioned with building the Daily CIP in a particular department over four consecutive modules; each one pertaining to a particular aspect of the Daily CIP. The ThedaCare program, as described by Barnas (2011), inspired this 20-week program where one day each month all teams gather and are trained on one aspect of the program. The program is highly standardized which facilitates its delivery in concise modules and its presentation in a binder as a manual or training guide.

By the end of the four months the Daily CIP is fully implemented. The time between each session enables the team to test and tweak the system. Some organization members expressed that they felt the initial four months were stressful as a lot of knowledge was divulged with little time to be acquainted with the system. However, they expressed that they were able to adjust to the new system within the 20-week program. Their description of the change suggests a change management model similar to the unfreeze-change-refreeze model described by Levasseur (2001).

The Improvement Team's objective from having this prolonged period of testing is to enable the team to try out their ideas, and provide them with sufficient time to observe their impact. The interdisciplinary team is coached in a structured fashion throughout the implementation. Coaching is available afterwards through the Steering Committee meetings attended by the interdisciplinary and the Improvement Team. Figure 5.1 depicts the Daily CIP; it holds all the elements and utilities of the Daily CIP. The Daily CIP House is used to guide the interdisciplinary team through the implementation program.

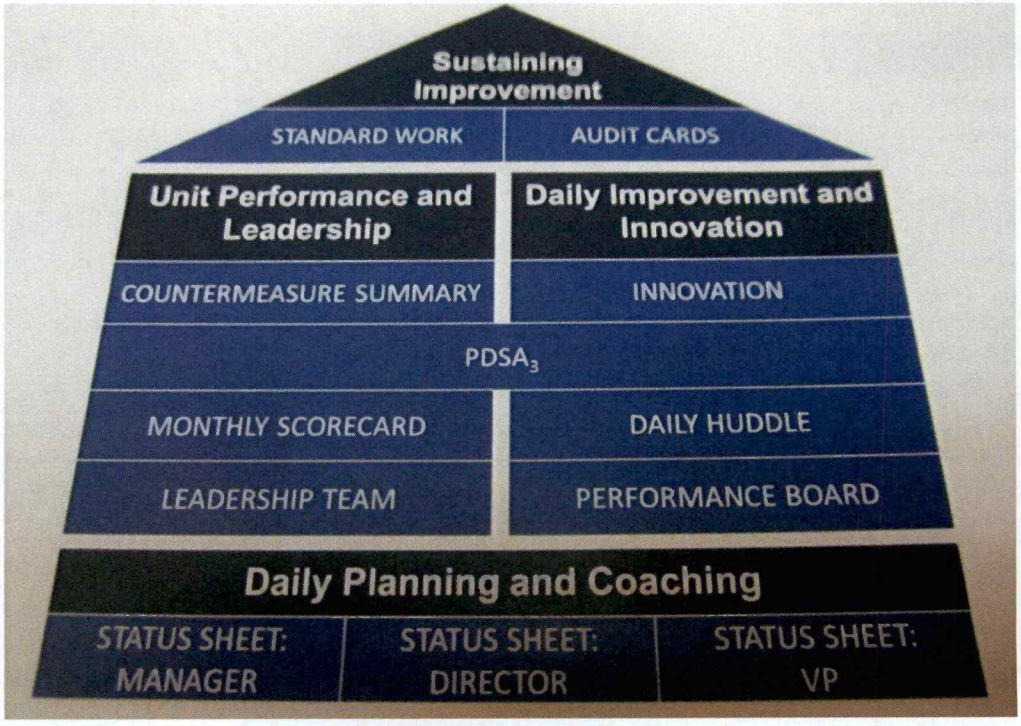

Figure 5.1: Daily CIP House

The first module is designed to create an understanding of the Daily CIP House and set expectations for the implementation program. By the end of the day, the first iteration of three tools would be developed, they are; the daily Status Sheet for managers, scorecard, and the Leadership Team selection. The Leadership Team is another interdisciplinary team of internal stakeholders, but unlike this team who is responsible for implementing the

Daily CIP; the Leadership Team member owns the performance of the business.

The Leadership Team for one of the pilot areas, for example, was composed of a core group of senior manager, quality leader, nurse practitioner, clinical support nurse, medical physician, surgeon, and nurse educator. In addition to the core group, ad hoc members who attended on occasion were a director, infection prevention and control practitioner, professional services, patient service aid manager, transitional care coordinator, community care access center representative, unit clerk, pharmacist, IGT manager, decision support, human resources, finance, patient and family representative, and trauma care coordinator.

The Leadership Team's monthly meetings are opportunities to review performance and work done to date. In addition, these meetings are an opportunity to prioritize ensuing projects. The first Leadership Team meeting focuses on the unit's current performance and setting their baseline. The following meetings then focus on program performance and conformance by monitoring improvement percentages off these baselines.

The objective of the second module is to develop the first iteration of the director Status Sheet, learn about Performance Board setup and Huddle facilitation. In addition, the module introduces the team to PDSA thinking and recognizing the eight types of waste that Weinstock describes (2008). The third module dives deeper into A3s and the scientific approach to problem solving. The objective is to provide the team with the tools and skillset needed to solve problems effectively, and be able to apply and communicate the approach within their unit. The fourth and final module introduces innovative thinking and brainstorming tools, as well as generates awareness of standard work and review processes.

By the end of the last module, the team is able to implement all aspects of the Daily CIP in their unit. Systemic coaching remains available to the

interdisciplinary team throughout the 20-week implementation program. According to the Innovation Team, the change and transition typically settles by the end of the 20-weeks, so interdisciplinary team members tend to not seek further coaching.

5.3 EMERGENCY DEPARTMENT

The Emergency Department was part of the first wave of implementations after the initial pilot areas. It was one of the fastest departments to adopt and absorb the Daily CIP, according to the department leadership and the Improvement Team. The reason they cited was that ED PIP, the Ministry of Health sponsored initiative previously described, gave the department the opportunity to experience a Lean improvement. This experience developed a shared mentality that readily accepts experimentation and change.

The Visual Communications Board consists of two boards that are placed next to each other; the Daily Improvement Board and the Area Improvement Center. Huddles are conducted three times a week at 12:15 P.M. in front of the Daily Improvement Board. The board is located at the backend of the department and is showcased in figure 5.2. Even though a timer is set to 15 minutes, the Huddle tends to run closer to 30 minutes on a regular basis, according to department members.

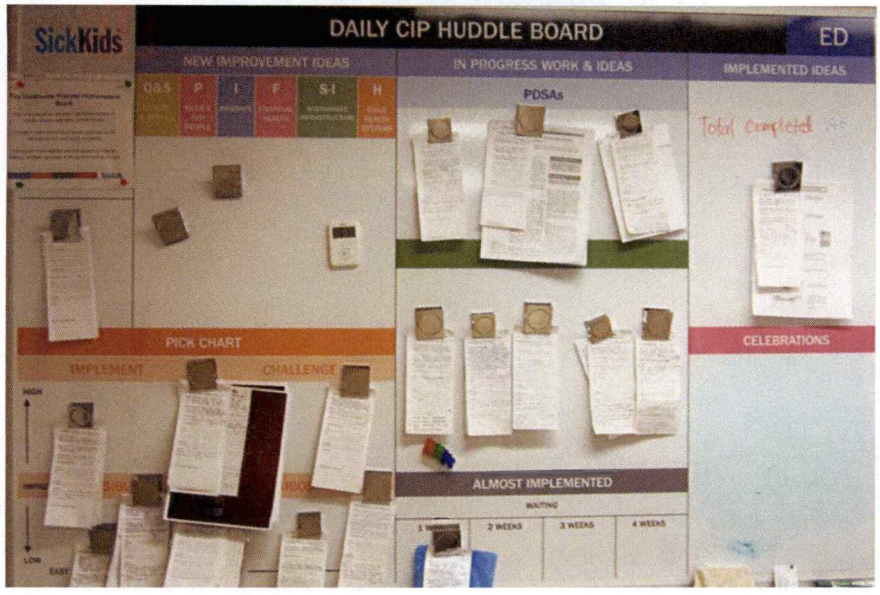

Figure 5.2: Emergency Department Daily Improvement Board

According to some department members, attendance was an issue when the huddles were first introduced. As time passed and the frontline staff saw its effects in terms of improved working conditions, it has become an established routine. Today, nurses at the frontline still expect a five-minute warning before the start of the meeting. The manager and quality leader take turns in facilitating the huddles, which are conducted solely to manage the Improvement Opportunity Cards. The facilitator usually takes some time before the start of the huddle to review the cards on the board. Similar to the approach taken by ThedaCare, managing and improving operations are executed separately; the huddles create the improvement mechanism while the Status Sheet Reports that will be later described manage department operations.

Nurses at the frontline appreciate being able to suggest and implement improvements that affect their daily activities through these Improvement Opportunity Cards. In addition to describing the symptoms and root cause of the problem on the Opportunity Cards, they must also indicate the Avenue to Excellence the improvement pertains to. Once the card is selected for

implementation, the plan, person leading the implementation, and the expected completion date must also be indicated on the card.

According to department heads, conducting these meetings on a regular bases not only trains the team on effective problem solving, it also helps the team understand the problem solving process, and realize how much time and effort it takes to make simple changes. This common understanding between frontline and middle management can set the right expectations between them. Having the team prioritize the Improvement Cards ensures that the improvements that affect the frontline staff the most are taken care of first. While historically the manager was expected to solve all problems, the team is now given the opportunity to participate and take ownership of improving their area by setting priorities and finding solutions.

During the huddle, the PICK chart helps the team prioritize improvements based on their impact and ease of implementation. Once the team decides to tackle an improvement idea, they must categorize it as "just do it" or as a PDSA project. "Just do its" are smaller issues that require simple changes to rectify. The rule of three is that they require less than three days, less than three steps, and less than three individuals to resolve. PDSA projects are more challenging as the solution may not be known, or may impact multiple units.

From examining the board and observing the huddle, there are many Opportunity Cards lined up in their designated Avenues to Excellence and in the PICK chart waiting to be selected. The huddle commences by examining the work-in-progress cards in the "just do it" and PDSA sections. There is a maximum number of cards that can be undertaken at one time, and that number is dictated by the allotted space on the board. Starting with outstanding tickets allows the facilitator to empty some space on the board in order to initiate new Improvement Opportunity Cards from the PICK chart. How long each Improvement Opportunity Card is discussed is not controlled; so while three Improvement Cards may be discussed in one

huddle, another huddle may only address one Improvement Card. This ultimately depends on how effective the facilitator is in managing the meeting, and delegating responsibilities so less time is used in conversing. Facilitation skills are therefore very important, and according to some organizational members, may require further coaching.

The program objective is to complete at least four "just do its" and one cycle of a PDSA project per month. However, observation and individual interviews indicate that PDSA projects are rarely implemented. Apparently, some PDSA Improvement Cards remain on the board for some time and wind up being tossed after several months of not being addressed. When asked why that happens, several reasons are cited; lack of time, lack of expertise at the frontline, and the attempt to clear all the easier improvements before tackling the large and complicated ones. Another factor identified by the researcher, and validated by several organizational members, is that the number of total completed Improvement Opportunity Cards is tracked on the board. It serves as a motivation for department members to continue to implement improvement ideas. The type of improvement, "just do it" or PDSA, is not indicated; naturally, individuals tend to prefer to implement the easier and quicker improvements to increase that number.

A summary of completed improvement ideas is sent out every month to the entire department. The database on the SharePoint site provides the improvement ideas with an organization-level platform. Sharing improvements throughout the organization enables knowledge sharing. Improvements to common problems can therefore be applied throughout the organization. How often department members actually review the implementations of other departments may need to be examined; as some members indicate it is useful, while others perceive most improvements to be department-specific.

Improvement Opportunity Cards that are pending for support from other departments are tracked for four weeks, after which they are escalated to the

department director or executive. Department members feel comfortable in escalating these situations to their superiors because the escalation process is structured and standardized. Outside this structured escalation chain process, individual interviews indicate that organizational members try their best not to escalate problems if they perceive it to be within the boundaries of their responsibilities.

The second part of the Visual Communications Board is the Area Improvement Board in figure 5.3; it showcases the department driver performance metrics.

Figure 5.3: Emergency Department Improvement Centre

A distinction is made between driver and watch performance metrics in that the Leadership Team is actively working on improving the performance level of the driver metrics, while only passively monitoring the performance of watch metrics. Driver metrics that are underperforming for two or more months require an action plan using the A3 and PDSA approach, and a countermeasure summary presentation is expected during the monthly Leadership Team meetings to share PDSA status. The countermeasures developed by the Leadership Team to improve the driver metrics are unit

initiatives that are addressed in addition to those derived from the Daily Improvement Board in figure 5.2.

A graph of the metric from the scorecard as well as the A3 is usually displayed on each metric lane on the Area Improvement Board. As these metrics show improvements and no longer need active involvement from the Leadership Team, driver and watch metrics can be swapped. The Improvement Team set the number of driver metrics to four at most; their justification is that controlling the number of metrics will ensure that they receive sufficient attention and resources to improve. The interdisciplinary Leadership Team is responsible for choosing the metrics, but it is the director and manager that set target performance levels.

During the implementation of the Daily CIP, the Leadership Team was required to formulate indicators by identifying an indicator name, strategic objective, measure, data source, business owner, data steward, performance baseline, target performance, and year-end improvement percentage. The team started by formulating two indicators and were able to continue to add to them continuously.

Given the Leadership Team's involvement with the Daily CIP from the start, its members tend to be the most trained on A3 thinking and effective problem solving. The team therefore assumes most of the responsibility of designing and directing the countermeasures. Some department members argue that finding the time to address both types of initiatives is a struggle. Also, resources are more readily allocated to these countermeasures than to PDSA projects that emerge from the Daily Improvement Board in figure 5.2; this is one reason why PDSA projects are put on the backburner. Department members note that the Leadership Team was extensively coached during the Daily CIP implementation to become coaches for their area, but coaching is not part of the Daily CIP framework. Some feel that a structured and systemic coaching is needed to develop the frontline's problem solving skills.

Department members and leaders indicated that they would like to see more people use A3 as a problem solving structure within and outside the department. They expressed that as the Daily CIP expands to more areas, the continuous improvement culture can be strengthened since most of these PDSA projects span across multiple departments. Yet, there is a disagreement among interviewees on how developed the culture inside the department actually is. While some believe that the frontline nurses embraced the Daily CIP and its initiatives, some argue that they still do not always feel comfortable being observed as they perform their duties. Genchi Genbutsu is conducted fairly regularly, although not in a structured manner, according to department leaders. The frequency and duration of each visit varies, according to department members.

Department members and leaders state that they already see changes within the department in terms of structure and communication. They also recognize the limitations of their deployed Daily CIP; they indicated that the continuous improvements stop at the boundaries of the department. An organizational approach to continuous improvement is one that transcends department boundaries and produces organization-wide outcomes. They indicate that expectations of the Daily CIP remain at the department level, and attribute a lack of accountability and alignment as a consequence of that department focus.

5.4 ONCOLOGY DEPARTMENT

The department was also part of the first wave of implementations after the two pilot areas. The program setup is almost identical to that of the Emergency Department. The two Visual Communications Boards are located at the entrance of the department and look exactly the same as those depicted in figures 5.2 and 5.3. Huddles are also conducted three times a week at 2:15 P.M. and the facilitator role rotates between the manager, quality leader, and recently a charge nurse. As with the Emergency Department, it took some time for department members to embrace the

huddle. Department leaders indicate that the huddle set the expectations for the manager as well as the frontline, and that is why attendance has improved drastically since its introduction.

The stand-up meeting is capped at 15 minutes by using a timer as well. And from observing the huddle, it seems the frontline staff is enthused and eager to make changes in their workplace. The discussion is on point in terms of its pace. Department leaders point out that through the huddles and ensuing improvements, the system creates the opportunity for engaged department members to highlight themselves. Also, having the huddle at the entrance of the department, in front of the nurses' station, enables physicians and other organizational members who are passing by to participate.

As in the Emergency Department, the Leader Standard Work was not adopted throughout. Department leaders indicate that while it would be helpful to set standards, cultural issues need to be addressed before Leader Standard Work can become more commonly accepted. Furthermore, upon interviewing multiple department members, it seems there might be some confusion between Leader Standard Work and Process Standard Work.

In terms of the structure of the Daily CIP meetings among the different tiers within the department, and in keeping with the same numbering system of the different tiers as in the previous case, the structure comprises of four levels; charge nurse (team leader), manager, director, and executive. After the charge nurse's (level-1) meeting with the team of nurses early in the morning, the (level-2) daily Status Sheet meeting with the manager takes place. The (level-2) manager, (level-3) director, and (level-4) executive meetings are all structured using the Status Sheet framework that was developed during the program implementation.

As indicated previously, these Status Sheet meetings are how the department is run. These meetings are conducted separately from the huddles that lead continuous improvements. Status Sheets are used as a communication

medium between tiers. Status Sheet questions are open ended in order to stimulate back-and-forth discussion between the levels. An example would be: what known or anticipated safety risks for patients, families, or staff worry you the most today? Such a question would enable the superior to understand the status of the frontline beyond numbers and metrics. It also provides an opportunity to guide and coach the subordinate on how to solve problems and handle identified risk areas. These meetings take place at the nurses' station or a superior's office; a Status Sheet Observation Guide is used to audit the process on occasion.

According to department members, when the Status Sheets were first introduced to the unit, some individuals felt they were put on the spot; they were asked to anticipate possible issues within the area and have a plan to address them. Such a conversation was not happening before the deployment of the Daily CIP. But with time, these conversations became easier as department members learnt how to identify and articulate potential risks. The (level-3) Status Sheet meeting between the manager and the director is conducted weekly, and the (level-4) Status Sheet meeting between the director and the executive is conducted every two weeks. Issues of safety and funding are most commonly escalated through the tiers of the Status Sheet meetings.

Multiple department members and leaders indicated that an overall shift in the frontline staff's mindset became evident since the introduction of the program; they now feel that they are part of something great. Department leaders also indicated that frontline staff now has a better understanding of the process and time it takes to solve even seemingly simple problems, which results in better cohesion and trust between the frontline and the middle managers.

The (level-1) meeting between the charge nurse and the nurses at the frontline is not part of the Daily CIP; its structure is not included in the Daily CIP manual. The meeting is thus not structured or scripted, but there is a

consensus among department members and leaders that it must be conducted daily, because the information is shared with the manager on a daily basis. The charge nurse is able to structure the meeting according to the standard structure of the (level-2) meeting with the manager.

As previously described, the Status Sheet meetings and the Improvement Huddles do not address performance metrics. Department staff meetings are conducted every three months, and that is the only time when performance measures and targets are discussed with the frontline staff. Yet, the department leaders and the Improvement Team indicate that the frontline is well aware of the metrics and their performance level.

Improvements and initiatives that aim to enhance performance levels have three separate origins: those that originate from the Daily CIP which were previously discussed, other department initiatives developed by department leaders, and organizational initiatives that are pushed down from executive management. Department members convey some frustration with these competing initiatives.

Given that it is still structurally difficult to invest time in non-clinical processes, leadership recognizes the importance of focusing on activities that contribute to the overall organizational goals. But with a total of 55 global organizational indicators, organizational members expressed the difficulty of ensuring initiatives have a significant impact on global metrics. The three scorecards for the program, department, and organization do not always match. Department leaders find it cumbersome to try to manually align them to ensure the department is achieving suitable results.

While the frontline prefers to spend more time on Daily CIP initiatives that they feel make a bigger difference in their daily activities, some department leaders indicated a need to ensure initiatives actually impact the hospital's overall performance levels. The need to align Daily CIP metrics is therefore accentuated. Some department members stated that they do not feel that

local department metrics are aligned with the global organizational metrics, and that not having True North metrics led to this disconnect. They also indicated that the Avenues to Excellence are too broad and should be revisited, along with a combined scorecard instead of the three separate scorecards. In addition, some organizational members note that without aligning the metrics on these three scorecards, the success of the entire program cannot be gaged.

5.5 FUTURE OUTLOOK

In what can be described as a second iteration of the program for departments that have already implemented the Daily CIP, the Improvement Team plans on working on strengthening the connection between top and middle managers. Without losing the organic nature of the Improvement Opportunity Cards in that they are what the frontline staff care about, they plan to devise a system to reach a balance between what top management deems a priority and what the frontline staff prefers to improve.

The focus on the deployment so far has been on inpatient clinics. Once ambulatory (outpatient) units are addressed in the very near future, the Improvement Team expects to face different challenges. Two new pilot areas were chosen for ambulatory care; Dentistry and Gastro Intestine Health, and the first wave of implementations is scheduled for the fall of 2014. There are structural differences between inpatient and outpatient units. Most notably, quality leaders in inpatient units tend to be responsible for an average of two units, while the quality leader for outpatient units is responsible for 23 departments. In addition, there is no core frontline team in outpatient units; the frontline staff is not available on a regular basis, as they are linked to the physician rather the manager. Therefore, resources must be moved constantly around the physician's schedule. The Improvement Team has already made plans to rework the (level-2) Manager Status Sheet Meetings and the role of the quality leader from ongoing support to consultative support.

Support Departments are also in the plans for late 2014; the Learning Institute already underwent the deployment program with no changes in structure. Once Human Resources successfully implements it as well, more departments can be included in the program. Which departments are included in each phase is again dependent on the resources each department is able to commit.

5.6 CASE CONCLUSION

In order to summarize the findings of this case in light of the literature review, the two conceptual models will be used. LDMS components that are exhibited in the Hospital for Sick Children Daily CIP are bolded, and the remaining missing components are faded in figure 5.4. While some of the faded elements are part of the Daily CIP, they were not demonstrated during the observations and interviews. The figure demonstrates the lack of upper management involvement in the Daily CIP, as both supporting utilities on the outer loop are faded.

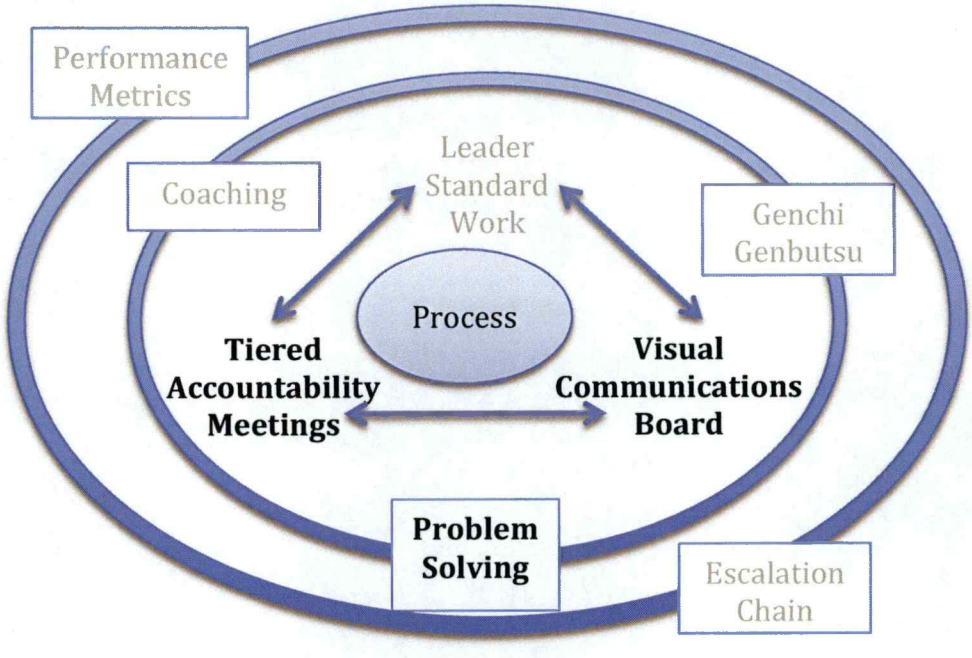

Figure 5.4: Hospital for Sick Children Daily CIP

As demonstrated in the case, the objective of the Daily CIP implementation model has been for each department to build and be responsible for sustaining their Daily CIP. The deployment strategy chosen enabled the Improvement Team to spread a self-sufficient system at a fast pace through an inch-wide mile-deep approach. Toussaint (2014) describes the inch-wide mile-deep approach as a comprehensive system that involves department members throughout the command chain. However, the implemented Daily CIP was not fully extended throughout all the levels within each department; upper management (level-4) involvement is not very evident since alignment of KPIs was not achieved. So although directors were incorporated into the Daily CIP to some level, executives were not, and for that reason, this seems to suggest that the change occurred from the middle-down rather than the middle-out. It is important to recognize that the currently deployed LDMS is not necessarily complete and comprehensive within an area. Multiple iterations to further stretch the deployed Daily CIP to include upper management will be implemented to further refine the implemented system according to the Improvement Team's plans.

Different pilot areas were chosen for different types of departments. Inpatient, outpatient, and non-clinical departments constitute the different phases of deploying the Daily CIP. Utilizing pilot areas and the stepwise approach fit the structured and standardized Daily CIP deployment very well. Figure 5.5 depicts the Hospital for Sick Children's deployment model in comparison with the conceptual model developed from the literature review on the left. Deviations are indicated on the right hand model by fading the elements that do not apply to the case of the Hospital for Sick Children.

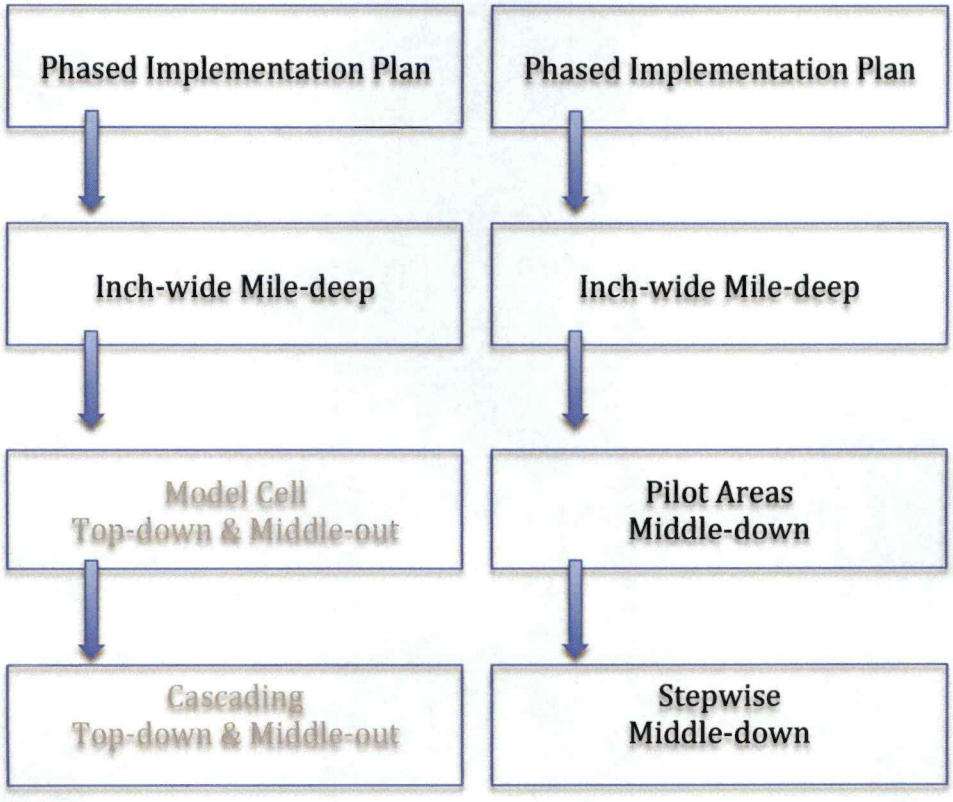

Figure 5.5: Hospital for Sick Children Daily CIP Deployment

CHAPTER 6: ST. BONIFACE HOSPITAL

The second largest hospital in the province of Manitoba is comprised of seven buildings and roughly 4,000 employees, including 340 physicians and 100 managers. Innovation and experimentation, in its denotation of active learning, have long been an integral part of the organizational culture. The hospital's leadership in providing quality patient care is a source of pride for many organizational members. The experimentation mindset predates their Lean transformation, and their efforts are made public in the annual report which can be found on the hospital website ("St. Boniface Hospital," 2014).

After a brief introduction to the history of the Management System at St. Boniface Hospital, the Surgery and Supply Chain departments will be further explored. The recent development of model cells will also be discussed before addressing the hospital's plans for the near future. The chapter will conclude with a brief summary of the findings in light of the LDMS conceptual models developed from the literature review. The data collection for the case was carried out over five days in July 2014. Six hours of observations and nine formal individual interviews were conducted. The formal interviews were conducted with leaders of different levels; only informal interviews were conducted with frontline staff members because of their limited interaction with St. Boniface Hospital's Management System.

The hospital's Lean transformation started in 2008 in an effort to improve the quality of patient care. President and CEO, Dr. Michel Tétreault, has been at the forefront of this transformation since the beginning. The hospital's Lean journey is well documented in the literature (Foropon & Landry, 2014; Foropon et al., 2013; Kirbyson, 2010; Piggot et al., 2011). Simpler Consulting (Hafer, 2012) spearheaded some of the initial Lean projects. Their relationship continues through a Sensei that is available on the premise one week every month to guide and coach the Transformation Team and hospital leadership. St. Boniface Hospital's Lean transformation was inspired by

several organizations: the Institute for Healthcare Improvement, Virginia Mason Medical Center, and ThedaCare. StandardAero, a local jet engine repair company, played a key role in helping shape St. Boniface Hospital's vision and practices as well.

In 2010, the hospital's True North metrics were formed:

- Satisfy patients
- Engage staff
- Do no harm
- Manage resources[2]

The True North metrics allowed the leaders to assess their areas of control in order to identify gaps between targets and actual performance levels. According to the Transformation Team, as leaders sought to reduce all these identified gaps, improvement opportunities started to pop in many different directions according to the size of these gaps. Small initiatives were therefore implemented throughout the hospital to mend the gaps. This led to the creation of pockets of success, which Ohno (1988) referred to as isolated islands. These small initiatives did not build a momentum because they were scattered throughout the hospital. Their scattering also led to a loss of direction because the hospital, as a whole, was still not feeling their effect. Another factor that led to the loss of vision was turnover in leadership which some attributed to the change of direction at the hospital.

Similar to the plateau that ThedaCare experienced (Barnas, 2014), St. Boniface Hospital recognized a regressive trend and reassessed their approach in 2011. According to the Transformation Team, by mapping a reverse fishbone to determine why they were not achieving their True North

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[2] A fifth metric was later added in 2014; "flow" pertains to the streamlining of the flow of patients and services while minimizing inhibitors or restrictions.

objectives, they realized that they needed a holistic and systematic approach. The decision was therefore made in early 2012 to adopt a Management System that would sustain and refocus the improvement efforts. The Transformation Team experienced turnover until the final team makeup was set in 2012. The team is a resource entirely dedicated to the Lean and Continuous Improvement transformation. The following sections discuss the deployment of the Management System during the last couple of years.

6.1 TOP-DOWN APPROACH

The deployment strategy was to build the Management System one level at a time, starting at the executive level, in 2012. The mile-wide inch-deep approach entailed deploying the Management System from the top-down. When it is well deployed and absorbed at that level, the Management System can then be deployed at the following director level. Executive leaders and the Transformation Team deemed that only when leaders adopted the scientific approach to problem solving could they be expected to enable their teams to adopt PDSA and A3 thinking. Leaders also point out that they deemed it necessary for executives to try out the new initiative first before asking their teams to adopt it. According to several leaders, the Management System can be considered the tool that enables department members to become effective problem solvers. The success of the Management System deployment therefore depends on the progress made in developing problem solvers.

The structure within each department is along the same four tiers described in the previous cases; frontline staff, managers, directors, and executives (including the CEO). Directors and executives together (levels 3 & 4) are commonly referred to as leadership. The Management System at the hospital has only been deployed at the leadership level; starting with the executive level and then onto directors. Given a gradual implementation of Management System tools, the Director Check meetings and Director Improvement Boards were first introduced. They have sine then become

established throughout hospital departments; however, department participation does vary by director, according to the Transformation Team.

Daily huddles are conducted at the (level-1) frontline in some departments. According to multiple organizational members, the frontline staff has experience with Lean from the various Lean initiatives and RIEs conducted through the years. However, the daily huddles seem to vary greatly between departments. While the Medicine Department, for example, only focuses on the expected number of patient discharges for the day, other departments, such as the Emergency Room Department, review all patient cases in order to discuss any obstacles that prohibit them from being discharged or internally transferred. The patient flow True North metric is the focus of all these meetings; however, each department addresses it differently. While (level-1) frontline were affected by Lean initiatives, and the Management System targeted (levels 3 & 4) leaders, (level-2) managers did not have direct exposure and training on the Lean mindset and methodologies.

When asked about the Management System, all interviewed executives and directors indicated the effect it has made on their ability to solve problems effectively. The scientific approach they describe is in line with the research, as explained by Toussaint (2013), as well as Spear & Bowen (1999). It entails understanding the root cause of the problem, developing a hypothesis, devising an experiment to test it, and finally, after obtaining concrete objective evidence, implementing the initiative, and controlling its results.

In order to produce objective evidence that the A3 process would yield significant results, one of the first experiments conducted in 2012 required all directors to develop A3s to include in their annual plans for their respective areas of control. The annual plans from thereon needed to cover their strategy to address each True North metric. The executives reviewed these A3s during the Director Quarterly Alignment Reviews; an established process where the director meets with the Clinical Leadership Team which vary from one to three executives for each area of control. Performance

levels are amalgamated on a Visual Board to track the progress of each True North metric. Located at the Mission Control room, figure 6.1 depicts the global True North metrics on the (level-4) Visual Communications Board.

As executives conducted more of these Director Quarterly Alignment Reviews, limitations to the deployment model started to surface. According to the Transformation Team, not deploying the Management System vertically through all the tiers put a strain on directors who were expected to truly understand their areas of control even though they did not have the tools to do so. Directors were expected to understand the inner workings of their respective units, anticipate problems, and provide countermeasures to address them. Since managers were not included in the Management System, directors could not receive the support they needed from their teams.

Figure 6.1: Mission Control True North Metrics Board

In addition, according to the Transformation Team, while communication within the leadership level improved drastically as a result of the Management System, it shined a light on the disconnect between directors and the two tiers below them (managers & frontline staff). Another issue that surfaced from the experiment involved the negative consequences of the silo mentality; one department's countermeasures may have negative consequences on another department's performance level. Leadership and

the Transformation Team expressed that an effective horizontal communication channel and structure to resolve this issue has not yet been developed. They indicated that they needed a system that is deployed vertically, yet still has strong horizontal connecting points.

The following sections will first describe how the current Management System functions in its mile-wide inch-deep deployment at the leadership level in two departments, then introduce the model cell development of a new approach to systems thinking. The Transformation Team expects this new approach to address the previously indicated issues of the current Management System.

6.2 SURGERY DEPARTMENT

The department was one of the hospital's first Value Stream Maps (VSMs) in the hospital's Lean transformation in 2008; it is celebrated as one of the first departments to embrace the Lean methodology and mindset (Tétreault, 2013). The department leadership was also the first to embrace the Management System when it was later introduced in 2012. According to the Transformation Team, the department was chosen because of their experience with Lean and because the department has consistently been a high performer.

According to multiple accounts, when the leadership (director and executives) first introduced the Management System to the department, department members were weary of it. They needed to be convinced of its outcome; opinions changed once enough personal experiences were made with the Management system. Leadership recognized the need to create the foundation on which the target behaviour can be experienced. From the start of the deployment effort, leaders indicated that problem solving, and more specifically problem definition and scoping, was identified to be instrumental to the successful deployment of the Management System. The Transformation Team, along with the Sensei, conducted multiple coaching

sessions and workshops to build supporting utilities such as problem solving and escalation in common circumstances.

The (level-3) Director Improvement Board is the only board for the department given that the Management System has not yet been extended to (level-2) managers, as of the time of this research in July 2014. The Transformation Team along with the leadership level developed the (level-3) board together. The department's True North metrics are clearly indicated on the board in figure 6.2. Each True North lane has allocated space for two KPIs and their countermeasures. The graphs on the board are printed and updated on a monthly basis. The association between action items and their corresponding True North metric is indicated on the action plan, which is posted on the left hand side of the Director Improvement Board.

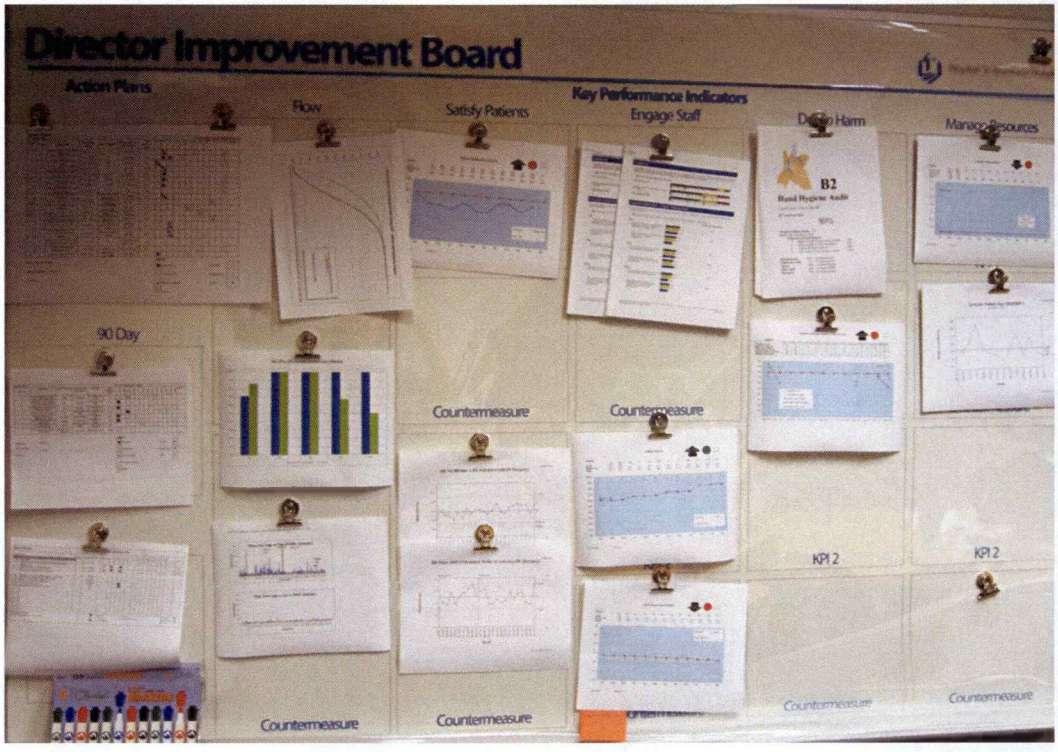

Figure 6.2: Surgery Department Director Improvement Board

The board is used to help directors prepare for the (level-3) monthly Director Check meeting with executives. During the meeting, the director reviews the True North metrics that have action items and provides an

update on their progress. Any persistent gaps between actual and target performance levels need to be addressed with countermeasures and action items. These meetings take place at a designated boardroom where the Director Improvement Board is located. In order to prepare for the Director Check meeting, the director conducts bi-weekly meetings with the managers to discuss updates on the action plans and countermeasures. These (level-2) meetings between the director and the managers are not standardized within the Management System; other departments do not conduct them in the same frequency or structure.

In addition to preparing for the Director Check Meeting, examining the board continuously enables the director to test whether department action plans have successfully impacted performance levels, or if these efforts need to be redirected. The director also conducts experiments to test the metric's sensitivity and impression on the global True North metric to ensure the appropriate local KPI is selected. Department members expressed that this alignment, and the Management System that accomplishes it, has made their priorities, goals, and objectives much clearer.

Some expressed that being able to measure progress towards goals serves as an incentive to continuously improve performance. It also serves as a training mechanism; recognizing intermediary results helps guide performance improvements throughout the process. Their explanation is similar to Kohlbacher's (2010) description of how timely intermediary results enables continuous performance improvements.

At the (level-1) frontline, daily huddles are conducted with the sole objective of developing a daily action plan of patient flow. The huddles were initiated before the introduction of the Management System; however, they have evolved over time to become more efficient and focused. Due to the inherent unpredictable environment in the Surgery Department, four huddles are conducted during a 24-hour period. This allows frontline nurses to create several amendments to the daily plan.

The huddles are conducted in a small room with just enough seats for the manager and nurses. Nurses take turn in sharing their workload and any issues they foresee while the rest of the attendees take notes. The manager or charge nurse logs the information in a binder that can be later be used to communicate to other managers if requested. However, several organizational members indicated that it is rarely used. The ten-minute meeting is fast-paced and controlled. Everything said during the meeting must pertain to key points indicated on the participants' sheets. It was observed that improvement ideas do surface during these huddles. Yet, because there is no systematic collection and transfer of this information up the command chain, the Management System structure does not capitalize on the improvement suggestions.

An element that is still not officially incorporated into the Management System is Leader Standard Work. While some executives have already developed theirs, most directors are still working on developing their own Leader Standard Work with the help of the Sensei. From the Transformation Team's perspective, now that the Meetings and Communications Boards are part of the new routine, the Leader Standard Work can be employed. This rationale is similar to what Mann (2010) prescribes.

Aside from the utilities of problem solving and alignment of key performance metrics, the remaining utilities are integrated into the Management System but are less visible. Coaching is conducted according to leadership; however, it is not conducted in a systematic or structured fashion. One aspect of Genchi Genbutsu is conducted in the Leadership Patient Visit Program, which was established prior to the Management System. The program structures leadership visits with patients to discuss their experiences at the hospital on a rotation basis. The objective is for leaders to better understand the current service level from the patient's point of view and seek to improve it. The hypothesis is that ongoing interactions with patients enable leaders to improve the overall hospital service level.

6.3 SUPPLY CHAIN DEPARTMENT

The first non-clinical department to embrace the Management System handles all logistics and procurement activities for the hospital and has 500 staff members. The Management System was deployed in the Supply Chain Department in 2012 shortly after the Surgery Department. The (level-3) Visual Communications Board looks identical to the one previously depicted in figure 6.2, and is also located in a designated boardroom in the department. Leadership, along with the Transformation Team also developed the KPIs and countermeasures in the True North lanes collaboratively.

The Leader Standard Work for the director is also in the process of being developed with the guidance of the Sensei, as of the time of the data collection in July 2014. In addition, the Director Check meetings and their preparation are conducted in a similar fashion as previously described. According to department members, Genchi Genbutsu usually follows the Director Check Meetings, and audits are performed to gauge the preliminary success of the countermeasures. Genchi Genbutsu to observe processes, fact-finding, or root cause determination provides the director with the opportunity to learn about operational nuances and connect with the frontline staff. Leadership also ensures to visit the floor when there is a known issue or problem. This has enabled a better understanding of how certain problems impact the processes and staff, which affected how these problems are prioritized and resolved. The frontline staff's general feedback is positive, as they appreciate the leadership taking an interest in their work.

While there is no formal (level-2) Manager Check meeting between the manager and director, some managers are more eager to be included in the Management System so they have proactively adopted it. One of the managers in the Supply Chain Department developed the Visual Board in figure 6.3 to help communicate with the staff and structure their (level-1) meetings. A five-minute daily huddle is conducted with supervisors to place

stickers that indicate where there are equipment malfunctions. Frontline staff members find that having that information available to them is beneficial; it signals problem areas and lets them know in advance that their manager and director are aware of the problem.

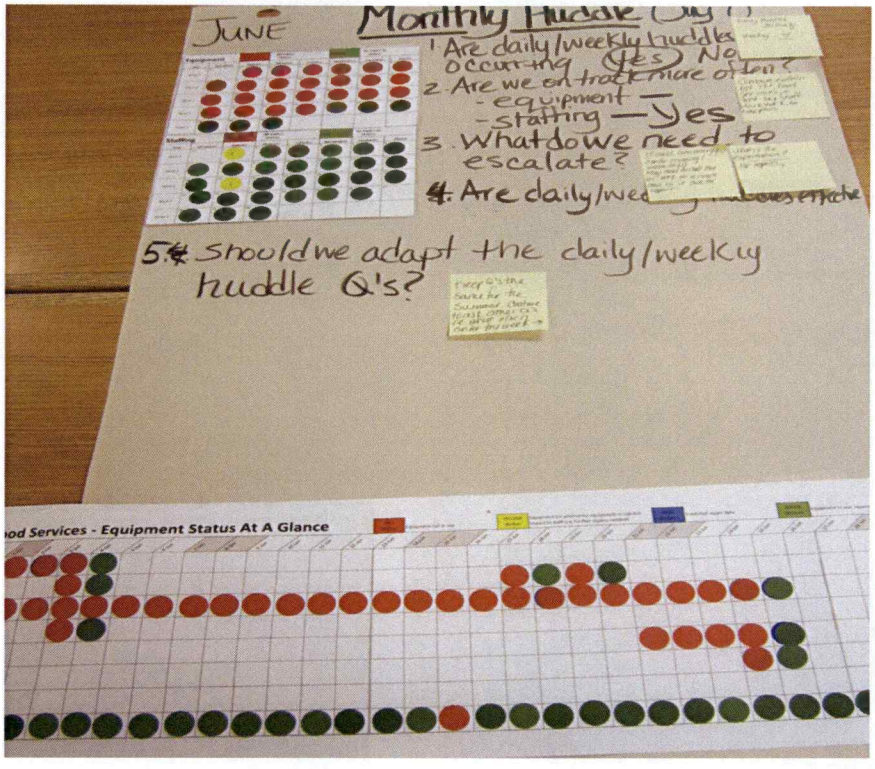

Figure 6.3: Supply Chain Department Manager Visual Board

Weekly meetings between managers and supervisors focus on resolving these problems; the director utilizes this problem-solving situation as a coaching opportunity to help the team develop their problem solving skills. Another monthly meeting between the director and the manager is used to review problems and the problem solving process. Given that all the directors were extensively trained on A3 thinking and effective problem solving, the more interactions the director has with managers and supervisors, the more the director is able to embark some of that knowledge through coaching. These meetings also serve as the platform that enables problem escalation through the command chain.

The initiative taken by the manager is indicative of the general appetite to adopt the Management System. Leaders and managers are eager for the Management System to become more inclusive and incorporate managers and frontline staff (levels 2 & 1). Since the structure of the Management System only includes leadership (levels 3 & 4), how and to what extent the rest of the department is incorporated was left to the director's discretion. For example, coaching is not structured within the Management System. Therefore, how much or little the director coaches the manager and frontline on effective problem solving is not part of St. Boniface Hospital's official Management System even though it plays a big role in its success.

The Transformation Team attributes much of the successful adoption of the Management System in the Supply Chain Department to the proactive and hands-on approach taken by department leaders and members. Some organizational members have expressed that non-clinical departments have it easy in comparison to clinical departments. In addition to differences in leadership structure of the Clinical Leadership Team, they cite an absence of emergency situations that threaten large-scale ramifications. An example of such a case would be human error that results in patient harm. They indicate that as a result, Supply Chain Department members have a more stable workday. However, many organizational members admit that it is a natural tendency for clinical department members to have such views of non-clinical departments in health care organizations.

6.4 MODEL CELL SYSTEMS DEVELOPMENT

As previously described, the current Management System has not yet been fully deployed vertically throughout the four tiers. Even though organizational members attribute visible enhancements in performance levels to the Management System, leadership recognizes that it may not be the best Management System they could develop for St. Boniface Hospital. The need for substantial objective evidence of success is the most cited reason for considering putting the current Management System aside and

starting a new one from scratch. However, it seems that a perfectionist mentality persists; St. Boniface Hospital opted to return to the starting point rather than make changes on the existing system gradually as more knowledge develops.

In early 2014, leadership reflected on the system they have so far created. They determined that a better way of developing a comprehensive Management System might be to think of it as a combination of various sub-systems that interlace with one another. This systems approach is a departure from the previously defined Management System elements and utilities. Considering problem solving a sub-system, for example, entails every aspect of effective problem solving, from the behaviours exhibited, to the related sub-systems and tools. The tools include aligned key performance metrics while related sub-systems include the coaching sub-system to develop problem-solving skills.

The Transformation Team, along with hospital leadership, decided to utilize a model cell approach in the deployment of the new Management System. In line with the experimentation mentality at the hospital, the model cell will allow the Transformation Team to create a new Management System and seek the objective evidence they need of its success before deploying it throughout the hospital. This new approach is more in line with the inch-wide mile-deep model cell approach that Toussaint prescribes (2014).

The Transformation Team expects VSMs to play a bigger role in deploying the new Management System in a methodical manner, although the pace of deployment is still unknown. The model cell was not used in the original Management System deployment model previously described because as several leaders stated, "we did not know what we did not know". An inch-wide mile-deep approach will be employed in two selected model cells; a clinical and a non-clinical department.

According to the Transformation Team, the new systems thinking deployment method developed from the model cells will provide the framework of the new Management System standard. Therefore, whatever system develops out of the model cells will be implemented throughout the hospital instead of the current Management System. Information on the systems approach to management can be readily found in the literature (Pojasek, 2003; Robinson, 1996; Spath, 2011).

Two interdisciplinary teams, one from each model cell, are responsible for developing the new Management System. The Transformation Team describes their approach as taking a vertical slice of the department tiers; the four tiers from frontline to executive must work together to develop a new Management System that is inclusive and practical.

According to multiple organizational members, the existing Management System previously described enabled organizational learning of key utilities, mainly alignment and problem solving in its leadership team. However, it does not engage all the tiers within each department, nor does it create a solid link between the tiers. Leadership's decision to take a step back and reexamine a Management System that has already been partly implemented, rather than simply expanding its breadth, speaks to the hospital's experimentation mindset.

Similar to how the Surgery and Supply Chain Departments were chosen for the current Management System, the Transformation Team again chose departments that are high performers with highly engaged members for their model cells. Different departments were selected this time around. An interdisciplinary team was selected from each model cell to create the Management System that will enable them to exhibit the target state behaviour they are striving for. The Transformation Team expects interdisciplinary team members to become champions who ensure that the Management System is utilized throughout the unit. Having gone through extensive training during the model cell development period, they become

local experts of the new Management System. In addition, their role in developing the Management System will generate a sense of ownership and accountability.

Considering the new Management System to be comprised of multiple sub-systems, the first phase of the model cell development is to build sub-systems of alignment, improvement, and leadership. Rather than attempting to boil the ocean, the focus on these three specific sub-systems within the overall Management System will help the interdisciplinary teams ensure that they address each aspect thoroughly. The interdisciplinary team is required to envision and articulate the purpose, expected outcome, tools, structure, triggers, measures, and renewal mechanism for each sub-system. The Transformation Team also requires each sub-system to have an owner to be held accountable for it. Behaviour of the leader, manager, and staff must also be articulated; these target state behaviours will be used to help design the sub-system tools and structure. Special circumstances, such as manager absence, must also be taken into consideration in the sub-system design.

Once these three sub-systems are developed and stabilized, more sub-systems such as the coaching and problem solving can be added. The Transformation Team depicts their vision of the model cell development in figure 6.4. After the three sub-systems of alignment, improvement, and leadership are properly defined, their intricacies can be designed. The interdisciplinary team will first be asked to choose one KPI that is aligned with a True North metric. Choosing only one KPI will enable the interdisciplinary team to focus on building the sub-system structure that revolves around it.

The vision of the Transformation Team is to have the frontline staff respond daily to the metric, managers to improve it weekly and standardize it monthly, and leaders to follow up and support the managers. However, the Transformation Team is giving the interdisciplinary team a *carte blanche* in designing the Management System. They expect multiple iterations to test

their design and believe that eventually the designed Management System will match the Transformation Team's vision.

More KPIs will be added iteratively to complete the picture for these three sub-systems before this newly created Management System can be introduced to other departments in 2015. As the other departments start to deploy the newly tested three sub-system model, more sub-systems such as coaching can be added and tested on the two model cells. The model cells will therefore always be one step further developed from the rest of the hospital departments.

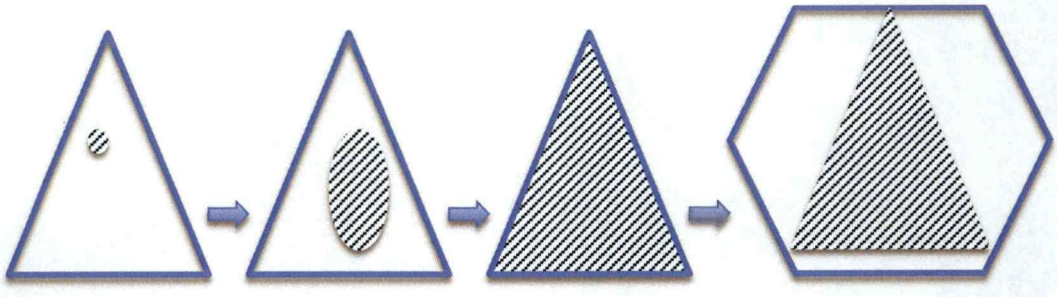

Figure 6.4: St. Boniface Hospital Envisioned Model Cell Development

Figure 6.4 represents the Transformation Team's depiction of how complexity will be layered onto the model cells. Triangle points represent the junction of the three initial sub-systems of alignment, improvement, and leadership. The space within the triangle represents the Management System that can be created within these three sub-systems. The shaded area inside the triangle represents the KPI(s) that the Management System will control. The first triangle starts with one KPI, therefore, only a small shaded area within the triangle. As more KPIs are introduced into the model, the shaded area expands. Eventually, the Management System thoroughly covers all the angles within these three sub-systems, as depicted in the third triangle. Once fully shaded, more sub-systems can be introduced to add more depth into the model cell, such as the problem solving or coaching sub-systems. More KPIs will then need to be introduced to cover some of the extra angles created by the new sub-systems.

The Shingo Model, along with its focus on exhibiting ideal state behaviour, is one of the guiding principles for this model cell experiment. St. Boniface Hospital's leadership were drawn to the Shingo Model principle of fashioning ideal behaviours in order to produce ideal results. The notion is that certain enablers create the environment that facilitates continuous improvement, which along with enterprise alignment, lead to ideal results. Enablers are the tools that allow the ideal behaviour to develop, such as Stand-up Meetings and Visual Communications Boards. The Shingo Model is distinctive because it devalues the tools as it emphasizes the desired behaviours of organizational members. The Model calls for the assessment of current behaviours, ideal behaviours, and what factors need to be addressed in order to develop the ideal behaviours. The Hunsman School of Business developed a comprehensive guide to utilizing the Shingo Model (2014). The Transformation Team plans to coach the interdisciplinary teams to articulate the ideal behaviour, as well as determine what changes and tools are needed to start exhibiting that behaviour. As the interdisciplinary teams' skills are further developed with time, the process of adding layers of complexity will be significantly easier and less time consuming.

Ultimately, the model cell approach is a considerable shift from how the Management System was deployed at the leadership level. The Leadership and the Transformation Team learned from the initial deployment approach that it is imperative to shift the focus from the specific tools to spreading the mentality and mindset. From discussions with several leaders, effective problem solving is signaled as the most significant element of the Management System and is considered the foundation for any improvement effort. So every other element, tool or utility should serve to strengthen the problem solving skillset.

Finally, an underlying note that was suggested by different organizational members throughout the data collection period relates to the pace of change. Although the experimentation mentality is what makes St. Boniface a pioneer

in quality improvement, finding a balance between experimenting to find the best resolution and applying semi-tested ones will be critical going forward as they seek to develop and deploy their new Management System.

6.5 FUTURE OUTLOOK

As Dr. Tétreault phrases it, "after six years of deploying Lean initiatives throughout the hospital, we are now graduating from kindergarten and are ready to start the first grade". Recognizing the time it will take to build a Management System that sustains itself and truly transforms the organization, he considers this a three-CEO job. For his own legacy, he would like to leave behind 4,000 problem solvers who would not notice when he is gone.

Leadership already recognizes dramatic shifts in attitudes and culture since the Management System was introduced. True North metrics have also seen positive results; patient satisfaction, which has been stagnant for a number of years at 80%, hopped to 85% in the last couple of years. However, leadership realizes there is still more to be done to truly transform the hospital. The model cell development put a hold on spreading the current Management System to managers and frontline staff. Depending on the outcome of the model cell, the decision can then be made on whether to utilize the newly developed Management System or to revise their previous hypothesis on systems thinking.

Physician involvement is another matter that has yet to be resolved. The leadership and Transformation Team consider physician involvement instrumental for the success of the deployment effort. Given that physicians cannot be compensated for time spent on such initiatives, finding an incentive for them to be involved is very difficult. Most cases where physicians did get involved were due to the prospect of publishing their findings on health care service quality. Yet, for the most part, physicians are skeptical that Lean and its Management System can improve health care

service. The Chief Medical Officer is already involved in the Management System deployment process as an active participant and champion. As more physicians follow in his lead, the Transformation Team believes that more physician involvement can be achieved.

6.6 CASE CONCLUSION

The case of St. Boniface Hospital provides a noteworthy context for the deployment of a Management System to sustain Lean improvements. With the model cell development of the new Management System, the hospital is seeking a major departure from their current Management System. This summary pertains to the current Management System because it will be examined in the multiple-case analysis. The goal is for the analysis to shed some light onto their model and hopefully benefit the Transformation Team in the model cell development of the new Management System. The new systems approach that is being developed in the model cells is a very innovative way to structure the Management System. The new Management System is not examined in the multiple-case analysis because it had not yet been deployed at the time of the data collection in July 2014.

In reviewing the hospital's current Management System, it is evident that it exhibits the same LDMS elements and supporting utilities described in the literature review, although some are more prominent than others. Figure 6.5 highlights St. Boniface Hospital's version of the LDMS; the bolded model elements are part of the St. Boniface Hospital Management Systems while the faded elements are not.

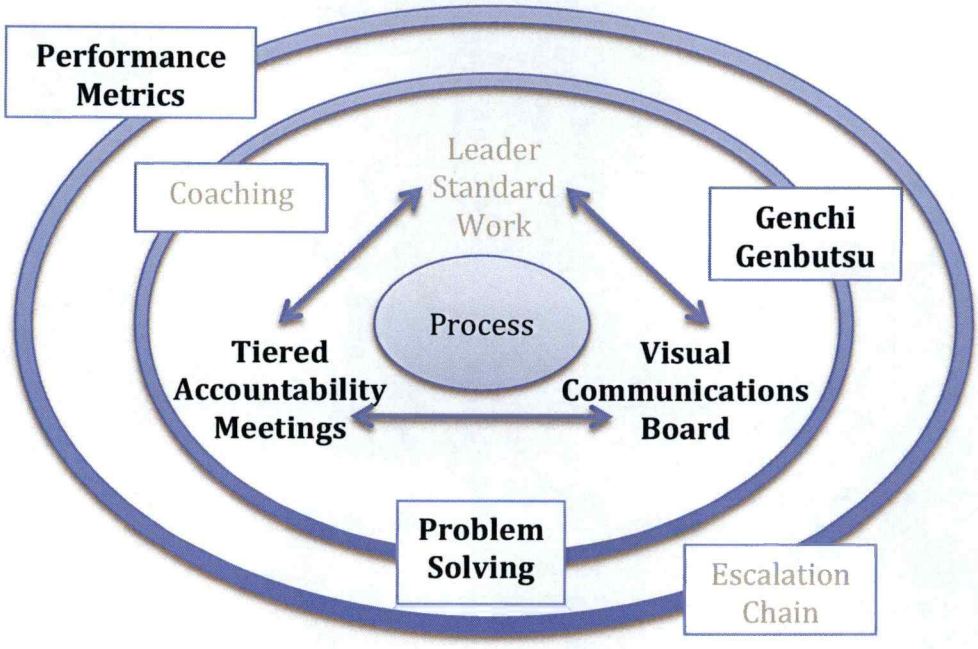

Figure 6.5: The St. Boniface Hospital Management System

Alignment and problem solving are the most quoted aspects of the current Management System. The reason may be that the mile-wide inch-deep top-down approach developed a strong utility skillset within the leadership team. Focusing on the leadership tiers perhaps enabled the Transformation Team to instill the desired mindset in them in a way not possible otherwise. However, the inclination to continuously improve, throughout the organizational tiers, is not exhibited throughout the different tiers; their deployment conceptual model may be one cause of that. Figure 6.6 depicts the deployment of the St. Boniface Hospital Management System on the right hand side of the conceptual model developed from the literature review; the model elements that are not exhibited at St. Boniface hospital are faded to indicate deviations.

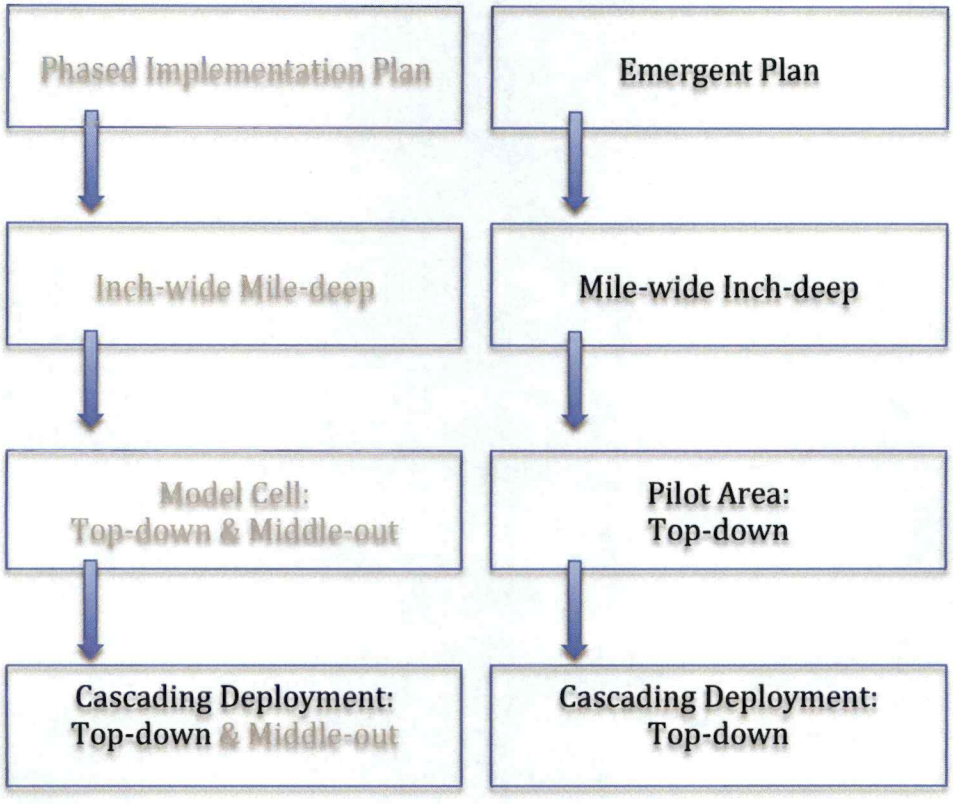

Figure 6.6: St. Boniface Hospital Management System Deployment

CHAPTER 7: MULTIPE-CASE ANALYSIS

This chapter will analyze the three cases in light of the two conceptual models developed in the literature review and answer the two research questions:

- What elements constitute LDMS?
- How can health care organizations that have adopted Lean through different means deploy LDMS?

The three cases of CSSS Haut-Richelieu-Rouville in Saint-Jean-Sur-Richelieu, the Hospital for Sick Children in Toronto, and St. Boniface Hospital in Winnipeg provide three different contexts and approaches to deploying their respective versions of LDMS. In each case, the intended role of LDMS heavily influenced how it was deployed. Perhaps the greatest difference between the different approaches taken by the three organizations is determined by each organization's view of LDMS. While CSSS Haut-Richelieu-Rouville wanted to deploy a management system that drives performance, the Daily CIP at the Hospital for Sick Children is more concerned with managing improvements, and St. Boniface Hospital sought to have their Management System transform their organization. After a brief overview of the three organizational contexts, the two conceptual models of LDMS and its deployment are examined. Two augmented conceptual models and propositions are deducted as a result of the multiple-case analysis.

7.1 ORGANIZATIONAL CONTEXT

Before analyzing the different model elements, it is important to review the different contexts within which these management systems were deployed. The context refers to the organizational environment before the deployment effort, as well as its purpose or intended goal. Organizational readiness, mindset, and culture all play a significant role in an organization's receptiveness to the management system. In order to provide a visual

depiction of the context of each LDMS deployment, contextual characteristics of each case were compared against Morgan's (2006) classification in "Images of Organization". Using metaphors is one way to simplify complex and multifaceted settings. Metaphors can therefore create insights into the organization, although it runs the risk of distorting reality by over-emphasizing the metaphor itself (Morgan, 2006). In this research, Morgan's classification is used to portray each organization's LDMS deployment rather than the organization as a whole. Morgan's eight metaphors are highlighted in this section to help provide a comprehensive assessment of which one best portrays each organization's LDMS deployment.

1. The "machine" metaphor refers to the rational structure of operations to achieve predictable results. Efficient and effective operations of planning, organizing, and controlling allows the organization to operate as precisely as possible through patterns of authority.
2. The "organisms" metaphor refers to a system that is open to its external environment and interrelated sub-systems. The system seeks to adapt to its external environment by aligning the needs of the external and internal elements.
3. The "brains" metaphor likens organizational settings to information processing, communications, and decision-making systems. Characterized with innovation and continuous learning, the metaphor envisages that such an organization would be able to self-organize and regenerate the same way the human brain does.
4. The "cultures metaphor" emphasizes and focuses on the processes that produce systems of shared meaning. This culture represents the mindsets, visions, paradigms, metaphors and beliefs that make each organization what it is.
5. The "political systems" metaphor describes the organization as systems of governments that seek to reconcile differences when some interests

are conflicting. The metaphor explores organizational rationality in its sorting of formal and informal authority and sources of power.

6. The "psychic prisons" metaphor refers to the confinement that is created through constructs of reality. Groupthink, and even some unconscious biases, may create constructs that lead organizations into an inescapable whirlpool.
7. The "flux and transformation" metaphor refers to the logics of change and draws on the notion of rethinking relations with the environment and interpreting their interconnected pattern. It strives to change the context that enables system evolution, and create small changes that generate considerable effects.
8. The "instruments of domination" metaphor denotes how certain individuals within an organization may be able to sustain a commanding influence over others. Such a power is typically used to radicalize the organization and exploit the employees (Morgan, 2006).

7.1.1 CSSS HAUT-RICHELIEU-ROUVILLE

Their Management System would be portrayed as the "organism". It constitutes of multiple factors and species in an open system, which implies a relatively fluid culture. Ecology interdependencies and different relations between species indicate the importance of collaboration within the organization to reach a shared mutually beneficial future (Morgan, 2006).

The organism must adapt to its environment, and so must CSSS Haut-Richelieu-Rouville's Management System. Part of the adaptation process entails discovering organizational needs, and integrating the needs of organizational members into the needs of the organization itself. For the management of open systems, Morgan (2006) recommends to focus on the environment and on the internal processes, and ensure these two factors are aligned. As previously indicated, creating a Lean culture was one of the goals of the Management System. In its deployment, the objective was to develop leaders that allow the Lean culture to thrive by not creating conflicting

priorities. The top-down approach was chosen is indicative of the emphasis placed on changing the attitudes and reflexes of upper management.

7.1.2 HOSPITAL FOR SICK CHILDREN

The "machine" is how Morgan (2006) would describe the deployment of the Daily CIP. The program is organized in a rational and efficient manner. The operational middle-out approach developed a mechanical thinking in organizational members. In addition, boundaries and lines of control are clearly defined; an example would be the defined role of the Improvement Team during the Daily CIP implementation. However, Morgan (2006) stresses that alignment becomes vital in this metaphor. Otherwise, the program may lose control of its focus, which may lead the organization astray.

Machine thinking is depicted in the drive to embrace a management system because it was the hospital's future direction. With some pull, a systematic and machine-like adoption of the Daily CIP took place. Since the two pilot areas were implemented, the machine continues to run as more departments enrol in the program. According to multiple accounts, departments that became quickly self-sufficient in their Daily CIP implementation were the ones that had experienced a Lean project before being introduced to the Daily CIP. This eagerness to adopt a new system that helps the organization continuously evolve can also be attributed to an organizational culture that celebrates an entrepreneurial mindset.

7.1.3 ST. BONIFACE HOSPITAL

Morgan's (2006) description of "brains" is very similar to how one would describe the hospital's deployment of their Management System. He also uses a "holographic" explanation to depict the "all over the place" character of brains. He describes brains as the decision-making sub-system where different tools are developed to enable better decision-making. Morgan (2006) indicates that gaining collective knowledge and developing a learning

organization becomes instrumental. He also indicates that the top-down approach does not cultivate learning organizations or knowledge development and sharing; he recommends an emergent strategic approach.

As the case depicted, the culture at St. Boniface Hospital was one that embraced the experimentation mindset. That meant that the introduction of the Management System did not present a departure from the organizational mindset. Yet difficulties arose due to its structure and objectives. This depiction of the context is one reason why the Hospital for Sick Children and St. Boniface Hospital have very different management systems and deployment models even though ThedaCare influenced them both. St. Boniface Hospital sought to gather knowledge from multiple sources and attempted to develop their own specific Management System.

7.2 LDMS CONCEPTUAL MODEL

In reverting to the LDMS conceptual model in figure 2.4, the three elements of Leader Standard Work, Visual Communications Boards, and Tiered Accountability Meetings are all evident to some degree in each case. Multiple organizational members from different tiers described them as the tools or mechanisms; they directly affect operations at the frontline. The five supporting utilities of Genchi Genbutsu, coaching, problem solving, escalation chain, and key performance metrics are also evident. However, because of their interrelatedness and the difficulty of defining their clear boundaries, organizational members were ambiguous in their understanding of these five utilities. Of the five utilities, the escalation chain was the hardest to comprehend for most interviewees. They indicated that they did not see its connection to their LDMS.

In order to answer the first research question of what elements constitute LDMS, the following section will examine the different versions of LDMS deployed in the three organizations. Their similarities and distinctions will be highlighted, as well as any departures from the literature review. Table

7.1 provides a summary of these findings for the three cases. The comparative is based on the two departments studied in each case, rather than the hospital as a whole. For each conceptual model element and organization, the two surveyed departments were considered together. For example, coaching would have had to be exhibited in both departments for the organization to be considered to have a structured coaching process.

Table 7.1: LDMS Comparative

	CSSS Haut-Richelieu-Rouville	Hospital for Sick Children	St. Boniface Hospital
LDMS	Management System	Daily CIP	Management System
LDMS Metaphor	Organism	Machine	Brains
Leader Standard Work	Minimal use by some members	Minimal use by some members	Starting to deploy
Visual Communications Board	Daily operations & continuous improvement	Continuous improvement & driver metrics	KPIs & countermeasures
Tiered Accountability Meetings	Daily, weekly, & monthly for the 4 tiers	Daily, weekly, & bi-monthly Status Report meetings for the 4 tiers, also improvement huddles three times a week	Daily level-1 huddles
Genchi Genbutsu	Not structured	Not structured	Patient Visit Program
Coaching	Not structured	Not structured	Not structured
Problem Solving	Not structured	Not structured	Ingrained in executives and directors
Escalation Chain	Not structured	Structured escalation of pending Improvement Cards	Not structured
Key Performance Metrics	Heading towards aligned True North Metrics	Avenues to Excellence & scorecards create confusion	Aligned True North Metrics

The comparative is not meant to weigh the organizations against one another, but rather to consolidate research findings and develop a better depiction of each organization's approach to LDMS. Each conceptual model elements is further examined in the following sections.

7.2.1 LEADER STANDARD WORK

Of the 25 formal interviews conducted for the three cases, 21 interviewees indicated that they believed that Leader Standard Work is an effective tool that should be utilized, and 12 interviewees indicated that it was long overdue. Others indicated that they did not feel that their work could be standardized or that Leader Standard Work is not relevant for their management style as it only helps them organize their day. From conducting multiple discussions with organizational members in different tiers, it seems many members are confusing Standard Operating Procedures with Leader Standard Work. The distinction is made in terms of the processes being standardized in whether they are operational or managerial (Sehested & Sonnenberg, 2011).

Interviewed leaders at St. Boniface Hospital are on the verge of implementing Leader Standard Work. The extensive mile-wide inch-deep top-down deployment approach that characterizes this hospital had concentrated all the effort on organizational leaders, and that might be one reason why their leaders have expressed their readiness to commit to Leader Standard Work. Another factor may be the continuous interaction with the Sensei, which helps reinforce the direction taken by the Transformation Team, as Allan suggested it would (2013). This continued external support proved to be invaluable because of the Sensei's experience in leading similar transformations, and in handling any unease with the process.

7.2.2 VISUAL COMMUNICATIONS BOARD

The boards showcase the processes the organization is attempting to standardize. Having an entire board dedicated towards the management of Improvement Opportunity Cards at the Hospital for Sick Kids is indicative of how their Daily CIP centers on continuous improvements at the frontline; the boards are very similar to the ones adopted by ThedaCare. On the other

hand, the boards at St. Boniface Hospital do not have a frontline continuous improvement section. The Visual Communications Board ultimately affects how the Tiered Accountability Meetings are run. Whether managing operations occurs at the same time as managing improvements dictates how the board layout should be.

How often KPIs and A3s are updated can be used as an indicator of the board's effectiveness. The Area Improvement Center board at the Hospital for Sick Children, which showcases their driver metrics along with their respective countermeasures, had been updated several months prior to the data collection period. This indicated, as was later verified from individual interviews, that the board is not reviewed regularly.

The more visually attractive boards at St. Boniface Hospital and the Hospital for Sick Children do affect organizational members' perception of them; investing in such boards signals management's commitment. However, discussions with several organizational members suggested that the boards lacked flexibility when it came to making changes. This is in line with the reason why Mann (2010) recommended inexpensive and easy to change boards rather than more sophisticated tools. At St. Boniface Hospital, when the True North metric "flow" was added in 2014, the boards had been already utilized. Organizational members expressed that the metric was not addressed in the same manner as the other metrics were until the board was updated with the new metric. In that sense, it can be said that the tool failed the system.

7.2.3 TIERED ACCOUNTABILITY MEETINGS

Meetings at the three organizations are conducted very differently from one another. An added complication when examining the meetings is that they were not all introduced within the framework of LDMS. For example, daily huddles at St. Boniface Hospital were conducted regularly before the Management System was introduced. However, the focus of the meetings has

been affected by the development of True North metrics. Another issue to consider is that the information gathered during the daily huddles is not utilized in other LDMS elements because of there is no (level-2) manager connection yet.

Meetings at the Hospital for Sick Children are largely influenced by the ThedaCare model (Barnas, 2014). The objective of the huddles is operations improvement at the frontline. Operations management is done through the Status Sheet Reports; only qualitative aspects of business are discussed in these meetings. Actual performance levels and driver metrics are only discussed every two or three months during the staff meetings. Even though organizational members claim the staff is well aware of the performance levels, it is very difficult to assert that performance levels could not be gradually improved with a shorter time lag between meetings as Kohlbacher (2010) described.

The tiered meetings at CSSS Haut-Richelieu-Rouville, where they have been implemented, are the closest to what is described in the literature (Mann, 2010; Nelson, 2011). Daily, weekly, and monthly meetings are conducted along the organizational tiers as quantitative and qualitative measures are passed on from one level to the next.

Whichever approach the organization assumes, it is important to utilize the same structure for both the Visual Communications Board and the Tiered Accountability Meetings in order to utilize both elements effectively. Whether managing operations and managing improvements are conducted together or separately in different meetings should therefore be taken into consideration when designing the Visual Communications Board layout. It is also important to take into account the frequency and duration of these meetings to ensure that they are effectively conducted to include all the LDMS aspects they are supposed to address. While there is a clear value in conducting daily meetings, it is important to take into account the different

cycles of different organizational tiers when carrying the knowledge from one level to the next.

Upon examining the three elements in the three cases, it becomes clear that each organization has adopted a very different interpretation of each element. Upon reflecting on how different the Visual Communications Boards and Tiered Accountability Meetings are in the three organizations, it becomes clear that these difference are not simply cosmetic; the objective and mechanism of each element is different. Leader Standard Work is not used in this comparative because it has not yet been implemented in the three organizations.

When asked how they came about developing these elements, the most cited references are Mann (2010) and Rother (2010), particularly in the case of CSSS Haut-Richelieu-Rouville. The ThedaCare BPS model was deployed at the Hospital for Sick Children. Lastly, St. Boniface Hospital gathered knowledge from multiple sources and organizations. Thus, the source of the knowledge each organization utilized influenced how they perceive each element's role in LDMS. This means that an organization that is seeking to start deploying LDMS needs to thoroughly examine each element to ensure that the elements function cohesively together. If different elements were derived from different sources, organizations run the risk of these elements operating as stand-alones and not being integrated within LDMS.

7.2.4 GENCHI GENBUTSU

While all leaders in the three cases indicated that they were conducting Genchi Genbutsu, only 15% of the leaders described a structured process in terms of which areas to visit and what to observe. At St. Boniface Hospital, the well-structured Patient Visit Program is a model of Genchi Genbutsu. The most important aspect is for the observers to be able recognize what they are seeking to get out of these visits. Proper documentation during the

Gemba visits would enable them to keep track of their observations and help generate improvement ideas (Ahmed, 2014).

7.2.5 COACHING

Coaching takes place in all three organizations in an unstructured manner; there are no clear guidelines for when to seek coaching or when to provide it as was recommended by Rother's (2014) Coaching Kata. When asked about receiving coaching, 40% of the formal and informal interviewees indicated that they did not feel they needed any more coaching. From multiple discussions with members throughout the three organizations, there seems to be confusion between coaching and operational training. These organizational members cited their continued application of the different elements of their respective LDMS as a reason why they no longer felt they needed coaching. They did not recognize the ongoing personal development aspect of coaching.

Yet, coaching does take place in the three cases mostly in a problem-solving context (Liker & Rother, 2013). Leaders utilize meetings as an opportunity to share their knowledge and knowhow. However, as the researcher could not be present during any such coaching situations, there can be no objective assessment of how much coaching is provided.

7.2.6 PROBLEM SOLVING

According to St. Boniface Hospital leaders, the entire Management System can be summed in the process of problem solving; all the remaining LDMS elements and utilities only serve to enable effective problem solving. They indicate that focusing less on the tools and more on the mentality is what creates an effective LDMS. Therefore, it became clear that for some organizational members, drawing a clear distinction between the tools and the enveloping system is not straightforward.

The top-down mile-wide inch-deep approach at St. Boniface Hospital is likely the reason why leaders at the hospital have come to this realization.

Coaching and Genchi Genbutsu can easily be seen as extensions of effective problem solving. While key performance metrics ensure that the solution is in line with organizational objectives, the three LDMS elements can be seen as the mechanisms that enable the execution of the proposed solution.

However, none of the three organizations have developed a structured process for problem solving even though most organizational members are able to describe what it would entail. The Transformation Team at St. Boniface Hospital had this notion in mind when designing the systems approach in the model cells. The sub-system of problem solving thus would interact closely with the different sub-systems, such as the coaching and Gemba sub-systems. Their vision is to have a structured approach to problem solving; the structure of the sub-system will enable its learning by all organizational members.

Determining who solves the problem is another aspect that all three organizations are still working out. Historically, problem solving has been a middle manager responsibility. The new directive, particularly at the Hospital for Sick Children through the Improvement Opportunity Cards, is to enable the frontline staff to solve their problems because of the belief that they understand the problem and its context best.

7.2.7 ESCALATION CHAIN

The ThedaCare model emphasized the importance of defining the escalation chain. Consequently, the Hospital for Sick Children has a defined escalation process for their Daily CIP. The other two organizations do not have a set process or signal of when to escalate an issue. However, from discussions with several organizational members, it appears that the escalation chain is considered a part of problem solving. This seems logical since knowing when to seek help should be considered part of the problem resolution.

The problem solving and escalation utilities were originally separated in the literature review because different individuals were responsible for them.

Even though middle managers are not expected to solve all the problems themselves, they are responsible for coaching the frontline on how to solve problems effectively. On the other hand, the escalation chain ensures that upper managers remain involved in the daily operations on a continued basis. It also ensures that problems receive attention, which tends to incentivise upper management to make enduring changes (Pojasek, 2001).

7.2.8 KEY PERFORMANCE METRICS

True North metrics are not the only way to achieve alignment of activities to strategic objectives. However, the controlled number of True North metrics enables organizational members to focus their efforts and generate considerable results (Womack et al., 2005). In both CSSS Haut-Richelieu-Rouville and St. Boniface Hospital, True North metrics were set and utilized throughout the different levels. Organizational members from both hospitals stressed that alignment is key in creating significant and valued change within the organization. In the case of St. Boniface Hospital, leaders have had sufficient experience with their Management System; they now have the mindset of experimenting with their performance indicators to select those that yield a higher impact on the global True North metrics.

In discussions with multiple organizational members at the Hospital for Sick Children, the issue of alignment surfaced; program, departmental, and organizational improvement initiatives created conflicting priorities for department members. CSSS Haut-Richelieu-Rouville had recognized such conflicting priorities as a hindrance at an early stage in their Management System deployment, which led to adoption of a top-down approach.

7.2.9 AUGMENTED LDMS CONCEPTUAL MODEL

The five supporting utilities together shape the backdrop upon which the LDMS elements create the mechanism of managing the daily aspect of the Lean transformation. In reverting to St. Boniface Hospital's model cell and their new systems approach, describing the supporting utilities as sub-

systems seems more appropriate because of their interdependent nature. In addition, describing them as sub-systems injects fluidity into the LDMS model; they no longer need to be categorized into upper management and middle management responsibilities because sub-systems imply an entire framework with owners and participants. The LDMS conceptual model in figure 2.4 depicted the separation of middle management utilities from upper management utilities by having two separate loops around the three LDMS elements. In changing from utilities to sub-systems, problem solving and escalation chain no longer need to be separated because the sub-system of problem solving would encompass all the different aspects pertaining to problem resolution.

As a result of the analysis of the different elements exhibited in the three cases, the following Augmented model in figure 7.1 was developed. As previously indicated, there are now four sub-systems of problem solving, coaching, Genchi Genbutsu, and alignment that revolve around the three tools of LDMS. Alignment of key performance metrics was previously examined when developing the original LDMS conceptual model in figure 2.4. However, the three cases demonstrated how instrumental using the key performance metrics to achieve alignment is. Therefore, this new model considers alignment as the sub-system that uses performance metrics and other supportive instruments.

The four sub-systems are on one single loop because that there is no longer a need to differentiate between organizational tiers; all the tiers have a role to play in each sub-system. Although the literature depicted the interdependency of the supporting utilities, the three cases further demonstrated how complex and intertwined they really are. The cases also depicted how different organizational members played vital roles in these sub-systems. In the alignment sub-system, for example, upper managers play a key role in determining organizational metrics. However, middle manager and frontline involvement is as instrumental to achieve alignment because

they develop and track the appropriate performance indicators. This led to the conclusion that dividing the supporting utilities into two groups is misleading; it may suggest that organizational members may not responsible for certain aspects of LDMS.

As for the three LDMS elements, redefining them as tools better describes them; it draws a clearer distinction between the sub-systems and the tools they utilize to thrive. The sub-system of problem solving for example is dependent on the accurate and up-to-date metrics on the Visual Communications Board, and the ongoing communication and standardization that is achieved through the Accountability Meetings. Another benefit of describing the three elements as tools is that it reminds organizational members that these are countermeasures that were designed to establish a certain environment and routine; they are not end results in and by themselves (Spear & Bowen, 1999).

These temporary tools enable the transition of the organizational mindset. As the four sub-systems evolve, the tools should be assessed and may be changed to better address the evolving environment. The new augmented model improves upon the original model in figure 2.4 by depicting two larger groups of elements; they are the four sub-systems that transition the organization and the three tools that form the mechanisms for the change. The process focus remains at the center of the model. The changes made in this augmented model reflect the recognition that the mindset of the organization needs to be developing through the sub-systems, not the tools. It is the tools that serve to reinforce the sub-systems, rather than vice versa.

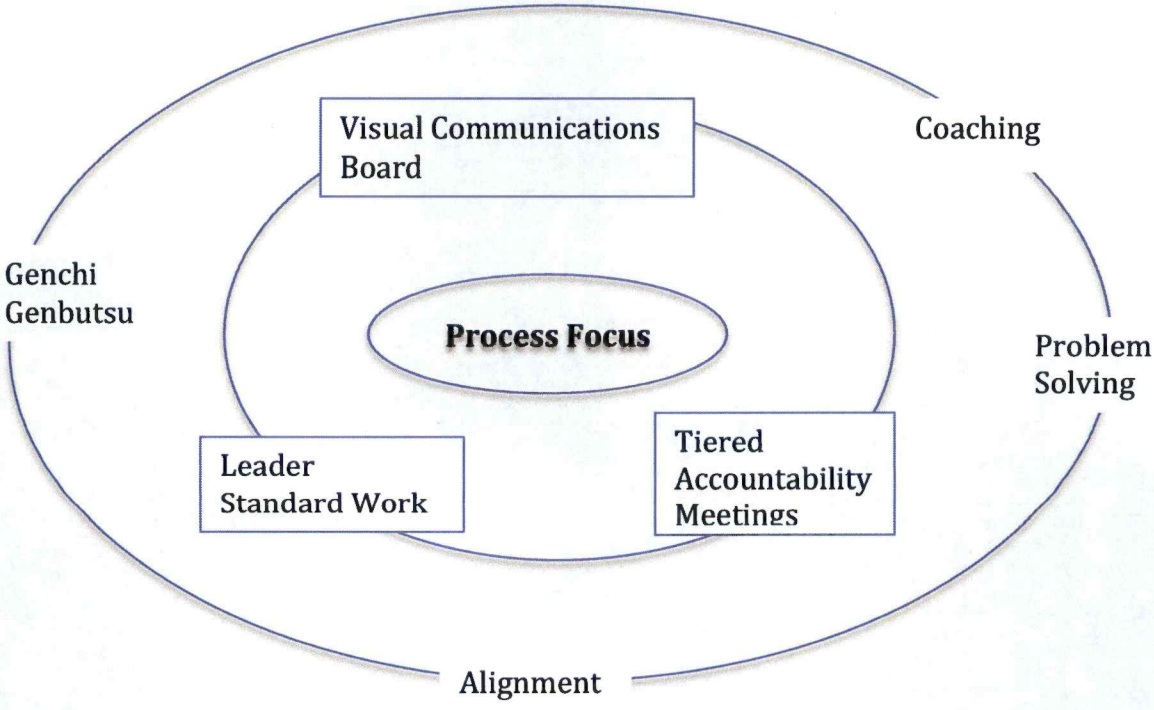

Figure 7.1: Augmented LDMS Conceptual Model

7.3 LDMS DEPLOYMENT CONCEPTUAL MODEL

This section answers the second research question of how can health care organizations that have adopted Lean through different means deploy LDMS. Each element within the LDMS deployment conceptual model in figure 2.5 is examined; the phased implementation plan, inch-wide mile-deep approach, model cell, and cascading deployment through a top-down and middle-out approach. As a result of the multiple-case analysis, an augmented LDMS deployment conceptual model is deducted. It is important to note that this deployment conceptual model is tied to the augmented LDMS conceptual model developed in this chapter since, as has been indicated, deployment is dependent on how LDMS is perceived.

Similarly to the previous section, a comparative of the three approaches depicted in the case studies is depicted in table 7.2 before each model element is examined. The objective of developing this comparative is to highlight their differences and similarities rather than select an optimal

approach. As previously indicated, how LDMS is deployed is largely dependent on how it is perceived. Upon examining three organizations three different interpretations of LDMS mechanisms were provided.

Table 7.2: LDMS Deployment Comparative

	CSSS Haut-Richelieu-Rouville	Hospital for Sick Children	St. Boniface Hospital
LDMS	Management System	Daily CIP	Management System
LDMS Metaphor	Organism	Machine	Brains
Phased Implementation	None	According to department type	None
Inch-wide mile-deep	Mile-wide inch-deep at upper management, inch-wide mile-deep in departments	Inch-wide mile-deep	Mile-wide inch-deep at upper management
Model cell	Pilot	Pilot	Pilot
Cascading strategy	After Kaizen project	Stepwise	Cascade
Top-down & middle-out	Top-down	Middle-down	Top-down

7.3.1 PHASED IMPLEMENTATION

The Hospital for Sick Children had clear and defined phases for the deployment of their Daily CIP according to department type. At the time of the data collection in August 2014, all the inpatient units had implemented Daily CIP. Focusing on inpatient units enabled the Improvement Team to deploy the Daily CIP at a faster rate. Given that all these units have similar structures, the knowledge gained from the pilot areas enabled a more efficient and effective diffusion of the Daily CIP. It also led to the complete deployment of an entire area, which serves to showcase the Daily CIP at an organizational level.

7.3.2 INCH-WIDE MILE-DEEP

The inch-wide mile-deep approach at the Hospital for Sick Children enabled the Improvement Team to target specific areas, implement the Daily CIP, and transition to the next leaving behind a fully functioning area. The remaining areas, where the Daily CIP has not yet been implemented, are somehow left isolated from the areas where it has been deployed. While this approach may

lead to a systematic and fast pace deployment, as has been demonstrated at the Hospital for Sick Children, organizational members expressed that interactions between departments are sometimes problematic. Departments that do not have the Daily CIP are not incentivised to adhere to the same time restrictions, for example.

On the other hand, St. Boniface Hospital's mile-wide inch-deep approach sought to enforce change one level at a time. As an outcome, leaders expressed that they are now on board with the transformation; they attest to its value, and some have informally extended their Management System to managers. It is noteworthy that even though the Management System crosses all departmental boundaries, the silo mentality is still evident as leaders expressed that they sometimes experience a negative consequence of another department's countermeasures.

The currently developing systems thinking that was described in the case of St. Boniface Hospital is a departure from their initial approach. Even though the inch-wide mile-deep approach will be undertaken to spread their new systems approach, organizational members recognized that the initial mile-wide inch-deep approach at the upper management level influenced the organizational mindset greatly. The Transformation Team indicated that this mindset and upper management buy-in is expected to enable the deployment of the new Management System. A downside is that some organizational members may aim to develop a new Management System that is only an extension of the current Management System, rather than think outside the box to develop a systems approach.

At CSSS Haut-Richelieu-Rouville, the approach can be described as a hybrid because a mile-wide inch-deep change was chosen for the executives and directors. In deploying the Management System in each department, the approach is better described as an inch-wide mile-deep. Although the Management System tools are deployed at the frontline, sub-systems, such as coaching and problem solving, are not. However, this dual approach enables

the Operations Support Team to achieve their objectives of changing upper management reflexes and improving operations.

The following figure 7.2 depicts the different paths taken by the three organizations. The matrix showcases each organization's trajectory in its LDMS deployment. The "X" marks where the organization started its LDMS deployment along the breadth vs. depth matrix. The circles indicate where the organizations currently are in terms of their LDMS deployment as a whole.

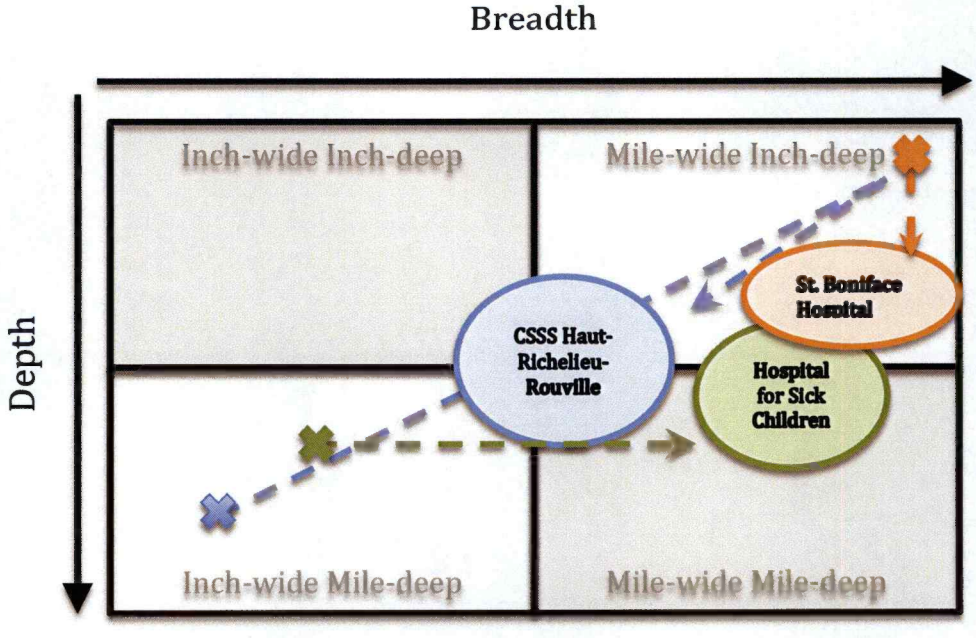

Figure 7.2: LDMS Deployment Focus Trajectories of Case Studies

CSSS Haut-Richelieu-Rouville initially started at the middle management level in an inch-wide mile-deep approach before altering to a mile-wide inch-deep approach at the executive and director levels. The organization is now at a juncture as it seeks to undertake an inch-wide mile-deep approach within each department. The Hospital for Sick Children took a completely different route by adopting an inch-wide mile-deep approach from the beginning. As more departments were enrolled into the program, the resulting program as a whole is now closer to being mile-wide mile-deep. Finally, St. Boniface Hospital's mile-wide inch-deep approach has led the

organization in the same direction. Since the mile-wide inch-deep top-down deployment has only been formally extended to the executive and director levels, the hospital as a whole is moving towards the mile-wide mile-deep deployment at a slower rate. As previously indicated, the hospital's current experiment with the model cells have not been included in this analysis since it was at the beginning stages at the time of the data collection period.

7.3.3 MODEL CELL

None of the three organizations initially utilized a model cell in their deployment. St. Boniface Hospital chose to develop model cells for their new systems approach because of its iterative nature. The Hospital for Sick Children had pilot areas because the implementation of the Daily CIP is not iterative; it is a one-time implementation that does not require revisiting as would be done with a model cell.

7.3.4 TOP-DOWN AND MIDDLE-OUT

Both St. Boniface Hospital and eventually CSSS Haut-Richelieu-Rouville adopted a top-down approach in deploying LDMS. While the intended change was process oriented at CSSS Haut-Richelieu-Rouville, a strategic change was the objective at St. Boniface Hospital. In both cases, the hypothesis was that upper management would influence how their subordinates adapted to the change of culture and strategy.

On the other hand, the Hospital for Sick Children's middle-down approach targeted operational change at the frontline, as well as the ensuing change in culture. However, a concern that has materialized at the Hospital for Sick Children is that middle managers have a greater influence at the frontline, their subordinates, than they have with upper management, their superiors. This suggests that targeting change at the middle management level is more likely to yield changes from the middle-down rather than from the middle-out. Because upper managers did not thoroughly review and simplify the Avenues to Excellence, as they would have under a top-down approach,

there was no alignment of key performance metrics. A hybrid of both top-down and middle-out approaches, while not demonstrated in any of the cases, can reap the rewards of both approaches.

7.3.5 CASCADING DEPLOYMENT

The Hospital for Sick Children's Daily CIP was spread through the stepwise approach where four departments would implement the program simultaneously. The departments are chosen based on the resources committed to the Daily CIP. This approach is effective because it places the responsibility on department heads to sustain the Daily CIP after the 20-week implementation program. Since department heads are accountable for the resources they manage, they are incentivised to ensure the successful implementation and sustainability of the Daily CIP.

An added modification, which was suggested by the Improvement Team, was for the resource negotiations to be structured around the selection of the director, rather than the department, for the purpose of implementing the Daily CIP. In other words, a director responsible for four departments, for example, would negotiate to enrol all four departments into the Daily CIP concurrently. Completing all the implementations together compels the director to devote more of his/her time throughout the implementation period as part of the interdisciplinary team.

At St. Boniface Hospital, the Management System was initially spread using Value Stream Mapping (VSM), but it eventually lost its structure. Organizational politics and department visibility seemed to have played a greater role in selecting the deployment areas. According to St. Boniface's Transformation Team, department selection was made after a lengthy debate between leaders. Should they start with problematic departments to prove the worth of the Management System in the most difficult context, or start with high performing departments to hedge against the risk of failing and build upon the existing utilities within these departments. The final

decision was to target high performing department because their members tend to be the most engaged.

7.3.6 ADDITIONAL ELEMENTS

In addition to the LDMS Deployment conceptual model elements analyzed in this chapter, there are additional elements that surfaced during the data collection for the three cases. Organizational readiness and mindset was stressed throughout the cases and the ensuing analysis. How it would fit into the conceptual model was considered during the literature review, but it was not included because of the complexity of measuring and defining what organizational readiness entails. That was only further convoluted after the multiple-case analysis because each organization had pre-existing systems and norms. A framework being developed by Pôle santé HEC Montréal along with Chaire IRISS (interdisciplinaire de recherche et d'intervention dans les services de santé) would prove valuable in this regard (Jobin & Lagacé, 2014).

An issue that appeared at the very start of the data collection for the CSSS Haut-Richelieu-Rouville case was that the Operations Support Team kept being pulled back into departments where they have already deployed the Management System. Department members and leaders often requested help to modify certain elements of the Management System or improve certain operations. This hindered the team's ability to spread the Management System due to capacity constraints. The Hospital for Sick Children avoided such a situation by having a structured program and a controlled implementation period. The well-defined handover process ensures that the Improvement Team is able to optimally allocate their resources. What can be labeled as an "exit strategy" thus enabled The Hospital for Sick Children to systematically expand the breadth of their Daily CIP at a fast and controlled rate.

The Daily CIP training manual also helps the Improvement Team transition out of the department because it contains all the general information that department members are expected to seek. There are always circumstances where additional information is needed. According to the Improvement Team, once these questioned are answered, the onus is placed back on the department member to utilize that information.

However, it is important for the organization to determine how they will measure the success of their LDMS and manage its deployment. Some may consider the objective to change the mindset within each department before moving on to the next. Others may prefer to spread LDMS and reach out to all organizational members as fast as possible so that they can influence one another. How the iterative process of LDMS deployment is viewed should be factored into this as well. Liker & Convis (2011) recommend implementing changes in small iterations; changes in behaviour can be expected after each iteration. Therefore, spreading LDMS as fast as possible, and continuously improving it in iterations, would enable organizational members to gradually develop their Lean mindset.

7.3.7 AUGMENTED LDMS DEPLOYMENT CONCEPTUAL MODEL

An augmented conceptual model for the deployment of LDMS was developed in light of the analysis conducted on the three case studies. In addition to the different visual difference between this and the original LDMS deployment conceptual model, the most notable change is the recommendation to adopt a mile-wide inch-deep top-down approach at the executive upper management level. As in both cases of CSSS Haut-Richelieu-Rouville and St. Boniface Hospital, gaining the commitment of upper management enabled the strategic and cultural change that LDMS needs to thrive. The role of leadership is pronounced in so many ways; from committing resources to changing the attitudes of organizational members. It was for that reason that this model separates the top-down from the middle-out approaches; some

time needs to be dedicated to enabling the leaders to take on the responsibilities of deploying LDMS.

At the department level, and within the model cell, the inch-wide mile-deep middle-out approach seems to produce change at the operational level. In terms of the cascading spread of LDMS within the departments, the analysis suggests that a structured process in terms of which department to select and how to transition in and out of the department would enable the organization to better manage the LDMS deployment effort efficiently and effectively. The following figure 7.3 depicts the suggested path towards the ultimate goal of having an LDMS with maximum breadth and depth (mile-wide mile-deep).

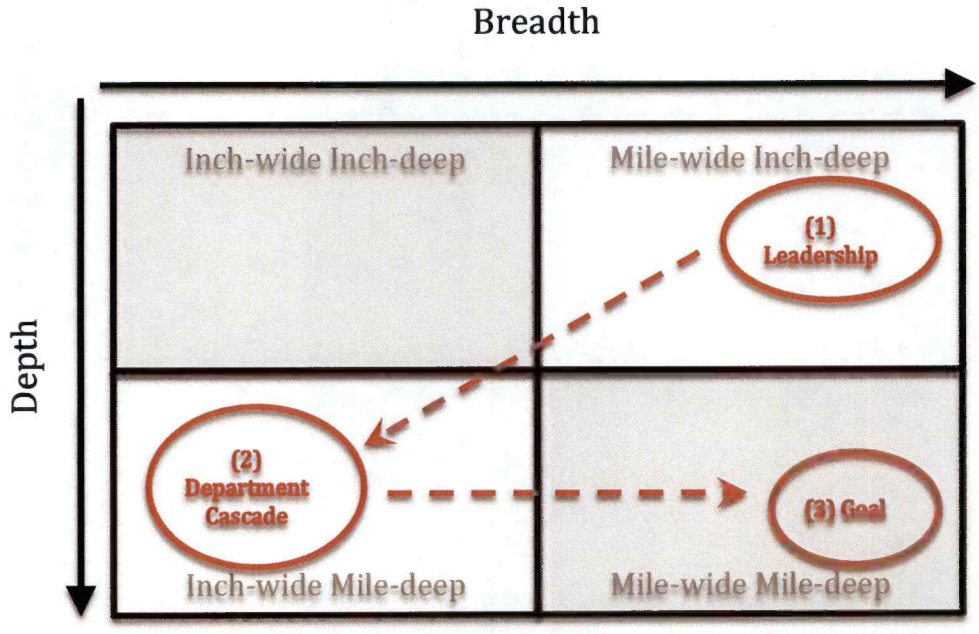

Figure 7.3: LDMS Deployment Path

According to figure 7.3, after a mile-wide inch-deep LDMS deployment approach at the upper management or leadership level, the next stage is to transition into an inch-wide mile-deep approach within departments that are enrolled into the management system in a cascading fashion. The pace at which the transition from mile-wide inch-deep to inch-wide mile-deep will

ultimately depend on various organizational-specific factors such as the organization's size and culture. As more departments adopt the management system in depth, the breadth of LDMS would be enhanced to the point where the organization has a system that is mile-wide mile-deep.

This transition of the focus of LDMS deployment creates a "T" shaped model. It entails the development of broad knowledge at the top and deep knowledge in organizational levels within the department. Executives (level-4), and possibly directors (level-3), make up the leadership. If not included in the leadership, directors (level-3), along with managers (level-2) and frontline staff (level-1) form the base of the framework that is coined the T-model.

Figure 7.4 depicts the complete augmented LDMS deployment conceptual model. It is important to restate that the conceptual model is intended for organizations that have adopted Lean but have not yet created the management system to support it. There is an expected iterative process that is essential in any continuous improvement effort such as LDMS due to its evolutionary nature.

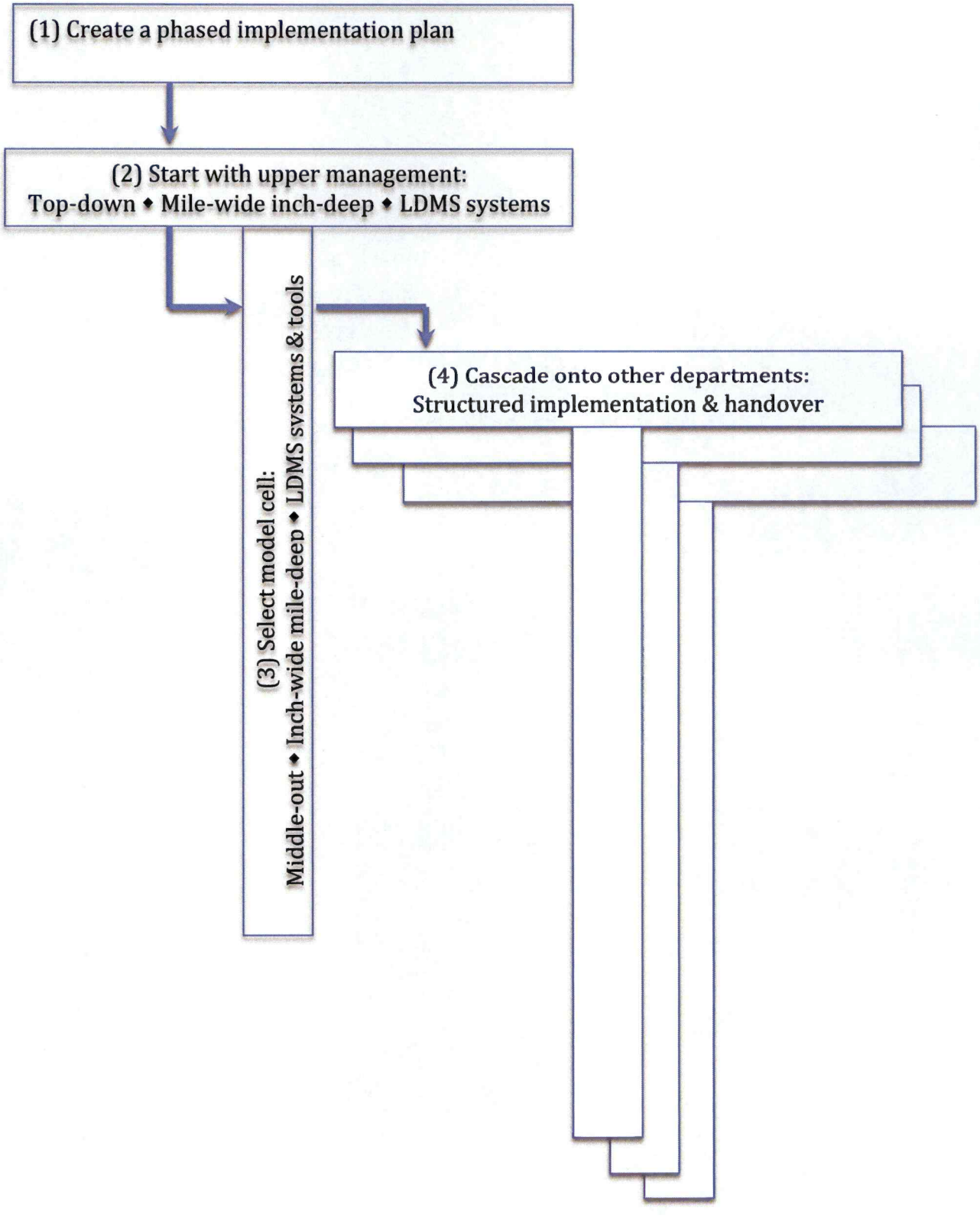

Figure 7.4: Augmented LDMS Deployment Conceptual Model

The Augmented LDMS deployment conceptual model leads to the formulation of the following propositions. Since the first step, creating a phased implementation plan, remains unchanged, these three propositions reflect the revisions made on the initial LDMS deployment conceptual model, as developed in the literature review.

Proposition 1:

- *Health care organizations seeking strategic and cultural change should start with a mile-wide inch-deep approach at the upper management level.*

Proposition 2:

- *Health care organizations that intend to produce changes at the operational level should transition from the top-down mile-wide inch-deep approach to a middle-out inch-wide mile-deep approach within each department or unit.*

Proposition 3:

- *Health care organizations that value a speedy deployment rate should utilize a cascading implementation strategy that structures the implementation and handover of the deployed LDMS within each unit.*

CHAPTER 8: RECOMMENDATIONS & CONCLUSION

This thesis answers the two research questions of what constitutes LDMS, and how can health care organizations, that have adopted Lean through different means, deploy it. In order to answer these questions, a literature review and a multiple-case analysis of three health care organizations that are currently deploying LDMS were conducted. The three cases of CSSS Haut-Richelieu-Rouville in Saint-Jean-Sur-Richelieu, the Hospital for Sick Children in Toronto, and St. Boniface Hospital in Winnipeg were examined through individual interviews and observations of members of different organizational tiers.

The literature review led to the development of the LDMS conceptual model, which depicts the answer to the first research question. Conducting the multiple-case analysis, and as a direct result of observing how different organizations interpreted the literature in different ways, led to the augmentation of the LDMS conceptual model in figure 7.1. In addition to changes in the naming and definition of some elements in the model, the augmented model better showcased the interrelatedness of the sub-systems of problem solving, coaching, Genchi Genbutsu, and alignment while drawing a clearer distinction between the sub-systems and the tools that they utilize.

The augmented LDMS deployment conceptual model in figure 7.4, which depicts the answer to the second research question, also changed significantly from the one derived from the literature review. The different approaches taken by the three organizations helped shed some light onto the effects of where organisations choose to start the deployment effort of LDMS. The augmented model recommends starting with a top-down and mile-wide inch-deep approach, then transitioning to a middle-out and inch-wide mile-deep approach in the model cell and ensuing departments. In addition, the structured transition into and out of each implementation area during the

cascading spread of LDMS throughout the organization was added to the augmented model.

It is the researcher's personal opinion that the deployment of LDMS needs to be as meticulous and structured as the design of its elements. The details of the implementation plan will ultimately depend on the organization's experience with Lean. If for example, an organization already has the four identified sub-systems of LDMS well developed, then they would only need to build the tools that will manage their continuous improvement effort.

Taking the organizational context into consideration is vital when designing the implementation plan. Building on the existing structure of meetings, for example, would help solidify the role of LDMS. Otherwise, LDMS becomes just another addition to the plethora of management initiatives. Having one management system, with LDMS as an element of it, and integrating all the different aspects of management within it, is thus imperative. Such a management system can then serve its role of leading the organization's Lean transformation. Research indicates that managing the Lean transformation should eventually lead to no longer distinguishing between Lean and non-Lean projects (Landry & Beaudoin, 2014). However, even in that case, the management system, along with its daily aspect in LDMS, serve to sustain the Lean improvements and guide the organization in its continuous improvement efforts (Jackson & Jones, 1996).

8.1 RECOMMENDATIONS FOR THE THREE ORGANIZATIONS

The three organizations depicted in the case studies graciously allowed the researcher to explore their LDMS and its deployment. Organizational members freed up some of their valuable time to discuss their experience and answer the researcher's questions. The access they granted provided the researcher with an unobstructed view of their LDMS. As a consequence of having a new set of eyes observe the mechanics of LDMS in each facility, the following three sections are recommendations for the three case studies of

CSSS Haut-Richelieu-Rouville in Saint-Jean-Sur-Richelieu, the Hospital for Sick Children in Toronto, and St. Boniface Hospital in Winnipeg.

8.1.1 CSSS HAUT-RICHELIEU-ROUVILLE

One of the issues facing the Operations Support Team at CSSS Haut-Richelieu-Rouville in Saint-Jean-Sur-Richelieu has been the insufficiency of resources needed to spread their Management System throughout the organization. The relatively small team continues to be called back into departments to help with the upkeep of the system and the implementation with various improvement initiatives. Bill 10 *(loi 10)* and the creation of CISSS Montérégie-Est are expected to further weigh on the hospital's administrative capacity.

A structured implementation plan, that clearly defines when the Operations Support Team commences and concludes the Management System implementation in each department, would help the team better manage the transition of the entire organization. In addition, as different Operations Support Team members start to spearhead more initiatives, the organization's dependency on the coordinator should decrease.

A more structured implementation plan of the Management System would also strengthen its effectiveness. A structured approach would enforce department members' accountability, as it puts the onus on the department to manage its continuous improvements after the Operations Support Team wraps-up its implementation. Not only would that help the Operations Support Team free up some resources, but it would also empower the department to better manage its Lean transformation.

Additional resources, to expand the team's capacity, may also need to be earmarked for the deployment of the Management System within CSSS Haut-Richelieu-Rouville. The design of the current Management System is sophisticated and structured in a manner that should bring about material changes, according to the literature review. As CSSS Haut-Richelieu-Rouville

continues to deploy the Management System, the researcher expects the Lean culture to slowly emerge.

The second recommendation is to review department KPIs and divide them into driver and watch metrics. Focusing on four or five driver metrics will better enable department leaders to focus on the key metrics that they are trying to amend. In addition, adding qualitative gages in Accountability Meetings, that connect the tiers to one another, would enable the manager and director to better understand the particulars of managing the department.

The final recommendation is regarding the continuous improvement efforts at the frontline level. While each level-1 Visual Communications Board includes a continuous improvement section, observations and individual interviews indicated that the section is not usually addressed during the (level-1) Accountability Meetings. Limiting discussions to driver metrics might help in the time management of these meetings. Additionally, it is the recommendation of the researcher to ensure that sufficient time is stipulated for continuous improvement initiatives during the (level-1) meetings. Encouraging "just do it" suggestions from the frontline during these meetings would provide the opportunity for them to participate in the continuous improvement efforts and be able to assess their results and effects on their unit. The frontline's involvement in the continuous and incremental improvement of their work area, not only further develops their proficiency; it also develops their sense of ownership and accountability. Such a change in attitude and behaviour is a vital part of the transformation of the organization and the development of the Lean culture the organization is striving for.

8.1.2 HOSPITAL FOR SICK CHILDREN

The most pressing issue the hospital is facing is the lack of alignment among the program, department, and organizational initiatives. Initiatives from

each front are reviewed in separate scorecards and pose conflicting priorities for the frontline staff members. Upper management's role in achieving alignment is vital; performance indicators need to be examined from the top-down. Well-defined metrics that branch out clearly and can be traced back to their core global measures are a necessity.

The aligned key performance metrics are also expected to guide the huddles that manage Improvement Opportunity Cards. Examining driver metrics and their countermeasures in addition to the Improvement Opportunity Cards during these huddles would better focus them on driving change, in the direction set by upper management, through the aligned key performance metrics. Continuously reviewing the performance levels and targets at the frontline also better focuses their improvement efforts on finding ways to mend that gap. Conducting these meetings daily is also recommended to establish a non-wavering routine of seeking continuous improvements on a daily basis.

The final recommendation pertains to creating horizontal connections between departments that have already implemented the Daily CIP. Structured communication between different department members at the same tier, middle managers or quality leaders for example, would enhance knowledge sharing between departments. As more departments participate in the program, organizational learning through the continuous sharing of experiences starts to take place. Stronger horizontal ties would also enable better collaboration on multi-department improvement initiatives and, eventually, organization-wide results.

8.1.3 ST. BONIFACE HOSPITAL

Building recommendations for the case of St. Boniface Hospital is more difficult because of the undergoing model cell development with the new approach of systems thinking. The Transformation Team expects this new approach to truly transform the mindset and behaviours of organizational

members throughout the hospitals. Since the model cells were still at the initial stages of development at the time of the data collection in July 2014, the researcher was not able to examine how the new systems thinking developed within the organizations. Because of this new direction that St. Boniface Hospital undertook, direct and specific recommendations on their current Management System would not prove very beneficial.

Based on the "brains" analogy made by Morgan (2006), St. Boniface Hospital's pursuit to continuously improve its quality of care and remain at the forefront of innovation in health care management indicates that it should pursue a Learning Organization mind-set. He describes how organizational learning can be indorsed with an emergent approach that encourages its evolution. The literature indicates that a top-down approach does not encourage evolution (Manville et al., 2012). While the model cell development is seeking such an emergent approach, it is important to reiterate due to the difficulty of completely abandoning what was learned and starting from scratch.

The second recommendation pertains to the pace of change throughout the model cell development and ensuing implementation plan. Considering the original Management System was conceived in 2012 and has not yet been extended to all organizational tiers, the pace of implementation can only be described as slow. The slow pace is partly attributed to the experimentation mindset at the hospital. As indicated in the literature review, it is important to let the dust settle when creating changes to allow the true consequences to develop and materialize. Continuously experimenting with new ideas may therefore impede the pace of change. A balance thus needs to be reached for the organizational transformation to come to fruition. Research indicates that the pace of change needs to be controlled for the effective introduction of changes within an organization (Amis, Slack, & Hinings, 2004), and for the evolution of the organization as a whole (Brown & Eisenhardt, 1997).

8.2 RESEARCH CONTRIBUTIONS

The main deduction made from the research is that the design of the deployment effort is directly correlated with the organization's interpretation of LDMS; the correlative relationship does not imply a causal one. LDMS deployment is largely affected by what it is expected to achieve. At the same time, the deployment method largely affects organizational members' experience and perception of LDMS.

This research contributed to the relatively scarce academic research on LDMS and its deployment. The two conceptual models of LDMS and its deployment provide health care organizations with a framework to use in their deployment effort. The LDMS deployment T-model provides a framework that guides LDMS deployment in any setting. The analysis of LDMS deployment is also applicable to several related management doctrines such as TQM. In addition to the developed conceptual models, the literature review and the three case studies exposed some of the subtleties and nuances that need to be considered when deploying LDMS.

Finally, the research can be utilized in the study of LDMS deployment in fields other than health care, such as universities or other service organizations. Some aspects such as physician involvement would need to be amended, but for the most part, the same conceptual models would prove relevant.

8.3 RESEARCH LIMITATIONS

One of the key limitations to this research has been the reliance on professional publications in the literature review. The lack of extensive academic literature on the management aspect of Lean also led the researcher to utilize research on related management doctrines such as TQM. In addition, the research addresses how to deploy LDMS, but does not provide a tool to determine its successful deployment. Research depicted several different frameworks for assessing the success of certain LDMS

aspects, but none that encompassed the different facets presented in the literature review.

Another limitation is attributed to the building of a theoretical framework from the analysis of three cases in which none have completed their LDMS deployment. A case study research of a health care organization that completed its LDMS deployment would have enabled the researcher to showcase tried ad tested LDMS deployment strategies. However, the time and budget restrictions in conducting the research for the case studies did not allow the researcher to seek other health care organizations more advanced in their Lean transformation. The researcher had to distinguish between each organization's vision of LDMS and what actually transpired even though the lines were often blurred when describing LDMS. There were also blurred lines between Lean and LDMS; because they utilize similar toolkits, it was not always clear where Lean ends and LDMS begins. An accommodation to this limitation would have been the inclusion of an organization, which successfully deployed LDMS, from any other industry in this research. This would have allowed the researcher to capture best practice guidelines that can be utilized in the health care industry. However, the professional literature applied throughout the thesis provides recommendations based on best industry practices.

Given that the researcher is not perfectly fluent in French, conducting some of the interviews in French at CSSS Haut-Richelieu-Rouville may have hindered the data collection as some nuances may have been missed during the individual interviews. However, recording the interviews to listen to the answers more than once provides assurance that there was no misunderstanding. Finally, the data collection initially included a focus group of participants from different fields such as physicians and managers in addition to individual interviews and observations. The objective of conducting a focus group was to gather collective information and witness group dynamics in each organization. This did not occur because of the

difficulty of finding replacements for these participants for the duration of the focus group.

Controlling the data collection phase for each case study was necessary since two of the three organizations required the researcher to travel to visit the premises. Since travel expenses were to be reimbursed by the Quebec Ministry of Health through the Pôle santé HEC Montréal - Centre de transfert Lean, the researcher capped the data collection period to one week because the expense of a longer visit would prove too burdensome if the full reimbursement did not come through. While the researcher is content with the conducted interviews, a lengthier data collection period would have enabled further observation. As depicted in the case studies, there were sometimes inconsistencies in statements given by some organizational members. The one-week time constraint prohibited the researcher from attempting to verify the actual situation through further observation. As a countermeasure, the researcher's contacts at each organization, who are responsible for deploying their respective LDMS, were requested to review the case study written about their organizations to validate the researcher's findings.

8.4 RECOMMENDATIONS FOR FUTURE RESEARCH

The propositions depicted in the multiple-case analysis after Augmented LDMS Deployment Conceptual Model (figure 7.4) provide a useful guide for research conducted on LDMS and its deployment. As stated in the literature review, an issue this research needed to overcome is that most of the literature used was professional rather than academic. Further research of LDMS and how it contributes to the creation of a Lean culture is needed. As well, measures of deployment success factors would insert some objectivity into this field.

In addition, while there is an abundance of research conducted on general change management models, further research on change management

within health care organizations is needed. The distinctive culture and environment of health care organizations warrant additional research on how to best manage change at an overall organizational level and unit-specific level. There is insufficient research on defining organizational readiness factors and assessment models. Rather than general models, concrete frameworks that enable organizations to assess how ready they are to embrace Lean would enable organizations to better understand themselves in order to choose the most suitable change management model.

Another matter of great significance and insufficient research is how multiple iterations of LDMS lead to the development of its management system and its underlying mindset within organizational members. Measures that ensure LDMS sustainability on the long run, as well as studies on the organizational impact of deploying LDMS, would prove very beneficial for the enhancement of the academic research on LDMS.

8.5 CONCLUSION

The thesis answered the two research questions of what constitutes LDMS and how can health care organizations that have adopted Lean through different means deploy it. Two conceptual models were developed after reviewing the literature; they were later augmented as a result of a multiple-case analysis of three Canadian organizations that have deployed LDMS to various degrees.

In the concluding remarks, gratitude must be extended to all the individuals who participated in this research, particularly to the members of the Operations Support Team at CSSS Haut-Richelieu-Rouville, the Improvement Team at the Hospital for Sick Children, and the Transformation Team at St. Boniface Hospital. Their help and support was instrumental to the development of the case studies and the advancement of research on LDMS and its deployment.

APPENDIX (A): CASE PROTOCOL

PRELIMINARY SCHEDULE:

Day 1 Morning	Upon arrival, meeting with the main contact to discuss and formalize the plan for the week: where the researcher can settle (office or desk), appointment schedule, and how to reach out to contact in case there is an issue that needs to be addressed urgently.
	General overview of LDMS with contact: how the system functions throughout organizational levels, how it was first deployed, how the hospital transformed since its introduction, vision for the future, and lessons learned from the different projects.
	Review of available documentations from historical projects and related reports and presentations to see the evolution of the system.
	Wrap up session with main contact at 4:30.
Day 2 Morning	Observation sessions.
	Daily huddle attendance, then debriefing by the person leading the meeting on content, it's reasoning, and how it will affect their standard work.
	Conduct 15-minute and 30-minute individual interviews.
	Continue documentation review.
	Wrap up session with main contact at 4:30.
Day 3 Morning	Observation sessions.
	Daily huddle attendance (another department), then debriefing by the person leading the meeting on content, it's reasoning, and how it will affect their standard work.
Day 3 Afternoon	Conduct 15-minute and 30-minute individual interviews.
	Continue documentation review.
	Wrap up session with main contact at 4:30.
Day 4	Complete individual interviews.
	Wrap up session with main contact at 4:30.
Day 5	Any remaining activities
	Meeting with main contact for general feedback before departure.

RESEARCH REQUIREMENTS:

- Sit down someone knowledgeable about the lean transformation to understand the background, the mindset and how it started. I would appreciate if we can start with this.

- Documents and project reports from the initial stage of the lean transformation in addition to some current ones if possible.

- After attending the daily huddles (stand-up meeting), a discussion with the person leading the meeting to familiarize me with the issues addressed, the context within which they apply, and how the action points are fed into the leader standard work.

- Two departments as units of analysis; they could be clinical & non-clinical, one that has employed the system earlier than another, a model cell and another department, or just two departments that have different circumstances. I will need to replicate my observations and interviews for the two departments, and communicate with all levels within those two departments

- Observations (30 minute sessions):
  - Nurse station (orthopaedic department for example)
  - Clerks
  - Level 1 manager (and attend daily accountability meeting)

- Short individual interviews (15 minute sessions):
  - 1 clerk
  - 2 nurses
  - 1 physicians

- Long individual interviews (30 minute sessions):
  - First level supervisor
  - Manager level 1
  - Manager level 2
  - Manager level 3
  - Manager level 4

- Lean change agents & managers

APPENDIX (B): SHORT INTERVIEW GUIDE

Hospital: _____ Location: _____

Date: _____ Time: _____

Name: _____ Position: _____

Introduction & instructions

Thank you for taking the time to meet with me.

To give you a background on my research, it is regarding the implementation of the management system at hospitals.

I am interviewing people in different positions who would be interacting with the management system. The questions will be regarding your personal experience with it, and should last around 15 minutes.

To start, I need you to sign the consent form. I will not be including your name in my paper, but am asking to record this interview in case I miss something in my notes. Only I will be accessing this recording.

If you are not comfortable with any questions we can skip them. And if you would like to contact me later for any reason, you have my contact information on the form.

GENERAL INTRODUCTION

1. Tell me about yourself. How long have you been working here and what do you do?

_____

_____

2. Were you working at the hospital when the daily management system was first introduced (visual board, standard work, & daily huddles)?

_____

_____

3. What do you remember about how it was first introduced?

_____

_____

4. How was it implemented?

_____

_____

5. What changes in the hospital do you see since it was implemented?

_____

_____

6. Why do you feel these changes occurred?

_____

_____

7. Would you go back to the old way of doing things if you had a choice?

_____

_____

8. Do you feel the daily management system helps you in your daily activities or is it just for the manager?

_____

_____

9. How do you use the daily management system or any element of it?

_____

_____

10. Should the hospital be doing something else instead of the daily management system?

_____

_____

11. Can you explain in your own words how the system works?

_____

_____

TIERED ACCOUNTABILITY MEETINGS

12. How often do you attend the daily huddles?

_____

_____

13. What sort of action items to you get from them? How often do you have any?

_____

_____

14. How beneficial do you feel they are?

_____

_____

VISUAL COMMUNICATIONS BOARDS

15. How often do you look for information on the visual board?

_____

_____

16. How do you use the information on the visual board in your daily activities?

17. What information are you looking for when looking at the board?

18. What do you think about the way the information is set up on the board? Is it easy to read?

LEADER STANDARD WORK

19. What do you think about standard work sheets?

20. How do they affect the way the daily activities are carried out?

GENCHI GENBUTSU

21. How often do managers visit and observe you or others in your position?

22. Which managers visit?

23. How long do they stay each time?

24. How do you feel about those visits?

25. What do you think they take away from these visits?

COACHING

26. How often do you get training in the form of coaching?

27. Who does the coaching?

28. What are you generally coached on?

29. How useful do you find it?

30. What would you think about having a mentor to go to for general guidance?

PROBLEM SOLVING (& ESCALATION CHAIN)

31. Who do you report to?

_____

_____

32. How often do you encounter problems that you cannot solve yourself and have to elevate to you manager?

_____

_____

33. What kind of problems are these?

_____

_____

34. How often does your manager elevate that problem to their managers?

_____

_____

35. What makes them elevate the problem?

_____

_____

36. How would you describe the process for problem resolution?

_____

_____

37. Are you included in the process of finding a solution?

_____

_____

38. How often are you asked to give feedback once the problem is solved?

_____

_____

CONCLUSION

39. What kind of ongoing positive reinforcement do you get when you follow the system?

_____

_____

40. How many times do you hear the phrase daily management system, continuous improvement, visual board, daily huddles, or leader standard work in a day?

_____

_____

41. If you had a magic wand that could change anything, what would you change in the daily management system to make your life easier?

_____

_____

APPENDIX (C): LONG INTERVIEW GUIDE

Hospital: _____ Location: _____

Date: _____Time: _____

Name: _____ Position: _____

Introduction & instructions

To give you a background on my research, it is regarding the implementation of the management system at hospitals.

I am interviewing people in different positions who would be interacting with the management system. The questions will be regarding your personal experience with it, and should last around 30 minutes.

To start, I need you to sign the consent form. I will not be including your name in my paper, but am asking to record this interview in case I miss something in my notes. Only I will be accessing this recording.

If you are not comfortable with any questions we can skip them. And if you would like to contact me later for any reason, you have my contact information on the form.

GENERAL QUESTIONS

1. Tell me about yourself. How long have you been working here and what do you do?

_____

_____

2. Were you working at the hospital when the daily management system was first introduced (visual board, standard work, & daily huddles)?

_____

3. Where you involved in the deployment of the system?

4. What was your role in its deployment?

5. How different is the system you have today different from what you envisioned at the beginning?

6. What do you remember about how it was first introduced?

7. How was it implemented? What was the deployment process?

8. If you look back, what would you have done differently?

9. What changes in the hospital do you see since it was implemented?

10. Why do you feel these changes occurred?

11. Do you look fondly at the good old days and sometimes wish you could go back to before this was deployed?

12. How do you use the daily management system or any element of it?

13. Can you explain in your own words how the system works?

TIERED ACCOUNTABILITY MEETINGS

14. How often do you attend or lead the daily huddles?

15. How often and what sort of action items to you get from them?

16. How do these action items affect your leader standard work?

17. How beneficial do you feel these meetings are for management and for staff?

_____

18. How does the information pass on from the one tier of daily meetings to the next (how are they interrelated)?

_____

_____

VISUAL COMMUNICATIONS BOARDS

19. How often do you look for information on the visual board?

_____

_____

20. How do you use the information on the visual board?

_____

_____

21. What information are you looking for when looking at the board?

_____

_____

22. Where else do you get information you need to carry out your duties that is not on the visual board?

_____

_____

23. How was the set up of the information on the board determined in terms of design and layout?

_____

_____

LEADER STANDARD WORK

24. How do you feel about leader standard work?

_____

_____

25. How did you feel when you were first told you needed to have them?

_____

_____

26. How do they affect the way you carry out your daily activities (are they a bit restrictive)?

_____

_____

27. How did you set up your leader standard work?

_____

_____

28. How often do you review it and make changes?

_____

_____

29. What is the process to change the leader standard work?

_____

_____

GENCHI GENBUTSU

30. How often do you visit the floor for Gemba visits?

_____

_____

31. How do you choose which positions and departments to visit?

32. How long do you stay each time on average?

33. What did you feel you got out of these visits?

34. What did you look for when conducting these visits?

35. How would you prepare for them?

36. What is the feedback from the participants regarding these visits?

COACHING

37. How often do you get training in the form of coaching?

38. Who does the coaching?

39. How is that decided?

_____

_____

40. What are you generally coached on?

_____

_____

41. How useful do you find it?

_____

_____

42. What is the coaching process if there is one?

_____

_____

43. What would you think about having a mentor to go to for general guidance?

_____

_____

44. How often do you contact your mentor?

_____

_____

PROBLEM SOLVING & ESCALATION CHAIN

45. Who do you report to and who reports to you?

_____

_____

46. How often are problems bought to your attention?

_____

_____

47. What kind of problems are these?

_____

_____

48. How would you describe the process for problem resolution?

_____

_____

49. How do you ensure that the problem is truly solved and will not occur again?

_____

_____

50. How often are these problems elevated through the escalation chain?

_____

_____

51. Why do these problems get elevated?

_____

_____

52. What is the procedure to escalate a problem?

_____

_____

53. Do you feel escalating the problem produces a quicker and better resolution?

_____

_____

PERFORMANCE METRICS

54. What are the metrics used to assess the overall performance, safety, quality, and?

_____

_____

55. How are these metrics set?

_____

_____

56. Would you change any one of them if you could?

_____

_____

57. How do you feel these metrics best represent the mission and strategy of the hospital?

_____

_____

CONCLUSION

58. When management decides to make changes, how are these changes communicated to everybody involved?

_____

_____

59. What kind of ongoing positive reinforcement do you get when you follow the system?

_____

_____

60. How many times do you hear the phrase daily management system, continuous improvement, visual board, daily huddles, or leader standard work in a day?

_____

_____

61. On a scale from 1 to 5, 1 being the lowest and 5 the highest, where do you see the hospital in terms of it having a culture of continuous improvement?

_____

_____

62. What more is needed to get the hospital to reach a 5 on the scale?

_____

_____

63. If today you found out that there is a new breakthrough in the daily management system that would produce great results for the hospital. You are responsible for implementing this breakthrough throughout the hospital. Think back to how the daily management system was first introduced. Tell me how would you do it, what are the steps and milestones?

_____

_____

64. If another hospital approached you and asked for recommendations to start implementing the daily management system, what would you tell them?

_____

_____

65. What lessons did you learn from your entire experience with the daily management system?

_____

_____

66. How have you changed by this experience?

_____

67. If you had a magic wand that could change anything, what would you change in the daily management system?

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