Patient Flows to Improve Hospital Performance

The Honors Program
Senior Capstone Project
Jacquelyn Parr
Faculty Sponsor: Dr. Angela Wicks
April, 2010

Table of Contents

ABSTRACT

This is a case study focused on Backus Hospital in Norwich, Connecticut. The purpose of this report is to discuss ways for Backus Hospital to improve patient flows, which will increase patient satisfaction and safety, increase revenue, and decrease costs. The focus of the research is how the kaizen blitz and A3 methodologies can be used to develop ways to improve patient flow processes. Literature reviews on flow, process improvement, and innovation strategies, both within and outside of the healthcare industry were conducted. The hospital is dedicated to process improvement, innovation and quality improvement, so methodologies based on the Toyota Production System will be applied to patient flows from the emergency room to a hospital bed. The end goal is to improve patient satisfaction and reduce waiting time and movement of patients throughout the hospital system by decreasing the average length of time that patients stay in the emergency department. This case study focuses on the segment of the process from when patients' admit orders are received to when they are discharged to specific floors. This was accomplished through a rapid cycle improvement project where a kaizen blitz was used along with A3 processes to implement change. Some of the major policy changes that resulted from the project include the development of a pull system, standardized processes and improved communication.

INTRODUCTION

The William W. Backus Hospital located in Norwich, Connecticut is a not-for-profit organization that was founded in 1893 by William Wolcott Backus and William Albert Slater. Backus donated the capital to build the hospital, while Slater donated the eighteen acres of land that the campus still sits on today. The acute care community hospital and trauma center has 213 beds, offers a plethora of services, serves almost a quarter of a million people in eastern Connecticut, and is the city's largest non-government employer. The hospital is always looking to improve and expand its offerings. Backus Hospital's vision is to be one of New England's most progressive community hospitals through its financial strength, excellent reputation for personal care, exceptional patient safety, the quality and comprehensiveness of its programs, and its positive impact on the health of the surrounding community. Backus Hospital is a socially responsible entity that values ethical conduct and quality in addition to strong leadership and passion. The hospital has also won awards such as Cancer's Outstanding Achievement Award, and is still the only hospital in the state of Connecticut to win this particular annual award. (The William W. Backus Hospital)

Backus Hospital is accredited by several independent professional organizations.

- The American College of Radiology
- American College of Surgeons, Commission on Cancer
- College of American Pathologists
- Joint Commission on Accreditation of Healthcare Organizations National Academy of Early Childhood Program

It is also licensed by the following.

- Connecticut State Department of Public Health
- Nuclear Regulatory Commission
- State of Connecticut Department of Transportation, Bureau of Aviation and Ports (The William W. Backus Hospital)

Backus Hospital is creating a new department called Hospital Excellence, which shows its focus on continuous improvement. The new department is developing ways to use the kaizen blitz and A3 problem solving processes to not only improve patient flow processes, but to enhance other systems within the hospital with new innovation techniques. Backus Hospital's

overarching goal is to decrease the average patient's length of stay in the emergency department (ED), which is a patient safety issue because the patients need to reach their designated floor as fast as possible to receive specialized care. The purpose of the patient flow project is to improve patient satisfaction and reduce waiting time and movement of patients throughout the hospital system. This will increase patient satisfaction and safety, increase revenue, and decrease costs. With the recent focus on reorganizing the health care system in the United States, Backus Hospital is concerned about any unexpected new costs that it may incur; therefore, it wants to be proactive by streamlining costs now. The issue is the unnecessary amount of waiting time that patients experience in each stage of their stay. This includes the time from when patients' admit orders are completed in the emergency room to when they reach hospital beds, which is the segment of the process that this case study focuses on. Patient satisfaction decreases while they wait to be moved to a floor after the physician in the emergency department has informed them of where they will be placed. In addition, the patients are safer when they reach their assigned floor where they can receive more specialized care than what the emergency department has to offer. The hospital staff is eager to make changes and has been at the forefront of this initiative, essentially creating the plan themselves under facilitator guidance. However, within the hospital and the industry, there are many reasons why this is a difficult but important goal and why hospitals struggle to decrease the average patient's length of stay. This case study examines one piece of the complex patient flow process.

Historically, hospitals did not have to focus on market competition. Now, they are lagging behind other industries in learning how to improve their processes. (Pontifical Institute of Mediaeval Studies, Toronto, Ontario, 1994) This case study will ideally be the benchmark for the entire Backus Hospital, as well as for other hospitals in the areas of patient flows, improving patient satisfaction, and reducing costs. Specifically, this project will look at health care in a new light through the use of both kaizen events and A3 structures to implement change.

The kaizen blitz project effectively created a standardized and streamlined process for assigning patients to beds. Therefore, patient safety is increased since the patients will get to

specific floors much quicker where they can receive specialized care. The major change is that the newly designed process pulls patients to the floor instead of patients being pushed up to the floors from the emergency department. Thus, control of the process is now the responsibility of the nursing supervisor. To successfully implement the new processes, the nursing supervisor was provided with more complete, real time, information about staff availability and patient acuity on the floors by accessing existing reports on the hospital's electronic Bed Board system. The Bed Board system is used to manage all the aspects of bed placement for patients. With Bed Board, the staff can maximize bed placement, discharges can be processed quicker and all hospital units are integrated. (MEDITECH Medical Information Technology, Inc., 2008) Other hospitals have had success with the system including Greenwich Hospital in Greenwich, Connecticut,

> "'We've seen a decrease in patient waiting times, between coming into the ER, being admitted as an inpatient, and securing a bed,' says Trish Babcock, manager of case management and patient throughput at Greenwich. 'In less than six months, with the assistance of Bed Board, we were able to further refine our average time by 30 minutes, and achieve our goal time of 270 minutes'" (MEDITECH Medical Information Technology, Inc., 2008).

Various other changes were recommended to facilitate the change to a pull system. For example, the matrix of nurse to patient ratios that was used to determine if each floor could accommodate more patients was eliminated. Nurses were using this ratio even though it did not reflect real time data and patient acuity, which is the degree of care that individual patients require. Therefore, the floor nurses were refusing to accept patients based on the inaccurate matrix guidelines. However, if the nurse to patient ratio was adjusted based on patient acuity, the floor might be able to accept another patient without jeopardizing the safety of any of the current patients on the floor. The electronic Bed Board technology is one of the numerous changes that will ensure that the patient flow process will become standardized and efficient.

LITERATURE REVIEW

Background

The history of the development of hospitals shows how there is increasing competition between hospitals.

> "When more than one hospital exists in a local area they compete for market share, since greater market share has a positive effect on economies of scale, utilization rates, learning curves and levels of quality. Competition is not only with other hospitals, but also with doctors who now perform some procedures in their offices, and with specialized clinics…strategy is to attract physician allegiance since they act as gate-keepers, directing patients to specific hospitals" (Pontifical Institute of Mediaeval Studies, Toronto, Ontario, 1994).

Hospitals have to compete for patients and to get on insurance companies' lists since there are more hospitals and they care for a wider geographical area. Hospitals compete based on price and quality.

> "…competition between healthcare providers will have two consequences. First, that competition between healthcare providers will push prices towards marginal cost. Second, healthcare providers will also compete on the basis of quality and this competition will give incentives for providers to provide the optimal level of quality" (Gowrisankaran & Town, 1999).

Hospital competition has been found to be socially beneficial because as the competition rises, hospitals provide higher quality care at lower prices, which is advantageous to patients' health. (Gowrisankaran & Town, 1999) However, in order to keep increasing the quality of care, hospitals need to find new ways to serve patients and improve patient flows throughout the hospital. This will help to decrease costs and increase patient and employee satisfaction, which are great ways to gain a competitive advantage. In addition, hospitals like Backus are tracking the government's progress on the reorganization of the healthcare system and want to streamline costs now before new and unexpected costs arise from the changes.

Little research has been done in hospital performance, but it is known that they are extremely slow to change and implement improvements, and cannot keep up with the demand for their services. For example, "Hospital emergency departments in the US are facing increasing challenges due to growth in patient demand for their services, and inability to increase capacity to match demand" (Medeiros, Swenson, & DeFlitch, 2008).

Challenges

Current problems and challenges for hospitals today include the fact that they are slow to implement change, their patient flows are ineffective, and they need to increase patient and employee satisfaction and revenue while decreasing costs and waiting times. For example, St. Luke's Hospital of Kansas City, Missouri, the benchmark for Backus' patient flow initiative, initially took over six hours from the time of patient admittance to getting them into a bed. St. Luke's goal was to place a patient in a bed within thirty minutes. After making numerous improvements, they are currently around forty minutes. (Mogg, 2009) St. Luke's proves that there is much room for improvement and that although a goal of thirty minutes seems unfathomable, it is in fact highly attainable given the correct tools and implementation methods. Likewise, Backus should be able to reach its goal after the patient data entry system is in place and the manual and fax method is discontinued.

Since competition between hospitals has risen, it is essential for them to change and focus on continuous improvement processes and retaining current patients. One of the areas for improvement includes the decreased patient satisfaction that accompanies high waiting times. This also directly influences and increases costs while decreasing much needed revenue for the hospital. For example, if the patient flow process is inefficient and the nurses are very busy, they may not be able to run tests fast enough or may make mistakes since they are rushed, which causes patients to stay at the hospital for an extra day. Errors are serious problems in a hospital setting and can result in an adverse event that leads to very unfavorable outcomes for the patient. In addition, the hospital is not paid for the extra day a patient stays, or to re-run faulty tests. In turn, this process dissatisfies patients and it is much easier to retain current patients than to find new ones, so keeping the patients satisfied is extremely important. Adverse errors are not only costly in terms of patient safety and additional costs to the hospital, but also negatively affect the image of the hospital, which can impact future revenue streams.

In addition, it is essential to increase nurse satisfaction so that they are more likely to buy into the new systems and processes, provide the best possible experience for patients, work quickly and efficiently, and keep nurse turnover low. In order to stay competitive, hospitals

must do whatever they can to make the patient experience as enjoyable, smooth and cost efficient as possible. The staff members including the nurses at Backus Hospital are working to improve their processes not only to make their own jobs easier, but also to provide the best patient experience.

Another reason why it is so critical to keep nurse satisfaction and therefore retention high is due to the ongoing nursing shortage in the United States. Backus Hospital is also experiencing these difficulties. The nursing profession has been described as cyclical and there have been recurring instances of nursing shortages and surpluses in the United States. However, the current shortage is different from previous shortages and cannot be mitigated through traditional solutions, and new strategies must focus on the long term. "Trends of an aging Registered Nurse (RN) workforce and limited supply to fill the impending vacancies are some of the unique aspects that bring a new dimension to an old problem" (Goodin, 2003).

In the past, issues such as a growing population or dissatisfaction with working conditions easily explained the nursing shortages and were straightforward to fix. Currently, fewer people are entering the nursing profession since there are a greater variety of professional jobs available; therefore, the aging nursing population will be harder to replace, especially as the baby boomers retire. The same will happen to the nursing educators, and this will force nursing enrollment to decrease. Nurse satisfaction has also decreased,

> "Because of increased patient load and decreased time to provide direct patient care, [nurses] were said to be less satisfied in their jobs. In addition, [nurses] reported that they frequently skipped meals and breaks to care for patients, felt increased pressure to accomplish their work, and participated in mandatory overtime" (Goodin, 2003).

Clearly, the quality of patient care will decline if there continues to be an insufficient number of staff members. The stereotypical image of nursing combined with reports of overworked and stressed nurses does not help to entice nursing enrollment. Nurses may be viewed as only an assistant to doctors and there is a misconception as to what their job description includes.

In the future, there may also be shortages across other professions in the medical field that could severely impact patient care and hospital performance. For example, many specialists within hospitals do not want to be on call in the emergency department, which has created a

shortage in this area and has caused disastrous outcomes for some patients. The on call specialists are deterred since they may not always be paid for their services, as some patients are uninsured, there is an additional liability with risky procedures; therefore, the doctors' insurance premiums are higher, and being on call disrupts their personal lives. All of these create monumental concerns for patient safety. (Institute of Medicine of the National Academies, 2006)

The various systems throughout the hospital that affect patient flow include information technology, the facility, clinical, registration and billing. (Montanaro) The patient flow issue begins in the Emergency Department at any hospital, including Backus.

> "Across America, hospital emergency departments (EDs) are in crisis. For many communities, the local hospital ED has become the linchpin of their health care safety net. With a legal obligation to see patients at all times and with more people than ever seeking their services, EDs nationwide are bursting at the seams" (Wilson & Nguyen, 2004).

Despite this overcapacity issue, "…many hospitals have done little to address the patient flow obstacles that lead to overcrowded EDs [emergency departments]" (Wilson & Nguyen, 2004). Ten hospitals participated in a yearlong Learning Network to attempt to find the best practices that would alleviate the massive emergency department issue. Through this study, the hospitals realized that it is important to address that emergency department crowding is not an emergency department problem; it is in fact a hospital wide problem. In addition, formal improvement methods need to be utilized to ensure success, as well as rigorous metrics and transparency. Transparency is an important issue because if the processes are so transparent that every worker is able to tell when a process is running correctly, then workers can identify when the ideal state is not met and take appropriate actions to change the issue. Through implementing these processes, the hospitals came up with several strategies and innovations. To facilitate patient flow coordination, a patient flow manager should be responsible for ensuring that patients in the emergency department are transported to their assigned beds on time. The push system should be replaced with a pull system, which is a just-in-time component that allows the floors to pull patients from the emergency department when the floors have vacant beds, versus the emergency department pushing patients onto floors where patients may not belong. Establishing new monitoring systems to ascertain when the hospital

is approaching maximum capacity and its threshold for diversion also helps to smooth the discharge process and put pressure to create an efficient discharge system to close out the length of stay loop, which starts at the emergency department when a patient is admitted. The creation of a hospital wide patient flow team with people from different departments to oversee the implementation of the changes is essential to completing patient flow changes to reduce emergency department crowding. (Wilson & Nguyen, 2004)

Backus Hospital has several goals and objectives to accomplish through the kaizen event and there are key success factors that are essential to achieving their implementation. Backus Hospital has the full support of upper management in its quest to implement initiatives and best practices that will provide the tools and solutions for its patient flow issues. This is a proven key success factor by the hospitals that participated in the Learning Network. In order for initiatives to be successful, it is essential for upper management to support the staff that is implementing the changes and help them to become accepted practices.

Backus' objectives include decreasing costs by 5% of the budget (excluding labor), and educating its staff on the importance of reducing wastes in a system, as defined by the kaizen methodology. Another goal is to minimize redundancies by collecting patient information only once, in the emergency department, instead of twice. Previously, the nurses had to collect data a second time on the floor. The electronic data collection system was first implemented in the emergency department just before the kaizen event was run and the task force recommended that the electronic data collection system be used more effectively. Since these issues address the overarching goal and cannot all be addressed at once, the goal had to be narrowed to one kaizen event goal: to reduce the time from when the emergency department patient's admit order is given to the unit coordinator to when the patient is transported to a floor. A critical success factor to this one kaizen event goal is addressing the discharge process. The current discharge process creates a bottleneck in the system, which has to be fixed in order for the implementation to be successful. Otherwise, beds will not open up quick enough to fully execute the pull system.

There are also issues with patients using the emergency department for primary care. This causes overcrowding, backup, and does not allow those who actually need emergency

department care to get it as quickly as possible. For example, one study cited, "Only 13% of the patients waiting for care had conditions that were clinically appropriate for emergency department services" (Grumbach, Keane, & Bindman, 1993). Emergency departments could refer patients not needing immediate care to primary care facilities; however, this would only work if primary care services were suited to low income populations. (Grumbach, Keane, & Bindman, 1993)

There has been a rapid increase in the number of patients visiting the emergency department; for example, twenty three million more people went to the emergency department in 2003 than a decade earlier. During the same time period, the number of hospitals in the United States declined by 703, which means there were 425 less emergency departments and 198,000 less hospital beds. This has been a partial cause of the ongoing overcrowding issue. When hospital beds are full, patients in the emergency department cannot be moved to a room, "This can lead to the practice of "boarding" patients—holding them in the ED, often in beds in hallways, until an inpatient bed becomes available. It is not uncommon for patients in some busy EDs to be boarded for 48 hours or more" (Institute of Medicine of the National Academies, 2006). There becomes the issue of safety with these patients. They cannot receive the specialized care they may need that is only available on specific floors, and they may not get necessary care in a timely fashion. Another aspect of patient safety arises when ambulances are turned away from hospitals, "…an average of once every minute" (Institute of Medicine of the National Academies, 2006), because emergency departments are full and they then have to travel further away to a different hospital, possibly endangering patients' health even more. A side effect of ambulance diversions is that ambulances become unavailable to other potential patients for longer periods of time. This increased travel and time could mean life or death for a variety of patients. (Institute of Medicine of the National Academies, 2006)

Kaizen Event

A modified version of a kaizen event was chosen as the means of change implementation to address the above issues at Backus Hospital for several reasons. The kaizen method originated from Japanese management concepts; it assumes that anything requiring long-term change can be constantly improved through continuous incremental change situations. The

kaizen method focuses on eliminating waste and inefficiency, improving productivity, and the standardization of procedures. (Value Based Management.net, 2009) Kaizen is an integral part of highly focused continual improvement and rapid improvement processes and is the foundation for lean production. When a kaizen strategy is implemented, it pulls people from all parts of the organization to form a team that is empowered to improve processes and solve problems. Kaizen events typically are inexpensive to run and last for about five days. (United States Environmental Protection Agency, 2009)

Black and Decker Corp. has been using kaizen events since 1994, and by 1996, the projects had increased plant-wide productivity by 29%, decreased WIP by 74%, reduced the floor space by 39%, and saved a total of $4.6 million. There were forty-two events held in 1996 alone. In a kaizen sub-team, worker productivity increased by 36% and 1,800 square feet of floor space was saved. (Sheridan, 1997)

Kaizen events should be planned out using the PDCA (Plan-Do-Check-Act) Cycle. In the Plan stage, a standardized plan is created to implement change, the Do stage includes carrying out the plan as a trial, the Check stage requires examining the results of the trial, and the Act stage includes implementing the changes on a broader scale. Please see Appendix A for a full description of this cycle. Backus Hospital is looking to reduce and eliminate the following types of waste: confusion, motion (movement), waiting, extra processing, defects, overproduction, and inventory. Please see Appendix B for a full description of the wastes in the current process. Kaizen also includes The Five S's: Sorting, or eliminating unneeded work or prioritizing work, Simply Access, which entails keeping needed items easily accessible, Standardization of processes, Shining/Scrubbing, or keeping the work environment clean, and Self-Discipline to instill continuous improvement as a way to work. (Appendix B) The end goal of kaizen, "The overarching focus of the methodology, however, is understanding and achieving what the customer wants, since that is seen as the key to profitability of a production process" (Jacobs, Chase, & Aquilano, 2009), focuses on the customer, since they are essential to any business' success.

The following table illustrates how Jimmerson adapted the definitions of waste to a healthcare setting. This table was instrumental in Backus' change improvements.

Table 1: Identifying Waste in the Current Process (Please See Appendix B)

1. Confusion: People doing the work are not confident about the best way to perform tasks

   Examples: Same activities are being performed in different ways by different people; unclear MD orders; unclear routes for medication administration

2. Motion (Movement): Is there unnecessary (non-value-added) movement of parts, materials, or information between processes?

   Examples: Looking for information; looking for materials or people; clarifying orders; materials, tools located far from the work

3. 3. Waiting: Idle time created when people, information, equipment, or materials are not at hand

   Examples: Waiting for other co-workers to give report; arrive at a meeting; have the OR ready; finish a procedure

4. Processing (Extra Processing): Activities that do not add value from the patient's perspective. When unnecessary hands (and brains) touch the patient or product

   Examples: Clarifying orders; redundant information gathering/charting; missing medications; regulatory paperwork

5. Defects: Work that contains errors or lacks something of value. Does the process result in anything the customer would deem unacceptable?

   Examples: Medication errors; re-work; variation in outcomes; surgical errors

6. Overproduction: Redundant work. Are we producing sooner, faster, or in greater quantity than the customer needs?

   Examples: duplicate charting; multiple forms with the same information; copies of reports sent automatically

7. 7. Inventory: More materials on hand than are needed to do the work.

   Examples: overstocked medications on units; overstocked supplies on units and in warehouse

Kaizen Blitz (Rapid Cycle Improvement)

The main difference between a kaizen event and a kaizen blitz is that the event lasts for about five days while the blitz only takes two. "Because of the compressed time frame, the Association for Manufacturing Excellence (AME) has dubbed the technique 'kaizen blitz'" (Sheridan, 1997). Please refer to the methodology for a full description of the kaizen blitz. The pharmacy department at Backus Hospital has already implemented change using kaizen through the Medication Safety Task Force. This is an excerpt from their plan.

Our Goals:

- To improve quality
- To improve safety
- To reduce cost
- To eliminate waste in the value stream

Philosophy of continuous improvement.

- Do it better – make it better
  - The alternative is stagnation and decline

Lean term is Kaizen (A3):
Kai (change) + Zen (to see or gain wisdom from doing)

Nissan Motor Co. Ltd. in Japan is an example of another organization that used a kaizen event program to its advantage. Beginning in 1985, Nissan made regular use of the two-day kaizen blitzes and its goal was to eventually fade out these events as the processes became closer to the ideal state. Nissan focused on eliminating waste, and empowering people in all levels of the company to ensure that the workplace was analyzed from many different perspectives to catch any mistakes or visualize any needed changes. To keep up with Toyota, Nissan launched many kaizen events to improve its processes in an attempt to compete with Toyota. Nissan's goal was to make the improvement process a part of each employee's everyday activities. By 1997, the two-day kaizen blitzes were uncommon because they had worked so well in integrating the continuous improvement concepts from the beginning that they had become vital parts of the process and culture. (Sheridan, 1997)

Rapid cycle improvement or rapid cycle change procedures are also important to patient flow processes. This quality improvement technique, "…allows hospital staff to initiate and test a large number of small changes related to patient flow very quickly by monitoring the effectiveness of those changes using small data samples" (Wilson, Siegel, & Williams, 2005). The rapid cycle change process identifies what needs to be changed or accomplished, which is the aim statement, how to measure the changes, and the strategies to choose in making improvements. For example, Backus Hospital would like to improve the patient flow process from the receipt of the admit order to when a patient is discharged to a floor from 138.83 minutes to sixty minutes; this will be measured through quantitative timing procedures as well

as patient and employee satisfaction levels. The tools used include kaizen blitzes and A3 processes and the strategies include all of the ways that Backus can get from the current state to the ideal state, which will be discussed later. The rapid cycle improvement process is inexpensive, fast, and includes small changes over multiple blitzes. Success in implementing change creates enthusiasm and buy-in from all parts of the organization and helps to fuel more improvements. The small-scale nature of the changes allows the implementation to be manageable and straightforward. (Wilson, Siegel, & Williams, 2005)

A3

Backus Hospital's kaizen blitz uses A3 problem solving processes to help solve its specific problems. A3 problem solving originates from the Toyota Production System of lean manufacturing and quality improvement. A3 processes focus on an ideal state where the process is defect free, has no waste, emphasizes one by one individual care, immediate response to problems, and on demand healthcare services that give customers what they want when they want it, including shipping prescriptions to their house. The ideal state focuses on each individual customer through the use of a flexible and standardized process that enhances attention to individually specific needs. The ideal state is an improvement of the current state and does not contain the wastes that are present in the current state. A3 thinking is, "A structured pattern of thought that begins with identifying and articulating a problem that limits the system and prevents well-intended workers from delivering ideal service. It begins with never taking our eyes off the customer!" (Jimmerson, 2007).

The Four Rules in Use in the A3 process include the following: Rule 1, clearly specify all activities of work, Rule 2, all steps in the request for a product or service are as simple and direct as possible (connections). Rule 3, the pathway (or flow of steps) required to produce the request is simple and direct, and Rule 4, all problems are addressed as close in time and person as possible, under the guidance of a coach. The A3 method is logical, sequential, and clearly defined, which allows people to become engaged in the method and begin questioning the process themselves as they go through it each day and move closer to the ideal state. "A3s rarely fail when the process is followed, because of the depth of understanding achieved in the examination of the current condition and root cause analysis" (Jimmerson, 2007).

To illustrate A3 problem solving, in one of Jimmerson's case studies, Shock Trauma ICU Medications, there were four sources of waste and too many people and steps in the process to order medications for the Shock Trauma ICU. Therefore, there were delays getting the medication to the patients and the employees were performing redundant work. The A3 solution was to use available technology to preserve the critical steps in the process and create a direct connection with the pharmacy. This created ease and speed in ordering medications. This example illustrates Rule 2 of the A3 process because a connection was created to make a process as direct and simple as possible to solve the problem of unnecessary steps and delays to the patients. Any needless steps in a process allow room for error, waste of time, and delays. (Jimmerson, 2007)

The Toyota Production System stimulates employee empowerment and an efficient network of suppliers and manufacturers. TPS includes some of the success factors seen above with kaizen and A3 in addition to others; the seven wastes, the five Ss, suggestion system, visual controls, defect warning, total preventive maintenance, standardized operations, just-in-time inventory, Jidoka (quality at the source), continuous improvement, automation, pull production, and load leveling. The system is used to improve cost, quality, productivity, safety, morale, lead-time, and other measures. (Kotelnikov)

> "TPS in Toyota is primarily concerned with making a profit, and satisfying the customer with the highest possible quality at the lowest cost in the shortest lead-time, while developing the talents and skills of its workforce through rigorous improvement routines and problem solving disciplines" (Kotelnikov).

The Toyota Production System is a very well known process that has been proven successful by the Toyota Motor Company, which is the reason why so many have copied it and learned about the system. Toyota clearly gained a competitive advantage over other carmakers; specifically the American carmakers and people took notice of the swift way in which they were able to capture a large market share and hoped to do the same.

Backus' pharmacy department then focused on defining an ideal state. After examining how they were contributing to the forms of waste, they identified tools to help them make changes, such as standardized work and just-in-time. Potential solutions were paired with each part of the problem to achieve their goal of creating a quality product. The pharmacy department

used the PDCA Cycle to ensure that they did not waver from their core goals and to serve as a reminder that kaizen requires the standardization of all processes involved. The success of this project has helped to prove that kaizen events in hospitals do in fact help to implement change over time.

STATEMENT OF PROBLEM

The length of stay for emergency department patients at Backus Hospital is over 177 minutes longer than the national average. Since this is a complex problem, only one segment is addressed: the time from receipt of patient admit order to patient discharge to floor.

The following table depicts the three main reasons why Backus Hospital is taking action to improve its patient flows by illustrating and comparing the average length of stay in the emergency department for three different segments of the process. The other two main reasons include the fact that there is a lack of accountability and the process of assigning patients to beds is non-standardized and therefore inefficient. The first two segments are the background information while the third segment, "Receipt of Admit Order to Discharge to Floor" is the focus of the kaizen event. The testing and analysis of the change implementation for the third segment will focus on the second and third shifts, please see Appendix C for a full description of the rapid cycle improvement project. Since the kaizen event would take about five days to complete, the Backus team decided to perform a kaizen blitz, which is essentially the same event but it lasts two days with a one-hour overview. It would be unrealistic to take employees away from their jobs for five days. The kaizen blitz was only a trial process since there were not enough open beds at the time of the trial to go live with the test. Data is currently being collected to compare the effects of the kaizen blitz.

Table 2: Emergency Department Length of Stay (Please see Appendix D)

Emergency Department Length of Stay		
Main ED Admitted Patients Average LOS		
	National Average	210 minutes
	Backus Average	>387 minutes
ED Decision to Admit to Discharge		
	Industry Standard	120 minutes
	Backus Average	277 minutes
Receipt of Admit Order to Discharge to Floor		
	Backus Average (May-Oct)	138.83 minutes
	Goal	<60 minutes

Backus Hospital implemented portions of the Toyota Production System, lean processes, quality improvement, and rapid cycle improvement processes with a kaizen event and A3 problem solving into its trial of the kaizen blitz. Through designing this kaizen blitz, it has allowed the Backus Hospital staff to identify other areas of improvement in a realistic and sequential manner. Therefore, other kaizen blitzes may be implemented as soon as possible to add to the kaizen events and work toward continuous improvement throughout all areas of the hospital. Overall, the kaizen events, A3 processes and rapid cycle improvement processes from the Toyota Production System have proven to work well up to this point and there has been positive feedback from the team and hospital staff. It is in the best interest of Backus Hospital to continue to implement new changes and accept suggestions from employees, stakeholders, and even customers.

RESEARCH MODEL

Hypothesis

The purpose of this case study is to find ways for Backus Hospital to improve patient flows, which increase patient safety and patient satisfaction while reducing the amount of waste in the system in terms of motion, waiting and time. If a standardized process is developed for the delivery of admit orders, then delays, confusion and scanning redundancies will be avoided, and the appropriate personnel will receive the admit orders so that the process of getting patients to a room will flow much faster. In addition, if a nursing supervisor takes over the responsibility of bed placement, then they will be the only one accountable for the process, which will become more consistent, and placement will be more efficient since they will be conscious of the state of the floors. By placing patients in the appropriate rooms more quickly, patient safety will increase because the patients will get the specialized care they need, which will decrease inpatient transfers. (See Appendix C) The following table outlines the Gap Analysis of the problems faced and their root causes to show the needed changes.

Gap Analysis

Problem	Root Cause
Admissions/Discharges/Personnel	More complex bed placement; later day discharges delay bed availability into peak admission hours; staffing structure changes for 2nd and 3rd shifts; fewer EVS personnel
Shift changes	A patient safety issue if new admissions are sent up during handoffs; floors will not accept patients during handoffs
5:00 Bed Meeting	Delays in floor admissions until after bed meeting clarifies bed availability and staffing levels; fewer bed assignments accepted between 3 and end of bed meeting
No one person responsible	Too many hands on the process result in multiple phone calls and lack of accountability; process fragmented. Bed registrar calls floor based on bed availability indicated in system; if patient fits bed criteria (m/f, contact type, etc.) and if staffing levels appropriate, patient accepted. If not, floor notifies bed registrar

	and process is repeated.
Lack of process standardization	Bed placement processes are different across time shifts; lack of consistency
Staffing matrix	Results in refusal of new patients based on matrix recommendation of patient/nurse ratios
Unclear where the process starts	No central location for delivery of admit orders results in delay in bed placement

The expected results include increased patient safety since the patients will be sent to floors only at the appropriate times, such as not during shift changes. The standardization of the process and assigned accountability will allow for consistent application of the decision criteria, which will therefore permit patients to reach the appropriate floors faster for specialized treatment. In addition, moving patients can cause instability, so less transfers results in increased patient stability. There will also be improved patient satisfaction since there will be less movement between floors and they will reach the appropriate beds faster. In addition, the employee satisfaction will increase since the patients will reach the floors at more appropriate times and as soon as there is availability. There will be fewer transfers between rooms, decreasing the amount of time nurses spend documenting the move and updating patient statuses. The streamlined bed placement process requires fewer phone calls, which can interrupt patient care on the individual floors and frustrate floor nurses.

Data

Backus Hospital has already collected quantitative data on the entire current process of the emergency department length of stay. Therefore, the data that needs to be collected will include that gathered by the various departments within Backus Hospital that are involved in the improvement processes after the changes and recommendations are implemented. The data will encompass the length of stay of main emergency department admitted patients, and the time it takes from when the emergency department makes the decision to admit the patient to when they are discharged. The focus of the data will be on the time from the receipt of the admit order by the unit coordinator from the emergency room physicians to when the patients are discharged to a specific floor. Another important measure is the amount of time from

when a bed is assigned to a patient to when the patient departs from the emergency department to go to their room. (See Appendix D)

Unfortunately, there are flaws in the quantitative data that have been collected. The data is not standardized and therefore cannot be compared as effectively. When an admit order is entered, this begins the timed process. However, no standardized process was in place for the receipt of emergency department physician admit orders, so the data collected for this patient flow segment was timed in a variety of ways, causing confusion and greatly increasing patient waiting time. Standardized data will be collected to study this measure and guarantee that all admit orders are given to the unit coordinators, please see the Results section for further explanation. The study will focus on the average length of stay in the emergency department since there was no standardized process in place to allow for accurate timing for the admit order placement.

Analysis Methods

Quantitative and qualitative measures will be used to analyze the data collected from the case study analysis of the kaizen blitzes and A3 processes. The qualitative method will include speaking to nurses and unit coordinators to get their feedback and see how the improvement processes have helped them to better perform their jobs. The quantitative methods for analysis include calculating percent improvement, length of time saved, and a means test to compare and determine the effectiveness of the implemented changes. However, since there have been various implementation issues, quantitative data has not been collected yet and therefore the changes cannot be measured in this way. The focus will be on how the change process was developed and what changes have been implemented.

METHODOLOGY

Backus Hospital decided to use a kaizen blitz as the form of change implementation versus a kaizen event because the event is five days long while the blitz is only two. It is extremely difficult to take hospital personnel from all parts of the organization away from their work for five days; therefore, multiple kaizen blitzes will help to tailor the change initiatives to their situation. McNichols, Hassinger and Bapst describe the process of how a kaizen blitz is run. The process allows for employee buy in and considerable improvements each time it is performed; blitzes can also be done multiple times on the same area. Since Backus' employees were so pivotal in the planning process, they will surely continue informal blitzes to continue change in their respective departments. The idea is to improve performance through working as a team and implementing the staff's ideas so that they have ownership in the process. Specifically, a cross-functional team of six to ten employees should conduct the changes, including one person who is outside the particular area to be blitzed, to enhance objectivity. At the beginning and end of the blitz, measurements of the entire process need to be calculated to analyze any changes that may have occurred due to the blitz; this may also include blue print drawings, photographs and videotapes. (McNichols, Hassinger, & Bapst, 1999)

A one to two hour orientation should precede the kaizen blitz for all involved. This should cover topics such as continuous improvement, elimination of waste and process flow mapping. Giving examples of other blitzes may help to illustrate the idea and how it should work. It is ideal if all involved do not have their normal responsibilities to complete during the time of the blitz, but if this is not possible, such as in a hospital setting, members may have to step out and the results may not be as impressive the first time. Others in neighboring areas should be notified before the blitz. Too much time should not be spent on the orientation, it is more important to go ahead with the blitz when all participants are prepared. There should be a place where everyone can write down long-term ideas that develop from performing the blitz. An example of the two-day kaizen blitz agenda is below. (McNichols, Hassinger, & Bapst, 1999)

Table 3: Kaizen Blitz Agenda (McNichols, Hassinger, & Bapst, 1999)

Kaizen Blitz Agenda

Day 1	
06:00–06:15 AM	-Introductions and overview
06:15–06:30 AM	-Measuring current performance
06:30–08:00 AM	-Task 1
08:00–08:15 AM	-Break
08:15–08:45 AM	-Observing the process
08:45–10:00 AM	-Task 2
10:00–10:30 AM	-Developing a new work combination with a team effort
10:30–11:30 AM	-Task 3
11:30–12:15 PM	-Lunch
12:15–12:30 PM	-Designing new work flow
12:30–1:30 PM	-Task 4
1:30 PM	-End—maintenance support & implementationplan prep
Day 2	
06:00–10:00 AM	-Task 5-new layout implementation
10:00–10:15 AM	-Break
10:15–11:30 AM	-Task 6 & 7-results summary & planning additional items
11:30–12:15 PM	-Lunch
12:15 PM	-End—summary & wrap-up

Task one is devoted to breaking into subgroups to perform tasks such as measurement of the current process, a flow chart of the current process, and counting the work in process units to see if the number is reasonable. The total area needs to be measured as well as an estimate of the standard process time. All collected data should be recorded and compared with the results after the blitz is finished. Task two involves performing and timing the actual process while observations are made and the flow is again mapped. Suggestions for improvement as well as descriptions of value added and non-value added activities should be documented. Any long-term suggestions will not be addressed during the blitz but should be recorded. Task three includes forming suggestions for new work flows and identifying issues such as bottlenecks, and then estimating the amount of time these new flows would take. In task four, the subgroups share their results and combine them to form an entire new workflow system; any logistical specifications should be included. This is the plan of action for changing the flow and it should be reviewed carefully. Task five is when the new process flow is implemented and tested. Task six involves measuring the new process flow, recording the results, and calculating the performance improvement. Long-term changes are discussed and

each person involved receives a copy of the results. The results are reviewed in Task seven and each member receives a task that ties into the long-term goals that they must follow up on to continue the plan for improvement. There are various benefits to using a kaizen blitz: rapid results are accomplished, areas for more improvement are discovered, there is employee empowerment, cross-functional team understanding and collaboration, and this process often becomes the first of many blitzes. (McNichols, Hassinger, & Bapst, 1999)

IMPLEMENTATION

Orientation

The Orientation at Backus Hospital introduced the participants to the facilitators, Colleen Sullivan, Director of Care Management at Backus and Angela Wicks, Associate Professor Bryant University. The team was given the purpose, rules of the blitz, the problem, goals, objectives, St. Luke's Hospital benchmark numbers, how to map the current process and what data to collect, and how the customers fit into the process. Wastes were identified in the current process, mapping the ideal process was discussed, and the first projects were identified. The full Orientation handout can be found in Appendix B.

The following is a description of the major points in the kaizen blitz, all information given to members of the blitz team can be found in Appendices B, C, and D.

Purpose

The purpose of the kaizen blitz is to improve patient care by improving the process from when admit orders are received to when patients are discharged from the emergency department to a bed. This is to ensure that patients are receiving the best possible care in the most appropriate setting. First, personnel will focus on reducing the time from receipt of admit orders to the placement of patients in a bed on the appropriate floor. The goal for this process is 60 minutes. All of this will help to increase patient safety and satisfaction, nurse satisfaction, and make the process flow easier for hospital staff.

Problem

Several problems combined cause the process to be inefficient. Table 4 below outlines the Initial State, and several of these items are discussed in detail. Fifty percent of admissions occur between 3-11pm; however, most discharges occur between 1-7pm. Therefore, there is a disconnect and not enough beds are freed early enough in the day. (Future kaizen blitz). Outpatients using inpatient beds for transfusions, IV meds, and chemotherapy minimize bed space for inpatients, who therefore have to wait in the emergency department for a period of time. The shift changes at 2:30pm, 10:30pm and 6:30am cause issues if new admissions are sent to the floors during these times because the floors will not accept them. There are too

few Environmental Services Personnel scheduled during the off shifts to clean the rooms and prepare them for incoming patients.

The Nursing Matrix, a method of using nurse to patient ratios to determine if each floor can accommodate more patients, does not indicate patient acuity and is only a guideline. However, it is used as a real time tool even though it is not. This causes major inefficiencies in the patient flow process since nurses refuse new patients based on the matrix.

The 5pm bed meeting for the nurses is an issue because their floor data is from noon and therefore is outdated. In addition, it delays floor admissions until after the bed availability and staffing levels are clarified in the meeting. Therefore, fewer bed assignments are accepted between 3pm and the end of this meeting. In addition, there are too many people involved in the second and third shift bed placement process, causing confusion and a fragmented process. There are also too many phone calls to attempt to alleviate the confusion before a resolution is made for each placement. A large part of this problem is the lack of accountability for the bed placement process, which causes confusion.

There is also a lack of standardization and verification of processes, causing the system to be incredibly inefficient. The bed placement process even varies across time shifts, making it almost impossible to map the flow of the current process. The patient flow process is flawed and uses a push system. This forces patients from the ED onto floors, versus a pull system where when there is an empty room; patients are pulled from the ED to fill the vacancies. However, it is unclear how to measure the time for the segment of the patient flow process from the ED patient admit order to when the patient reaches the correct floor because it is uncertain where the process starts. Sometimes the ED physicians give the admit orders to the unit coordinators, and other times to the bed registrars. Since the initial handoff of the admit order is not standardized and received by one person, the system is fragmented and cannot be measured correctly. This also results in a delay in bed placement.

Table 4: Initial State

2009 to date: Main ED Admitted Patients average length of stay is just over 387 minutes, when the national average length of stay is 210 minutes
January to June of 2009: ED Decision to Admit to Discharge averaging just over 277 minutes and the industry standard is 120 minutes
Backus is averaging about 88 to 98 minutes from receipt of admit order to discharge to floor and the initial goal is less than 60 minutes
50% of admissions occur between 3:00 p.m. and 11:00 p.m. during the second and third shifts
Outpatients using inpatient beds for transfusions, IV meds, and chemo
Most discharges occur between 1:00 p.m. and 7:00 p.m.
Shift changes occur at 2:30 p.m. to 3:00 p.m., 10:30 p.m. and 11:00 p.m., and 6:30 a.m. to 7:00 a.m. and patients are not admitted to floors at these times
Fewer EVS personnel scheduled during 2nd and 3rd shifts
Nursing matrix (explained above under Problem)
Bed Meeting scheduled at 5:00 p.m.
Major Problem: Bed Placement during 2nd and 3rd shifts
Many people are involved in the process (bed registrars, clinical coordinators, and nursing supervisors)
Often numerous telephone calls before resolution of each placement
No one person is responsible or accountable for bed placement
No standardization or verification of processes
It is unclear how to measure the time for this segment of the patient flow process
The initial handoff of the Admit Order is not standardized, sometimes received by the Bed Registrar and sometimes by the ED Unit Coordinator

Target/Ideal State

- Scope of first kaizen blitz = time from when admit order is received by unit coordinator to assignment of bed. The process begins when the admit order is scanned into the system.
    - Step 1: Physician gives admit order to Unit Coordinator (STAT orders, if any, noted on admit order and given verbally)

- Step 2: Unit Coordinator scans order into system
- Step 3: Unit Coordinator notifies nursing supervisor in charge of bed placement
- Step 4: Nursing supervisor assigns patient to a bed

Solution Approach

If we change this	This will happen
Bed placement becomes the responsibility of a nursing supervisor	• Part of the nursing supervisor's job is to be aware of the conditions on the floors (room restrictions, staffing levels, etc., inpatient/outpatient issues); should result in a smoother and faster placement process. One person becomes responsible and accountable for bed placement. Patient safety will be more effectively addressed by more quickly placing the patient in the most appropriate location; should result in fewer inpatient transfers. • Should result in more consistent criteria application
Develop a standardized process for delivery of Admit Orders	• Avoid delays and confusion whether all appropriate personnel have seen the Admit Order; avoid scanning redundancies

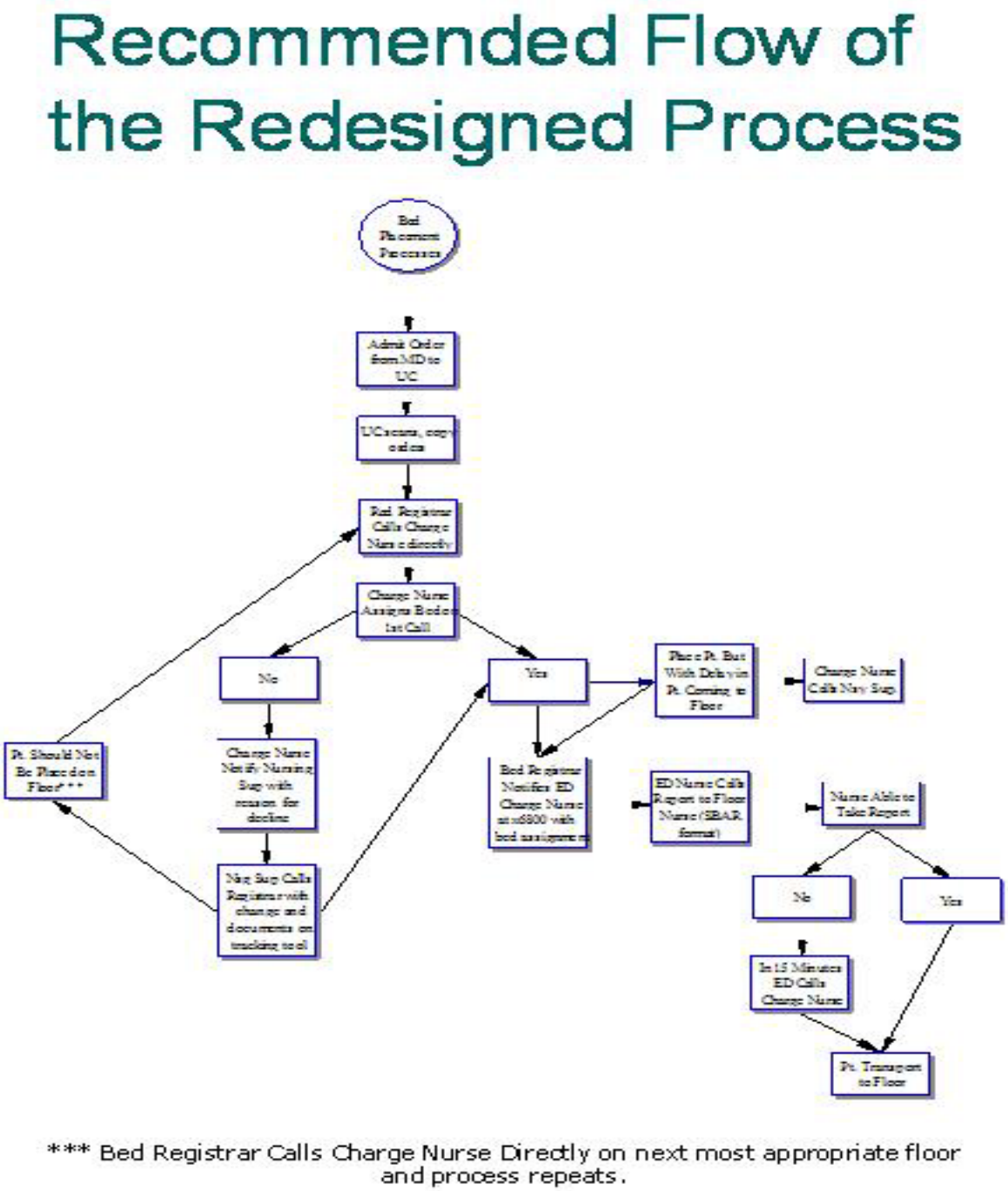
The following table describes the implementation requirements necessary for the success of the patient process flow project.

Table 5: Solution/Implementation Requirements

	Floor status and acuity report prepared during shift handoff by Clinical Coordinator.
	Floor status and acuity reports sent to nursing supervisor by 7:30am, 3:30pm, and 7:30pm.
	Bed placement becomes the responsibility of the nursing supervisor.
	Create a more acute awareness of the state of the floors to create a faster placement process. One person is held accountable for bed placement, which creates a more consistent approach. Patient safety

	will increase by placing patients quicker in the appropriate location.
	Nursing supervisor contacts the Unit Coordinator with bed placement availability by floor.
	Develop a standardized process for the delivery of admit orders.
	This will enable the process to avoid confusion, delays, and scanning redundancies, and the appropriate personnel will receive the admit order.
	Recommend flow chart below. Also in Appendix D.

Table 6: Recommended Flow of the Redesigned Process



*** Bed Registrar Calls Charge Nurse Directly on next most appropriate floor and process repeats.

Pilot

Rapid Implementation Experiment Plan

The new process flow was tested on November 17, 2009. The process was first tested with virtual patients three times to ensure the process flow was correct. No changes were needed to the process flow. The process was then tested on "live" patients, but there were no patient beds available and therefore the test did not work. The pilot resulted in implementation of most of the ideas with some expected to be implemented in the future.

Expected Results

Increased patient safety. Since the nursing supervisor is more aware of the conditions on the floors, patients cannot be sent to the floors during shift changes. In addition, one person is accountable for the bed placement process, which will create a consistent application of the decision criteria. Therefore, patients will reach their appropriate floors faster for specialized treatment.

Improved patient satisfaction. This results in patients initially being placed into the most appropriate beds faster and fewer subsequent transfers between floors. The less patient movement, the higher the patient satisfaction.

Improved employee satisfaction. Patients are transferred from the emergency department to specific floors at more appropriate times (e.g. not during shift changes) and as soon as there is availability. Also, there are fewer transfers between rooms and between floors. The streamlined bed placement process requires fewer phone calls, which can interrupt patient care on the individual floors and frustrate the floor nurses. Fewer transfers reduce the amount of nursing time required to document the move and update the patient's status after each move. Often even moving a patient can result in their instability. For example, a patient can be stable in the emergency department but become unstable on the way to the floor.

RESULTS

Recommendations

In addition, many process improvement recommendations were developed during the kaizen blitz. As demonstrated by the pilot tests, the new process flow was very efficient and effective. If a bed was available on the floor, the time from receipt of admit order to placement on the floor could be accomplished in thirty minutes or less, significantly exceeding the sixty-minute goal. Several changes could be implemented immediately without further approval or without any additional resource expenditures. Several other changes were recommended for immediate implementation. Please see Appendix E for full details.

One change that was implemented immediately during the kaizen blitz was a policy memo to instruct the emergency department physicians about who should receive the admit orders to ensure they reach the unit coordinator. A standardized process was needed to reflect adequate data collected on the process and to guarantee that all admit orders are given to the unit coordinators. The study will focus on the average length of stay in the emergency department since there was no standardized process in place to allow for accurate timing for the admit order placement.

Immediate Changes That Can Be Made Without Approval/Resources

The Bed Registrar can stop scanning Admit Orders and ensure that they are calling the correct person and that the Charge Nursing is filling a bed on the first call. The Bed Registrar can now be reached at 2271 24/7; and must carry a portable phone during the second and third shifts. When a Unit cannot take a patient, the Nursing Supervisors will track the "No's," and there will also be an automatic timing for printing Bed Board Reports.

Recommendations for Immediate Implementation

The changes to Bed Board Access are as follows. The Clinical Coordinators, Relief Charge, Unit Coordinators and Monitor Techs all need access to their floors and edit capabilities, while Nursing Supervisors need access to the entire hospital without edit capabilities. EVS will be the entire hospital and telephone update system. The benefits of this include that it will allow the floor to update patient data with changes in patient status (e.g., changes in

diagnosis, changes in room requirements such as need to move to private room, discharges, etc.). In addition, it will provide nursing supervisors with real-time reports on floor status and acuity and bed registrars with real-time data on bed availability changes. Training sessions will be required for these changes.

The changes to the Admit Order Scanning Processes include the following. Change the name of the report from Physician Orders to Pharmacy to Admit Order so it is easier to access. Scanning currently occurs three times in three different areas, once by the Unit Coordinator for the Pharmacy, once by the Bed Registrar, and once by EMR for Patient Records; however, it only needs to occur once to reach all areas. The benefit of this includes eliminating redundancy and waste in the process.

Another change is to Delete the Nursing Report since a real-time bed board report is available with that information. The benefits to this include that it improves readability, saves time, eliminates data entry redundancies in the process, and can eliminate the bed meeting. In addition, it removes the delay in placing patients into beds since they are not waiting for the bed meeting at 5pm. Currently, the hand-written reports indicate the correct status as of 12:00 noon, so this process will provide a better status picture in real time.

There needs to be Accountability for Not Taking a Patient on the Floor. The Nursing Supervisors will track "No's" when Units cannot take patients. Monthly reports will be submitted to the Clinical Directors, Nursing Supervisors, Karen Long, and Dr. Sidman. (A draft of the policy is attached in Appendix E). Implementation requirements for this process include creating a reporting format and advising the Nursing Supervisors of the change in policy.

Implementing the real-time status/acuity report from the Bed Board Report in lieu of the Nursing Report is an important change because the current hand-written reports indicate status as of 12 noon. The Bed Board report provides a better status picture in real time and improves readability. In addition, time will be saved by eliminating data entry redundancies, the need for the Bed Meetings, and the need for hand-written reports, while removing the delay in placing patients into beds.

Creating a Pull System from the Floors for Bed Placement will help to ensure that patients reach the correct floors. The floor status and acuity report is prepared during shift changes by the Clinical Coordinator; they are sent to the Nursing Supervisor by 7:30 a.m., 3:30 p.m., and 7:30 p.m. The Nursing Supervisor contacts the Bed Registrar with Bed Placement availability by floor and the process continues as illustrated on Table 6, the Recommended Flow of the Redesigned Process.

- Step 1: Bed Registrar assigns patient to a bed
- Step 2: Bed Registrar calls Charge Nurse to accept patient
  - Bed Registrars will have 3x5 cards prepared with Charge Nurse phone numbers for ease of use
- Step 3: Charge Nurse Accepts Patient on First Phone Call
  - Yes: patient is sent to floor
  - Yes, but delayed acceptance (room needs to be cleaned)
  - No:
    - If change in staffing
    - If diagnosis not clinically appropriate for bed
    - Must notify Nursing Supervisor
    - Makes Decision to take Patient or
    - Assign to another floor
    - Nursing Supervisor documents justification for not accepting patient
    - Patient Placement on Floors reviewed at Monthly Meetings
    - Bed Registrar calls next floor
- Step 4: ED Nurse Report to Floor Nurse
  - If Floor Nurse unavailable (e.g., in contact room), if permission from Floor Nurse, report to Charge Nurse
  - If Floor Nurse unavailable and no permission to report to Charge Nurse, ED Nurse calls back in 15 minutes

- If Floor Nurse unavailable, report to Charge Nurse
- Floor Nurse calls ED nurse if any questions

o Accountability

- Monthly Reports to Clinical Directors, Nursing Supervisor, Karen Long, Dr. Sidman

The Admit Procedures During Shift Changes process currently has a delay in accepting patients because of the shift change meetings. Therefore, while the assigned floor nurse is in the shift change meeting, the 7am-7pm Nurse or Charge Nurse will accept a bed placement from the Bed Registrar. If a patient arrives on the floor during the meeting, the 7am-7pm Nurse or Charge Nurse will accept the patient on the floor, check for patient stability, and move the patient into a room. If there are any issues on the floor, the Unit Coordinator will be contacted. The implementation requirements include advising the 7am-7pm Nurses and Charge Nurses of the change in policy.

The Change in the ED Nurse to Floor Nurse Reporting Policy is essential because of the delays in reporting and time wasted making phone calls. The solution is that if the Floor Nurse is unavailable (e.g., in a contact room), and if the Nurse has given permission, the Charge Nurse will take the report. If the Floor Nurse has not given permission, the ED Nurse calls back in 15 minutes. If the Floor Nurse is unavailable at that time, the report is given to the Charge Nurse. In both instances, the Floor Nurse calls the ED nurse with any questions. (A draft of the policy is attached in Appendix E). The implementation requirements include advising ED and Floor Nurses of the change in policy.

Standardized Use of SBAR Form for the ED/Floor Patient Report. The SBAR form is recommended for patient handoffs by The Joint Commission, the hospital accrediting body, and a hospital policy is already in place for the use of the SBAR. Unfortunately, the SBAR use has been sporadic. Therefore, the Task Force highly recommends the proper use of the SBAR form; there needs to be standardization of the report. Pads of SBAR forms should be available in the ED and on the counters on all the floors and the Print Shop can create pads of forms. The benefits of this change include that it creates a standardized process for patient handoffs so that errors of omission are minimized.

Standardized Physician Guidelines for Patient Bed Placement will help to reduce delays that occur because of incorrect or insufficient information. It is also needed for remote tele patients in the ED. A one-page summary of bed placement guidelines has been developed by the Task Force and will be laminated and strategically placed throughout the ED. (A draft of the new policy is attached in Appendix E.) The ED Physicians and Hospitalists will be notified of these guidelines. In addition, a key process change is that all Admit Orders will be delivered to the Unit Coordinator and a bariatric bed will be added to a private room.

Data Availability changes would help to track the performance of the flow process. The following data is needed.

- The time from receipt of Admit Order by Unit Coordinator to department from ED, which should be posted on Dashboard
- Time from Bed Assigned to Departure from ED
- Number of Admits/week/hour/floor
- Number of Discharges/week/hour/floor
- Number of Post Ops/week/hour/floor
- Time of discharge of hospitalists' patients from the hospital

The changes to the Flow of Admit Orders in the ED include the following steps. This standardized process will help to reduce confusion and the waste of time.

- Step 1: Physician delivers Admit Order to Unit Coordinator
- Step 2: Unit Coordinator scans Admit Order
- Step 3: Unit Coordinator calls Bed Registrar that Admit Order is Scanned

The Posting of Results and Acknowledgements will allow for more formal positive acknowledgement of improvements to the flow process. It will show results and be displayed in newsletter articles.

<u>Implementation Plans/Policy Changes</u>
Each of the policies described below has been implemented by Backus hospital during the kaizen blitz and can be found in Appendix E.

Policy For Admit Procedures During Shift Changes

When there is a New Admit Patient arrival on a Floor, the PCT from either shift will help settle them in and take their vitals. If appropriate, the 7am-7pm nurse will perform a quick assessment to ensure patient safety and stability until the admitting Nurse is available. Otherwise, the Clinical Coordinator from either shift will perform the assessment. The Patient is **not** to be left untended with the transporting PCT, Medic, or RN until the shift report is complete.

Policy for Nursing Supervisor Change of Shift Report

This process begins when the nursing supervisor accesses the Bed Board Snap Shot version at the beginning of a shift. The Clinical Coordinator/Relief Charge will call the nursing supervisor to gather information on patient acuity, the staffing matrix, bed assignments for pending admissions, pending discharges and immediate bed availability. The nursing supervisor will then meet with the bed registrar to review unit staffing and bed availability. Therefore, the bed meetings will be eliminated and the units will eliminate filling out a shift report on the units. Please see Appendix E for further details.

Policy for Patient Placement Review Meeting

A monthly meeting will be held to address patient flow concerns related to bed assignment/placement. This meeting will include the following staff members: VP of Nursing, Clinical Directors, Emergency Department Director and Patient Business Services Manager. Optional attendees include Director of Care Management and Nursing Supervisors.

During this meeting, the "Bed placement variance report" will be reviewed. This report will illustrate bed assignment times as they relate to the time admission orders that were written for all Emergency Department patients during the previous calendar month. All variances within the report will be evaluated specifically, and an action plan will be generated to avoid these issues in the future.

Discussion will be had regarding overall bed placement concerns from the previous calendar month. Individual situations will be evaluated at this meeting, and an action plan will be generated to avoid these issues in the future.

Policy for Standardizing Communication

As a part of a two-day rapid cycle improvement project to improve patient flow from the ER to a floor, hopefully, through the standardization of certain processes that this will be successful. One area that was addressed was communication from the ER nurse to the floor nurse when the patient report is given. It was noted that now at times there are multiple phone calls due to information missed during the patient report, which is an essential part of the patients' care. In hopes to reduce this, it is highly recommended to use the SBAR form of communication. Through using the SBAR form, the floor nurse can get a clear picture of the status of the incoming patient. This process will help to improve patient flow from the emergency room to floors and ultimately to improve patient safety. Please see Appendix E for further details.

IMPLEMENTATION ISSUES

Many great recommendations came out of the kaizen blitz. However, even though the staff members were at the forefront of this initiative and there was employee buy-in from all areas, there were still implementation issues. The process was paused due to various reasons and issues that are in the process of being resolved. This is a typical result of change initiatives, "…fundamental organizational change such as TQM is often misunderstood, resisted, and ultimately, doomed to failure" (Reger, Gustafson, Demarie, & Mullane, 1994). There was resistance to change; people are comfortable with the way that things have always been done and they are unwilling to change. "This perspective suggests that programs presented as radical departures from the organization's past fail because the cognitive structures of members, whose cooperation is necessary for successful implementation, constrain their understanding and support of the new initiatives" (Reger, Gustafson, Demarie, & Mullane, 1994). This is an issue not with the staff members working with the kaizen blitz, but with the upper level nursing supervisors.

To go along with this, there is not a strong push from upper management to go through with the implementation; if upper management does not support change, then there is no reason for implementation because there are no incentives to change. "…the implementation of TQM often flounders because it is improperly framed by top management" (Reger, Gustafson, Demarie, & Mullane, 1994). The lack of communication between Colleen Sullivan, the Director of Care Management, and upper management to get someone with power to step in and help guide this project to completion is detrimental to its success. This will be a good solution to part of the problem once there is a clear line of communication established. Once the blitz team has the full support of upper management, incentives can be put in place so that the changes will be continued and there is a reason for all staff members to abide by the new patient flow process.

There is also a lack of trust between the floor and emergency department nurses, partially due to a lack of communication and understanding of each other's responsibilities. Without complete trust, the initiatives will not work properly. In order to counteract this, there needs

to be constant communication before, throughout, and after the blitz, in addition to cross-functional teams and observations so that the nurses can see each other's point of view.

There is already a shortage of beds at Backus Hospital, especially during the peak admit time, and although this process is clearly necessary to help reduce the bed shortage, it cannot be implemented under those circumstances. An external factor distracting the employees is the fact that Wellspring Consulting recently came in to analyze the organization, make recommendations and help Backus Hospital to reduce its costs. Currently, the consensus at the hospital is that the cost issue is more important than the kaizen blitzes to improve patient flows; therefore, the project has ceased for now. Until upper management places this project as a priority, it will not be completed. The kaizen blitz events need to be seen as in conjunction with Wellspring Consulting's recommendations to reduce costs instead of two separate issues.

Policies Not Yet Implemented

Policy For Admit Procedures During Shift Changes

Phone Report from ED Nurse to Floor Nurse: The 7am-7pm Nurse working the floor will take the report and pass it on to the admitting Nurse after the shift report is complete. In all other circumstances, if the floor Nurse is unavailable, the ED Nurse will call back in 15 minutes. If in 15 minutes the floor Nurse is still unable to take the report, the Clinical Coordinator or Relief Charge Nurse will make herself available and then pass it on to the appropriate RN. Any issues on the floor that interfere with the process need to be immediately reported to the Nursing Supervisor.

Policy for Floor Status/Acuity Report

The first half an hour of every shift, the charge nurse on the floor will get a report from the off going charge nurse. After receiving the report, the charge nurse will then call the nursing supervisor for that shift to give an update on immediate beds available at that time. The Nursing supervisor will collect a report of bed availability from every floor and then go to registration to discuss beds that are available at that time for immediate placement. Registration will call charge nurse directly on their charge phone to place a patient. The

Charge nurse will give a bed placement to that patient on the first phone call from registration. The Charge nurse may only refuse placement for that patient for the following reasons:

- The patient is an inappropriate fit per diagnosis for the room or floor (including but not limited to: telemetry on non telemetry floor, post op patient to room with infectious patient, VIP patient with no private room available)
- The floor is not staffed for additional patients (at full capacity for nurses per patient ratio) with knowing there are no definite discharges to happen in the near future.

If the charge nurse does not accept a patient that registration tries to place on that floor for the above reasons, a call must be placed to the nursing supervisor with a reason so that documentation can be made.

If the charge nurse places a patient but needs more time before the patient comes to that floor due to issues that have emerged in that time, (example: high acuity or emergent situations i.e. rapid response or code) a call must be placed to the nursing supervisor to explain. The Nursing supervisor will contact registration.

FUTURE RECOMMENDATIONS

Through designing this kaizen blitz, it has allowed the Backus Hospital staff to identify other areas of improvement in a realistic and sequential manner. Therefore, other kaizen blitzes may be implemented as soon as possible to add to the kaizen events and work toward continuous improvement throughout all areas of the hospital. Overall, the kaizen events, A3 processes and rapid cycle improvement processes from the Toyota Production System have proven to work well up to this point and there has been positive feedback from the team and hospital staff. It is in the best interest of Backus Hospital to continue to implement new changes and accept suggestions from employees, stakeholders, and even customers.

Evaluate Discharge Processes:

In order for the patient flow process changes to work, a morning discharge policy must be implemented. Nothing else can be implemented if no patient beds are available. At this time, the highest number of discharges and the highest number of admits occur during the second shift. Subsequently, there simply are not enough beds during the second shift and there will continue to be a bottleneck until the discharge process is improved. Afterwards, the rest of the process changes will fall into place. Pushing discharges earlier in the day should move ED patients into the most appropriate care setting sooner.

The high volume of discharges in the afternoon pushes bed cleaning into the peak admit times when there are fewer EVS personnel. During the first shift only, there is an EVS on each unit, which means hospital discharge policy is pushing bed cleaning to a time when there are fewer personnel available.

Admitting Floor Nurse:

Develop a process similar to the Admitting Physician in ED with a nurse on each floor responsible for admissions. This could possibly shift duties to allow time to process admissions. This recommendation would use at large nurses as availability allows instead of new hires.

Evaluate Transport Processes:

Current transport processes require Nurses, Paramedics, and PCTs from floor and/or the emergency department. All the recommendations that follow have an important impact on patient flows, reducing costs, and increasing patient and employee satisfaction. The Dedicated Transport Team that will be implemented in the future will allow nurse and staff free time to be increased and patients will get to their specific floors faster. The floor nurses would also like the Dedicated Transport Team to help alleviate workload planning. The nurses expect patients within minutes of being notified that they will be coming to a floor and if there is a delay, there becomes uncertainty on the floor and treatment is put off for other patients in expectation of a new patient arriving. Data needs to be tracked from the time it takes from when a floor is notified of a patient coming to the actual patient departure from the emergency department to determine if this is an issue. In addition, new employees need to go through orientation training to get them familiar with the standardized processes so that they may be on board with the changes in patient flow processes.

Evaluate Processes When Patient Accepted on Floor But Delays from ED in Patient Arriving on Floor:

Work load planning on the floor is impacted when a patient is expected and there is no notification that patient transport to the floor will be delayed. Need to track time from bed assigned to departure from ED.

Orientation Training:

Training for new employees should include the flow process policies.

Observation Unit:

This is an area in the emergency department where patients can go that do not need immediate emergency care.

Prioritizing Admits in ED:

To determine if prioritizing admits would have a positive impact on the ED, the floors, the hospitalists. Also, to determine if prioritizing admits would have any impact on discharges.

To determine if a change in expectations for the time chest pain patients move to the floors would impact patient satisfaction, impact on ED, floors, and hospitalists.

APPENDICES

Appendix A – Excerpt From Kaizen Brochure: Patient Flow Task Force, Project 1

NEXT STEPS

STEP 3: Use PDCA (Plan-Do-Check-Act) Cycle

- Kaizen requires standards – standard specifications, standard processes, standard systems, standard procedures, standard work instructions …
- Think of it as SDCA (Standardize, Do, Check, Act)

- Plan (Standardize): create a plan for change
  - Identify specifically what we want to change
  - Define the steps we need to make the change
  - Predict the results of the change
- Do: Carry out the plan in a trial or test environment
  - Do this on a small scale – under controlled conditions
- Check: Examine the results of our trial
  - Verify we have improved the process
  - If we have – consider implementing it on a broader scale
  - If we have not – go back and try again
- Act: implement the changes on a broader scale
  - Update the standard operating procedures

GREAT WORK!

Thank you for all the energy, sharing, and work you have put into this project.

Appendix B – Orientation

Orientation

Introduction and Purpose

Facilitators

Colleen Sullivan
Angela Wicks

Purpose:

Improve care for the patient by improving the admit order to bed process

Ensure the patient is receiving the best possible care in the most appropriate setting.

First, we want to focus on reducing the time from admit order to the placement of the patient in a bed on the appropriate floor.

Rules of the Room:

What is said and done in this room, stays in this room.

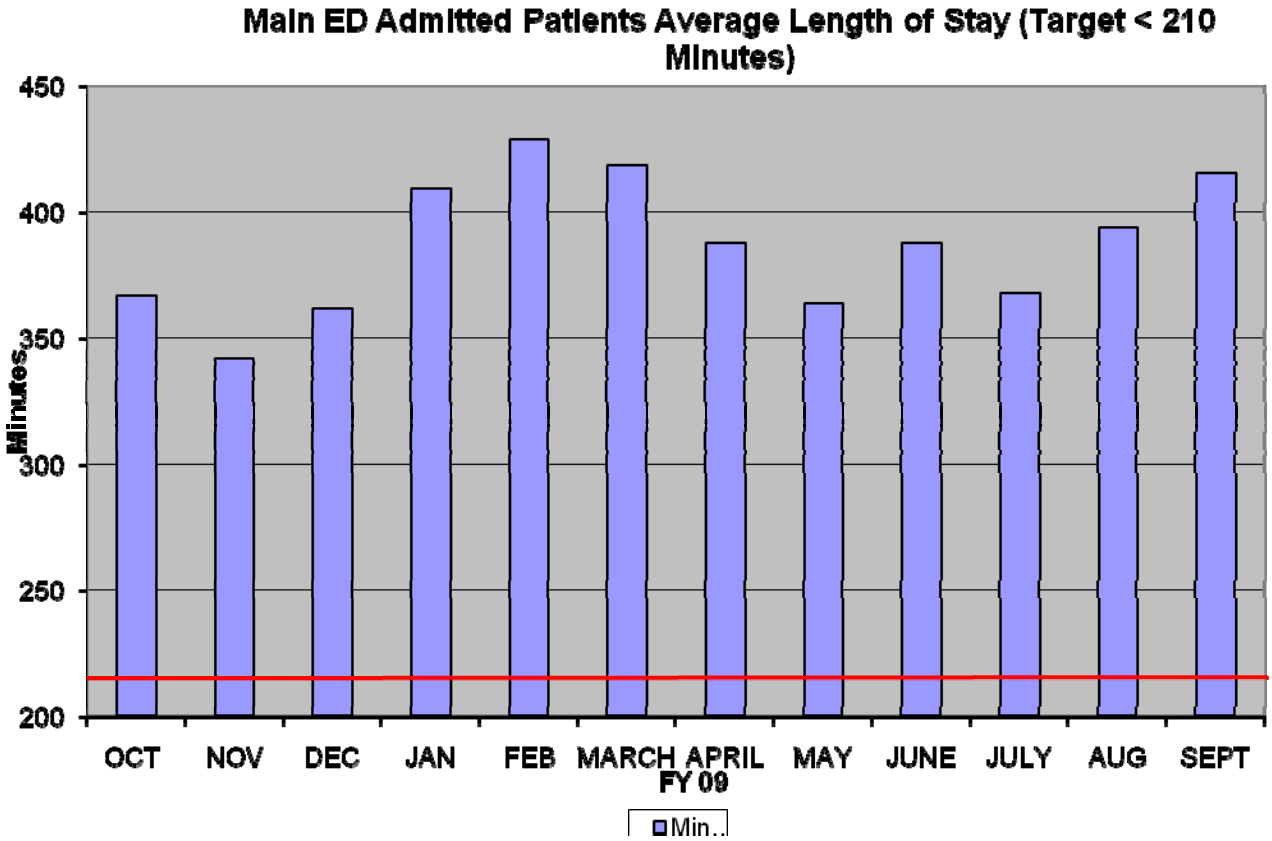
No criticism. We want to listen to all ideas; even far out ideas may provide a kernel of wisdom we can use.

No placing blame.

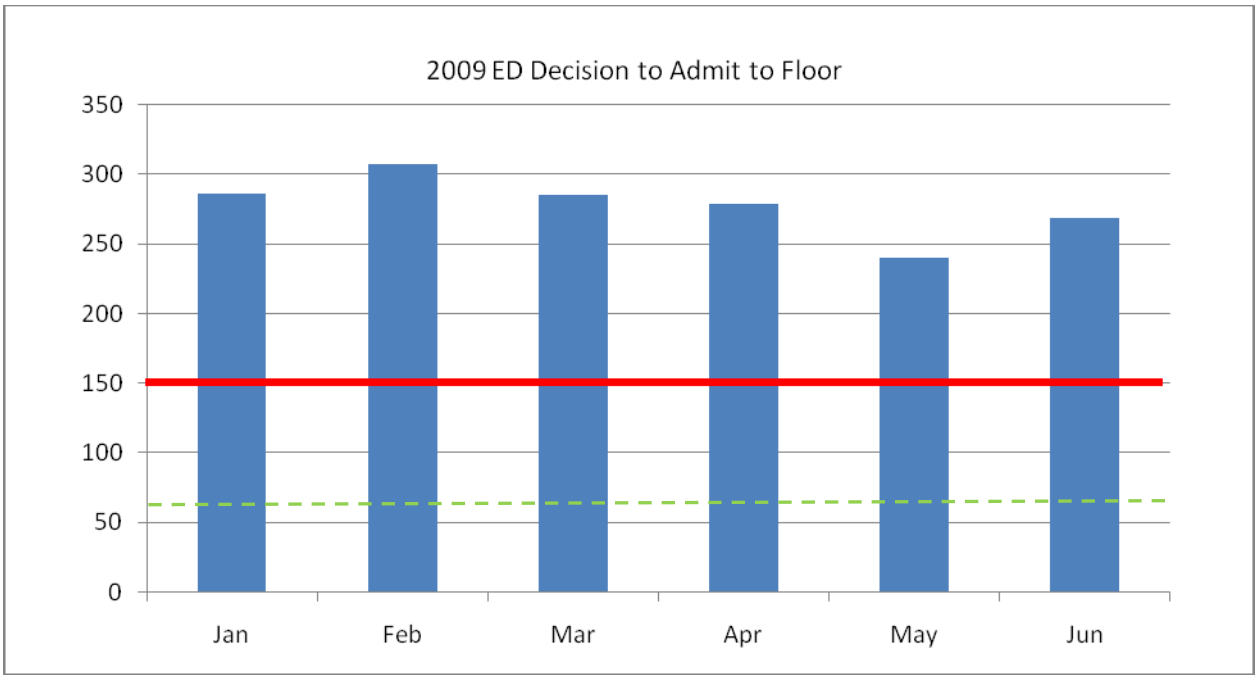
We do not want to dredge up the past, but accept this is where we are and move forward from this point.

The Problem, Goals, and Objectives

The red line at 210 minutes is the national average length of stay; the blue columns indicate where we stand through September of this year. We are averaging just over 387 minutes.



State Average time from decision to admit to bed placement is 150 minutes; the blue columns indicate where we stand through June of this year. We have no data on the time from admit order to bed placement; anecdotal information indicates that we are averaging about 88 to 98 minutes for this segment of the process.



Our Goal: Patient Safety First!
60 minutes
We probably will not get there in this first attempt; but this is a start, and we will keep trying to improve.

Benchmark:
St. Luke's of Kansas City
Currently at 45 minutes; implementing an electronic records system in January and expect to reach their 30 minute goal.

Mapping the Current Process

Why do this?

Shift from "gut feel" understanding to "Measurable" and "Quantifiable" understanding

Support or disprove preconceived ideas and theories

Determine a baseline of current process performance

Develop metrics to measure the impact of changes on a process

Identify and understand relationships that might help explain process variation

Data?

Do we need to make any changes in the way the data has been tracked?

Customers

Be sure to identify all our customers in these processes and understand how process impacts all these customers. Suppliers; Inputs; Process; Outputs; Customers; and Boundary.

Creating a Process Map of the Current State

We want to graphically create the steps, actions, and operations that constitute a process to create a clear picture of the current process.

Use basic shapes:

- Start/Stop
- Task/Activity
- Decision Point
- Direction of Flow

arrows

Identifying Waste in the Current Process

1. Confusion: People doing the work are not confident about the best way to perform tasks
    a. Examples: Same activities are being performed in different ways by different people; unclear MD orders; unclear routes for medication administration

2. Motion (Movement): Is there unnecessary (non-value-added) movement of parts, materials, or information between processes?
    a. Examples: Looking for information; looking for materials or people; clarifying orders; materials, tools located far from the work

3. Waiting: Idle time created when people, information, equipment, or materials are not at hand
    a. Examples: Waiting for other co-workers to give report; arrive at a meeting; have the OR ready; finish a procedure

4. Processing (Extra Processing): Activities that do not add value from the patient's perspective. When unnecessary hands (and brains) touch the patient or product
    a. Examples: Clarifying orders; redundant information gathering/charting; missing medications; regulatory paperwork

5. Defects: Work that contains errors or lacks something of value. Does the process result in anything the customer would deem unacceptable?
    a. Examples: Medication errors; re-work; variation in outcomes; surgical errors

6. Overproduction: Redundant work. Are we producing sooner, faster, or in greater quantity than the customer needs?
    a. Examples: duplicate charting; multiple forms with the same information; copies of reports sent automatically

7. Inventory: More materials on hand than are needed to do the work.
    a. Examples: overstocked medications on units; overstocked supplies on units and in warehouse

Mapping the Ideal Process

- Process Design
    - Are there steps that can be eliminated?
    - Are there steps that we can combine?
    - Should the order of the steps be changed?
    - Can we simplify the process?
- Error Proofing
    - Implementing process checks to ensure quality and time input and output
- Five S's
    - Sorting: eliminating unneeded work or prioritizing work
    - Simply Access: keep needed items easily accessible
    - Standardization: standardize the process work
    - Shining/Scrubbing: keep work environment clean and free of clutter
    - Self-Discipline: instilling continuous improvement as a way to work

Selecting the First Projects

Focus on Quick Wins:

- Easy to Implement
- Reversible
- Fast to Implement
- Within the Team's Control
- Inexpensive to Implement

Appendix C – Patient Flow: Admit Order to Floor Rapid Cycle Improvement Project: Minutes

Patient Flow: Admit Order to Floor
Rapid Cycle Improvement Project
Minutes
November 11, 2009

Members

Melanie Long; Amy Weidner; Carla Jordan; Christine Lefebvre; Mary Wissell; Valerie Maricle; Claire Lamonica; Sondra Sherman; Regina Barnhill; Susan Prokop; Jamey Levis; Kathleen Gauthier; Naomi Nomizu, MD; Megan McInnis

Facilitators: Colleen Sullivan, Director of Care Management
Angela Wicks, Assoc. Professor, Bryant University

Reason for Action

Problem Statement:

Non-standardization of process to assign patients to beds; lack of accountability

Platform:

Patient Safety and Standardization

Boundaries:

Admit Order to Discharge from ED

Initial State

- 2009 to date: Main ED Admitted Patients Average Length of Stay averaging just over 387 minutes
  - National Average LOS 210 minutes
- January to June of 2009: ED Decision to Admit to Discharge averaging just over 277 minutes
  - Industry standard is 120 minutes
- Averaging about 88 to 98 minutes from receipt of admit order to discharge to floor
  - Initial Goal: less than 60 minutes
- 50% of admissions occur between 3:00 p.m. and 11:00 p.m.
- Outpatients using inpatient beds for transfusions, IV meds, and chemo
- Most discharges occur between 1:00 p.m. and 7:00 p.m.
- Shift changes occur at 2:30 p.m. to 3:00 p.m., 10:30 p.m. and 11:00 p.m., and 6:30 a.m. to 7:00 a.m.
- Fewer EVS personnel scheduled during 2nd and 3rd shifts
- Nursing matrix
- Bed Meeting scheduled at 5:00 p.m.

- Major Problem: Bed Placement during 2nd and 3rd shifts
  - Many people are involved in the process (bed registrars, clinical coordinators, and nursing supervisors)
  - Often numerous telephone calls before resolution of each placement
  - No one person is responsible or accountable for bed placement
  - No standardization or verification of processes
- It is unclear how to measure the time for this segment of the patient flow process
  - The initial handoff of the Admit Order is not standardized, sometimes received by the Bed Registrar and sometimes by the ED Unit Coordinator

Target State:

Scope of the first Kaizen Event for Patient Flow: Time from when Admit Order is received by Unit Coordinator to assignment of bed. The process begins when the Admit Order is scanned into the system

Step 1:
Physician gives Admit Order to Unit Coordinator (STAT orders, if any, noted on admit order and given verbally)
Step 2:
Unit Coordinator scans order into system
Step 3:
Unit Coordinator notifies Nursing Supervisor in Charge of Bed Placement
Step 4:
Nursing Supervisor assigns patient to a bed

Secondary Analysis:

It appears to be unclear who should receive the Admit Orders. Either the Bed Registrars or the ED Unit Coordinator could receive the order. Sometimes neither receives.

Although this step is not part of the scope of the initial project, this could be a relatively simple fix that could significantly impact the time a patient spends in the ED.

Gap Analysis

Problem	Root Cause
Admissions/Discharges/Personnel	More complex bed placement; later day discharges delay bed availability into peak admission hours; staffing structure changes for 2nd and 3rd shifts; fewer EVS personnel
Shift changes	A patient safety issue if new admissions are sent up during handoffs; floors will not accept patients during handoffs
5:00 Bed Meeting	Delays in floor admissions until after bed meeting clarifies bed availability and staffing levels; fewer bed assignments accepted between 3 and end of bed meeting
No one person responsible	Too many hands on the process result in multiple phone calls and lack of accountability; process fragmented. Bed registrar calls floor based on bed availability indicated in system; if patient fits bed criteria (m/f, contact type, etc.) and if staffing levels appropriate, patient accepted. If not, floor notifies bed registrar and process is repeated.
Lack of process standardization	Bed placement processes are different across time shifts; lack of consistency
Staffing matrix	Results in refusal of new patients based on matrix recommendation of patient/nurse ratios
Unclear where the process starts	No central location for delivery of admit orders results in delay in bed placement

Solution Approach

If we change this	This will happen
Bed placement becomes the responsibility of a nursing supervisor	• Part of the nursing supervisor's job is to be aware of the conditions on the floors (room restrictions, staffing levels, etc., inpatient/outpatient issues); should result in a smoother and faster placement process. One person becomes responsible and accountable for bed placement. Patient safety will be more effectively addressed by more quickly placing the patient in the most appropriate location; should result in fewer inpatient transfers. • Should result in more consistent criteria application
Develop a standardized process for delivery of Admit Orders	• Avoid delays and confusion whether all appropriate personnel have seen the Admit Order; avoid scanning redundancies

Rapid Implementation Experiment

Plan:

- Process development and a test conducted during 2nd shift Test Admission will occur on 11/17/09.
- "Live" patient tests on 11/18/09 after test review and process changes if required

Expected Results:

- Increased Patient Safety
  - Patient in most appropriate location faster
  - Only one person responsible so more consistent application of decision criteria
  - Nursing supervisor more aware of conditions on the floors so patient can be sent up to floor at a time that will not conflict with shift handoffs
- Improved Patient Satisfaction
  - Into a bed faster
  - Fewer between room/between floor transfers
- Improved Employee Satisfaction
  - A more streamlined process with fewer phone calls to interrupt patient care
  - Patients transferred from ED at more appropriate times

Appendix D – Patient Flow Task Force: Project 1: ED Patient Admit Order to Floor

Slide 1

Patient Flow Task Force

2009

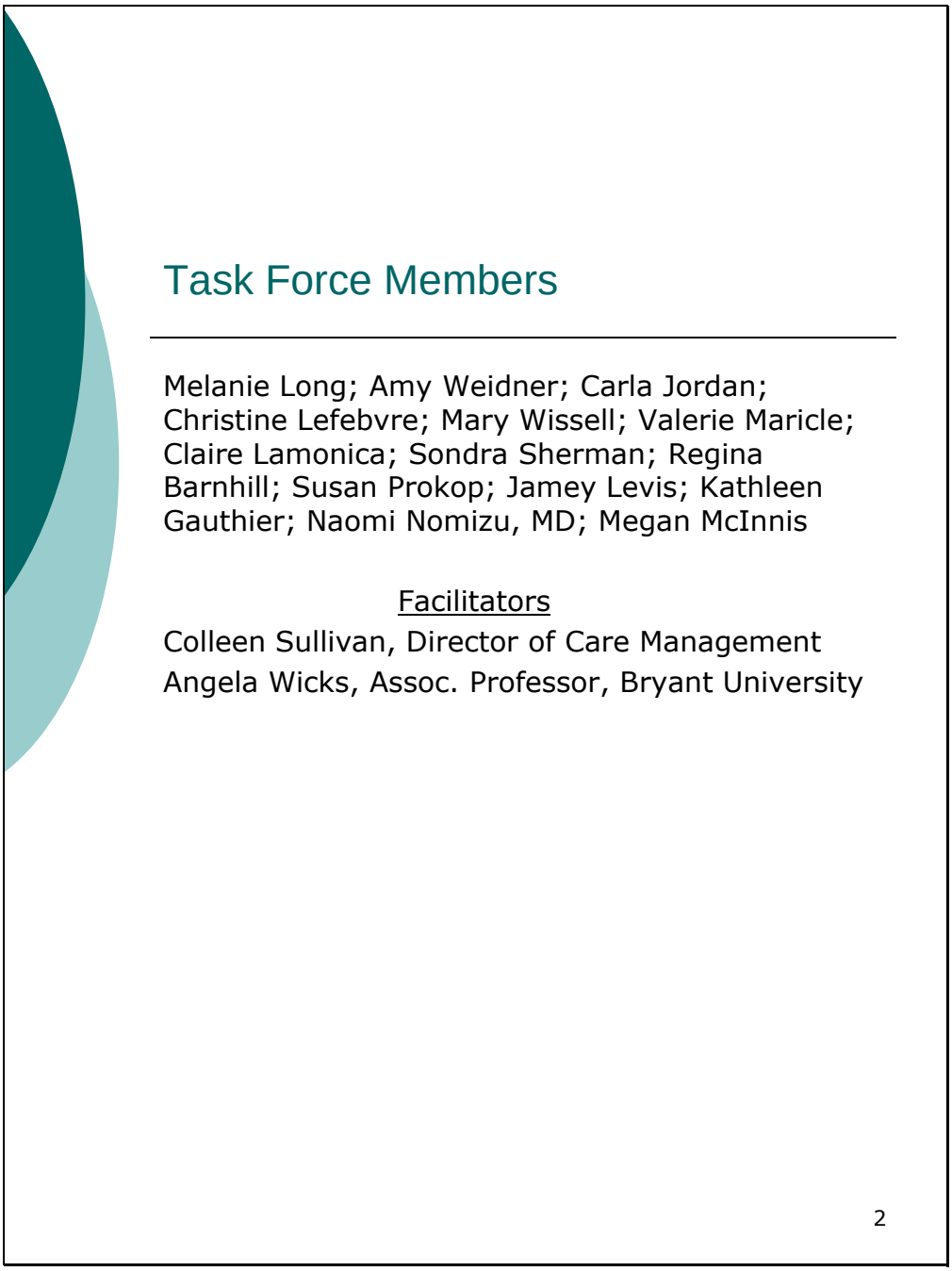
Project 1

ED Patient Admit Order To Floor

Kaizen Blitz Recommendations
December 4, 2009

1

Slide 2


Task Force Members
Melanie Long; Amy Weidner; Carla Jordan; Christine Lefebvre; Mary Wissell; Valerie Maricle; Claire Lamonica; Sondra Sherman; Regina Barnhill; Susan Prokop; Jamey Levis; Kathleen Gauthier; Naomi Nomizu, MD; Megan McInnis
Facilitators
Colleen Sullivan, Director of Care Management
Angela Wicks, Assoc. Professor, Bryant University
2

Slide 3

Reason for Action

ED Length of Stay

Main ED Admitted Patients Average LOS
National Avg: 210 minutes
Backus Avg: >387 minutes

ED Decision to Admit to Discharge
Industry Standard: 120 minutes
Backus Average: 277 minutes

Receipt of Admit Order to Discharge to Floor
Averaging 138.83 minutes (May-Oct)
Goal: less than 60 minutes

Non-Standardization of the Process of Assigning Patients to Bed

Lack of Accountability

3

Slide 4

Issues Identified With The Current State

50% of admissions occur between 3-11 p.m.

Most discharges occur between 1-7 p.m.

Outpatients using inpatient beds for transfusions, IV meds, and chemo

Shift changes at 2:30 p.m., 10:30 p.m., 6:30 a.m.

Fewer EVS personnel scheduled during off shifts

Nursing matrix

Bed Meeting scheduled at 5:00 p.m.

4

Slide 5

Major Problems Identified with Bed Placement Process for Second and Third Shifts

Many people are involved in the process (bed registrars, clinical coordinators, and nursing supervisors)

Often numerous telephone calls before resolution of each placement

No one person is responsible or accountable for bed placement

No standardization or verification of processes

It is unclear how to measure the time for this segment of the patient flow process

The initial handoff of the Admit Order is not standardized, sometimes received by the Bed Registrar and sometimes by the ED Unit Coordinator

5

Slide 6

Solution: Creating a Pull System from the Floors for Bed Placement

Implementation Requirements:

Floor status and acuity report prepared during shift handoff by Clinical Coordinator

Floor status and acuity reports sent to Nursing Supervisor by 7:30 a.m., 3:30 p.m., and 7:30 p.m.

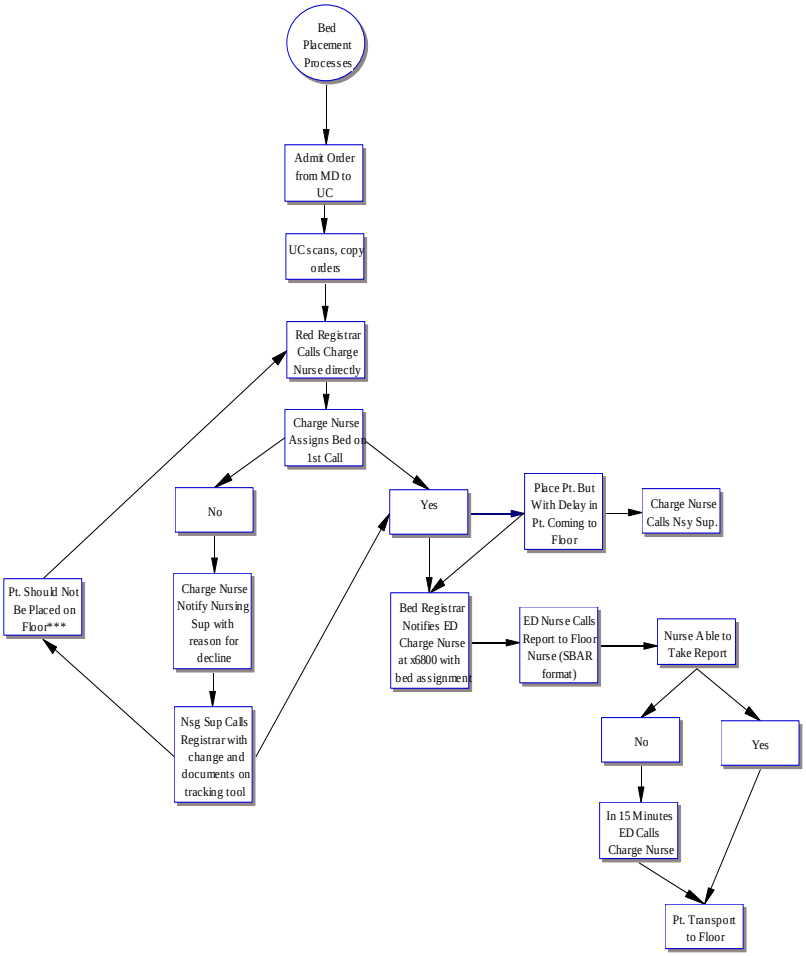
Nursing Supervisor contacts the Bed Registrar with Bed Placement availability by floor

Please see the Flowchart on the next page for the remainder of the process.

6

Slide 7

Recommended Flow of the Redesigned Process



*** Bed Registrar Calls Charge Nurse Directly on next most appropriate floor and process repeats.

7

Slide 8

Recommendations:

Changes to Bed Board Access:

Clinical Coordinators and Relief Charges: access to their floors with edit capabilities

Unit Coordinators and Monitor Techs: access to their floors with edit capabilities

Nursing Supervisors: access to entire hospital; no edit capability

Benefits:

Will allow the floor to update patient data with changes in patient status (e.g., changes in diagnosis, changes in room requirements, etc.).

Will provide Nursing Supervisors with real-time report on floor status and acuity

Will provide Bed Registrars with real-time data on bed availability changes

Implementation Requirements:
Change in access codes by IT
Bed Board Training for Clinical Coordinators, Relief Charges, Unit Coordinators, Monitor Techs, and Nursing Supervisors

8

Slide 9

Recommendations:

Changes That Can Be Made With Minimal Resources

Bed Registrar can stop scanning Admit Orders: The Unit Coordinator is already scanning the Admit Order, which is available to the Bed Registrar on the Bed Board. In the new process, the Unit Coordinator will receive the Admit Order from the MD, scan in the Admit Order, and then call the Bed Registrar that an admit order has been scanned into the system.

Implementation Requirements:
Advise all Bed Registrars of Admit Order Location
Advise all ED MDs of standardization of Admit Order delivery to Unit Coordinator

Provide Bed Registrars with correct numbers for the Charge Nurses on each floor and in ED:

Implementation Requirements: Provide all Bed Registrars with a laminated card of phone numbers

Ensure Charge Nursing giving bed on first call:

Implementation Requirements: Advise all Charge Nurses of the Change in Policy (a draft of the new policy is attached)

Consistent 24/7 Phone Number for Bed Registrars:
Bed Registrar can be reached at 2271 24/7

Implementation Requirements: Registrars must carry portable phone during 2nd and 3rd shifts; advise offshift Bed Registrars to always carry and answer the portable phone

9

Slide 10

Recommendations:

Changes That Can Be Made With Minimal Resources

Accountability for Not Taking a Patient on the Floor: The Nursing Supervisors will track "No's" when Units cannot take patients. Monthly reports are submitted to the Clinical Directors, Nursing Supervisors, Karen Long, and Dr. Sidman. (A draft of the policy is attached.)

Implementation Requirements: Create a reporting format and advise Nursing Supervisors of the change in policy.

Implementing the Bed Board Report in lieu of the Nursing Report:
A real-time status/acuity report is available on Bed Board.

Benefits of Adoption:
Currently the hand-written reports indicate status as of 12 noon; the Bed Board report provides a better status picture in real time.
Improves readability
Saves time:
- *Eliminates data entry redundancies*
- *Eliminates the need for the Bed Meetings*
- *Eliminates need for hand-written reports*

Elimination of the Bed Meeting Removes delay in placing patients in a bed

Implementation Requirements: In addition to the training requirements discussed in the Changes to Bed Board Access, specific training for the Nursing Supervisors on creating and using the Bed Board Report. Need to provide for automatic printing of the Bed Board Report so the Nursing Supervisor has a current report at shift change

10

Slide 11

Recommendations:

Changes That Can Be Made With Minimal Resources

Change in Admit Procedures During Shift Change:

Problem: Currently there is a delay in accepting patients because of the shift change meetings.

Solution: During the meeting, the 7-7 Nurse or Charge Nurse will accept a bed placement from the Bed Registrar. If a patient arrives on the floor during the meeting, the 7-7 Nurse or Charge Nurse will accept the patient on the floor, check for patient stability, and move the patient into a room. If there are any issues on the floor, the Unit Coordinator will be contacted. (A draft of the policy is attached.)

Implementation Requirements: Advising the 7-7 Nurses and Charge Nurses of the change in policy.

Change in the ED Nurse to Floor Nurse Reporting Policy:

Problem: Delays in reporting and time wasted in phone calls

Solution: If the Floor Nurse is unavailable (e.g., in a contact room) and if the Nurse has given permission, the Charge Nurse will take the report. If the Floor Nurse has not given permission, the ED Nurse calls back in 15 minutes. If the Floor Nurse is unavailable at that time, the report is given to the Charge Nurse. In both instances, the Floor Nurse calls the ED nurse with any questions. (A draft of the policy is attached.)

Implementation Requirements: Advising ED and Floor Nurses of the change in policy

11

Slide 12

Recommendations:

Changes That Can Be Made With Minimal Resources

Standardized Use of the SBAR Form for the ED/Floor Patient Report: The use of the SBAR Form will create a standardized process for patient handoffs so errors of omission are minimized. A Hospital Policy is already in place for the use of the SBAR.

Implementation Requirements: Advising all Nurses of the existing policy. Pads of SBAR forms can be created in the Print Shop and placed in the ED and on the counters on all the floors.

Standardized Physician Guidelines for Patient Bed Placement:
Some delays occur because of incorrect or insufficient information. Dr. Nomizu has created a one-page summary of Bed Placement Guidelines for ED Physicians. The summary will be laminated and placed in the ED for quick reference.

Posting of Results and Acknowledgments:
The Task Force suggests that a more formal set of processes be developed to post results and acknowledge improvement to the flow process.

Implementation Requirements: Adding the results to the Dashboard currently under development. Preparing Newsletter Articles to showcase the Kaizen Events and their results. Newsletter articles acknowledging process flow best practices and best floor results, etc.

12

Slide 13

Recommendations:

Changes That Can Be Made With Minimal Resources

Data Availability: The following data would help track the performance of the flow process.

The time from receipt of Admit Order by Unit Coordinator to department from ED.

It was suggested that this data be posted on Dashboard

Time from Bed Assigned to Departure from ED

Number of Admits/week/hour/floor

Number of Discharges/week/hour/floor

Number of Post Ops/week/hour/floor

Time of discharge of hospitalists' patients from the hospital

13

Slide 14

Future Recommendations

Admitting Floor Nurse:

Develop a process similar to the Admitting Physician in ED with a nurse on each floor responsible for admissions. Could possibly shift duties to allow time to process admissions instead of new hires; use at large nurse as availability allows.

Evaluate Discharge Processes:

The highest number of discharges and the highest number of admits occur during second shift. Pushing discharges earlier in the day should move ED patients into the most appropriate care setting sooner.

The high volume of discharges in the afternoon, pushes bed cleaning into the peak admit times when there are fewer EVS personnel. First shift only: EVS on each unit.

Evaluate Transport Processes:

Current transport processes require Nurses, Paramedics, and PCTs from floor and/or ED.

14

Slide 15

Future Recommendations

Evaluate Processes When Patient Accepted on Floor But Delays from ED in Patient Arriving on Floor:

Work load planning on the floor is impacted when a patient is expected and there is no notification that patient transport to the floor will be delayed. Need to track time from bed assigned to departure from ED.

Orientation Training:

Training for new employees should include the flow process policies.

Prioritizing Admits in ED:

To determine if prioritizing admits would have a positive impact on the ED, the floors, the hospitalists.

To determine if prioritizing admits would have any impact on discharges.

To determine if a change in expectations for the time chest pain patients move to the floors would impact patient satisfaction, impact on ED, floors, and hospitalists.

15

Appendix E: Patient Flow: Final Minutes and Policy Memos

Patient Flow: Admit Order to Floor
Rapid Cycle Improvement Project
Consolidated Minutes
November 18, 2009

Members

Melanie Long; Amy Weidner; Carla Jordan; Christine Lefebvre; Mary Wissell; Valerie Maricle; Claire Lamonica; Sondra Sherman; Regina Barnhill; Susan Prokop; Jamey Levis; Kathleen Gauthier; Naomi Nomizu, MD; Megan McInnis

Facilitators: Colleen Sullivan, Director of Care Management
Angela Wicks, Assoc. Professor, Bryant University

Recommendations for Immediate Implementation

Changes to Bed Board:

- Clinical Coordinators and Relief Charge: access to their floors and edit capability
- Unit Coordinators and Monitor Techs: access to their floors and edit capabilities
- EVS: entire hospital and telephone update system
- Nursing Supervisors: entire hospital; no edit capability

Benefits:

- Allows floor to update patient data on changes in patient status (e.g., changes in diagnosis, changes in room requirements such as need to move to private room), discharges, etc.
- *Training Sessions Will Be Required*

Changes to Admit Order Scanning Processes:

- Change Name of Report from Physician Orders to Pharmacy to Admit Order so easier for access
- Scan One Time; now scanned three times in three different areas:
    - Scanned by Unit Coordinator
    - Available to Pharmacy
    - Available to Bed Registrar
    - Available to EMR

Benefits:

- Eliminates redundancy in the process. Now scanned three times: once by the Unit Coordinator for Pharmacy, once by Bed Registrar, once by EMR for Patient Records.

Deleting Nursing Report:

- A real-time bed board report is available

Benefits:

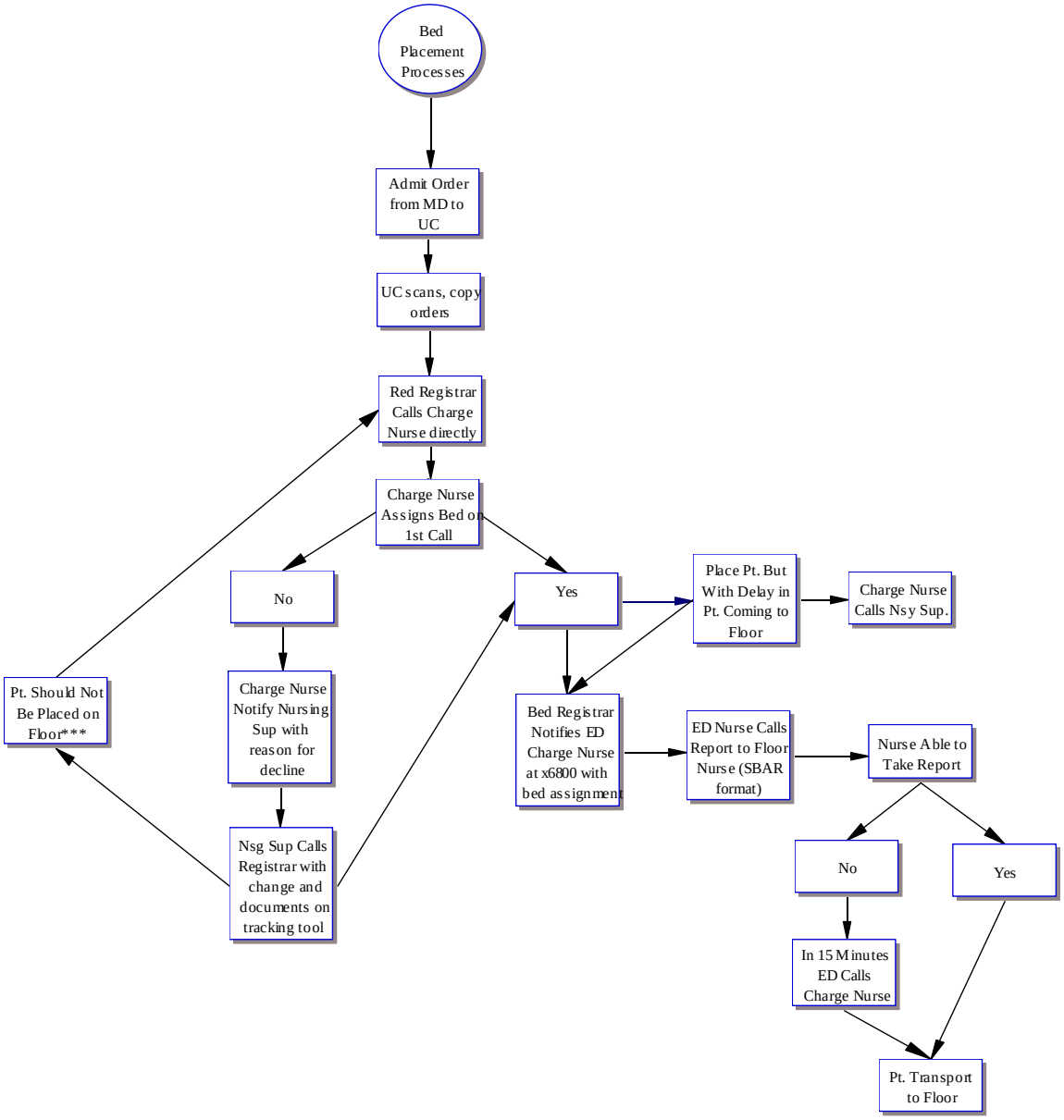
- Currently the hand-written reports indicate status as of 12:00 noon, so better status picture available in real time.
- Improves readability
- Saves lots of time
- Eliminates data entry redundancies in the process, so saves time
- Can eliminate the bed meeting
- Removes delay in placing patients in bed since not waiting for bed meeting at 5:00 p.m.

Creating a Pull System from the Floors for Bed Placement:

- Floor status and acuity report prepared during shift handoff by Clinical Coordinator.
- Floor status and acuity reports sent to Nursing Supervisor by 7:30 a.m., 3:30 p.m., and 7:30 p.m.
- Nursing Supervisor contacts Bed Registrar with Bed Placement availability by floor
- Bed Placement Process
    - Step 1: Bed Registrar assigns patient to a bed
    - Step 2: Bed Registrar calls Charge Nurse to accept patient
        - *3x5 Cards with Charge Nurse Phone Numbers prepared Bed Registrars*
    - Step 3: Charge Nurse Accepts Patient on First Phone Call
        - Yes: patient sent to floor
        - Yes, but delayed acceptance (room needs to be cleaned)
        - No:
            - If change in staffing
            - If diagnosis not clinically appropriate for bed
            - Must notify Nursing Supervisor
                - Makes Decision to take Patient or
                - Assign to another floor
            - Nursing Supervisor documents justification for not accepting patient

- Patient Placement on Floors reviewed at Monthly Meetings
- Bed Registrar calls next floor

- Step 4: ED Nurse Report to Floor Nurse
  - If Floor Nurse unavailable (e.g., in contact room), if permission from Floor Nurse, report to Charge Nurse
  - If Floor Nurse unavailable and no permission to report to Charge Nurse, ED Nurse calls back in 15 minutes
  - If Floor Nurse unavailable, report to Charge Nurse
  - Floor Nurse calls ED nurse if any questions
- Accountability
  - Monthly Reports to Clinical Directors, Nursing Supervisor, Karen Long, Dr. Sidman



*** Bed Registrar Calls Charge Nurse directly on next most appropriate floor and process repeats.

Admit Procedures During Shift Changes

- If 7am-7pm on duty: covers admissions
- If no 7am-7pm on duty: charge nurse covers admission
    - Accepts bed placement from Bed Registrar
    - Accepts patient on the floor; checks stability and moves into room
- If issues on floor, Unit Coordinator is contacted

Standardized Use of SBAR form ED/Floor Report

- The Task Force highly recommends the use of the SBAR
- Pads of SBAR forms should be available in the ED and on the counters on all the floors
- Print Shop can create pads of forms

Benefits

- Creates a standardized process for patient handoffs so errors of omission are minimized

Standardized Physician Guidelines for Patient Bed Placement:

- A one-page summary of bed placement guidelines have been developed by the Task Force; will be laminated and strategically throughout ED. Draft of new policy is attached.
    - *ED Physicians and Hospitalists will be notified of guidelines.*
    - *Key Process Change: All Admit Orders will be delivered to the Unit Coordinator.*
- *Standardized Process needed for remote tele patients in ED*
- *Add: Bariatric bed to private room*

Flow of Admit Orders in the ED:

- Step 1: Physician delivers Admit Order to Unit Coordinator
- Step 2: Unit Coordinator scans Admit Order
- Step 3: Unit Coordinator calls Bed Registrar that Admit Order is Scanned

Acknowledgements

- More formal positive acknowledgement of improvements to the flow process
- Show results
- Newsletter Articles

Immediate Changes That Can Be Made Without Approval/Resources

- Bed Registrar can stop scanning Admit Orders
- Ensure Bed Registrar is calling the correct person
- Ensure Charge Nursing giving bed on first call
- Bed Registrar can be reached at 2271 24/7; Registrars must carry portable phone during 2nd and 3rd shifts
- Nursing Supervisors will track No's when Unit cannot take patient
- Automatic timing for printing Bed Board Report

Future Recommendations

Admitting Floor Nurse:

Develop a process similar to the Admitting Physician in ED with a nurse on each floor responsible for admissions. Could possibly shift duties to allow time to process admissions instead of new hires; use at large nurse as availability allows.

Evaluate Discharge Processes:

The highest number of discharges and the highest number of admits occur during second shift. Pushing discharges earlier in the day should move ED patients into the most appropriate care setting sooner.

The high volume of discharges in the afternoon, pushes bed cleaning into the peak admit times when there are fewer EVS personnel. First shift only: EVS on each unit.

Evaluate Transport Processes:

Current transport processes require Nurses, Paramedics, and PCTs from floor and/or ED.

Evaluate Processes When Patient Accepted on Floor But Delays from ED in Patient Arriving on Floor:

Work load planning on the floor is impacted when a patient is expected and there is no notification that patient transport to the floor will be delayed. Need to track time from bed assigned to departure from ED.

Orientation Training:

Training for new employees should include the flow process policies.

Prioritizing Admits in ED:

To determine if prioritizing admits would have a positive impact on the ED, the floors, the hospitalists.

To determine if prioritizing admits would have any impact on discharges.

To determine if a change in expectations for the time chest pain patients move to the floors would impact patient satisfaction, impact on ED, floors, and hospitalists.

Implementation Plans:

Policy Changes

Policy Memo for floor admissions and algorithm
Policy Memo from Karen Long and Mary Bylone to Nursing Supervisors regarding policy for accepting patients to the floor.

Policy Memo regarding monthly review of nursing supervisors' logs of justifications for not accepting patients on the floor by Karen Long, Mary Bylone, and Clinical Directors.

Policy Memo regarding charge nurse duties during change of shift meetings:
- charge nurse accepts patients when bed registrar calls
- charge nurse takes reports from ED nurse if floor nurse in meeting
- charge nurse checks stability of patients that arrive on floor from ED

Policy Memo regarding reimplementation of SBAR

Policy Memo regarding use of new report and deleting bed meeting

Policy Memo regarding the 15-minute rule

Training Recommendations:

- New Bed Board Report (KL)
    - Nursing Supervisors, Clinical Coordinators, Relief Charges

- Bed Board Training (JH/KL)
    - Clinical Coordinators, Relief Charges, Nursing Supervisor, Unit Coordinators and Monitor Techs.

- Viewing Admit Orders (MJ)
    - Bed Registrars, Pharmacy Techs

- ED Nurse Call Orders to Floor Nurse (SMc)/(KL)
    - ED Unit Coordinators
    - Floor Unit Coordinators

- Bed Assignment Accept/Decline Process (KL)
    - Clinical Coordinators
    - Relieve Charges
    - Nursing Supervisor

- Track logs for Declines (KL)
    - Nursing Supervisors

- 15-Minute Report Rule (KL/SMc)
    - RNs

- Placement Guidelines (posted and education) (RS)
    - Hospitalists
    - ED Docs
    - Med Staff

- SBAR (KL)
    - All RNs

- Bed Registrars reached at 2271
    - Everyone

Data Requests

Request that time from receipt of admit order by Unit Coordinator to departure from ED be posted on Dashboard.

Track time from bed assigned to departure from ED

Admits/hr/floor – including times and days of week

Discharges/hr/floor – including times and days of week

of Post Ops

Time of discharge of hospitalists patients from the hospital

Deliverables

Drafts of Policy Statements (delivered to Colleen by noon Tuesday, November 24).

Amy	Floor Admissions Non-Acceptance of Patients on Floor
Sondra	SBAR Re-Implementation
Kathy	Deleting Bed Meeting Use of New Report
Jamie	5 Minute Rule Floor Acuity Report Policy for Monthly Review
Teri and Megan	Change of Shift Admits

Complete Recommendations Document sent out for review by Colleen and Angela by noon on Tuesday, December 1.

Comments due by noon on Thursday, December 3.

Presentation to be scheduled by Colleen

Policy For Admit Procedures During Shift Changes

New Policy for admit procedures during **shift changes**: i.e. 6:30a-7:30a, 2:30p-3:30p, 10:30p-11:30p

1. Phone Report from ED Nurse to Floor Nurse: The 7a-7p Nurse working the floor will take report and pass it on to the admitting Nurse after shift report is complete. In all other circumstances, if the floor Nurse is unavailable, the ED Nurse will call back in 15 minutes. If in 15 minutes the floor Nurse is still unable to take report the Clinical Coordinator or Relief Charge Nurse will make herself available and then pass it on to the appropriate RN. Any issues on the floor that interfere with the process need to be immediately reported to the Nursing Supervisor.

2. New Admit Patient arrival on Floor: When the new admit patient arrives, the PCT from either shift will help settle him in and take his vitals. If appropriate, the 7a-7p will perform a quick assessment to ensure patient safety and stability until the admitting Nurse is available. Otherwise the Clinical Coordinator from either shift will perform the assessment. The Patient is **not** to be left untended with the transporting PCT, Medic, or RN until shift report is complete.

Policy for Nursing Supervisor Change of Shift Report

1. Access Bed Board Snap Shot version at start of shift
2. Print off at 7am, 3pm and 11pm
3. Nursing Supervisors will give shift report using the bed board snap shot sheet.
4. Clinical Coordinator/Relief Charge to call Nursing Supervisor at x6812 at 7:30am, 3:30pm and 11:45pm

    Information to be shared:
    -Acuity on unit
    -Review staffing matrix
    -Bed assignments for pending admissions
    -Review pending discharges
    -Immediate bed availability (clean beds, empty beds)

4. Nursing Supervisor makes notes on Bed Board Sheet
5. Nursing Supervisor meets with bed registrar and reviews each unit staffing and bed availability

Note:

- bed meetings will be eliminated
- Units will eliminate filling out a shift report on the units

Advantages:

- Bed Board is up to date
- There will no longer be a 2 hour window awaiting bed meeting for bed assignments to be made
- Units will have Clinical Coordinators/relief on units and not losing time at bed meeting
- Supervisors will have up to date information from the bed board instead of noon census sheets with old information

Policy for Patient Placement Review Meeting

A monthly meeting will be held to address patient flow concerns, related to bed assignment/placement. This meeting will include the following staff members: VP of Nursing, Clinical Directors, Emergency Department Director and Patient Business Services Manager. Optional attendees include Director of Care Management and Nursing Supervisors.

During this meeting, the "Bed placement variance report" will be reviewed. This report will illustrate bed assignment times as they relate to the time admission orders were written for all Emergency Department patients during the previous calendar month. All variances within the report will be evaluated specifically, and an action plan will be generated to avoid these issues in the future.

Discussion will be had regarding overall bed placement concerns from the previous calendar month. Individual situations will be evaluated at this meeting, and an action plan will be generated to avoid these issues in the future.

Policy for Floor Status/Acuity Report

The first half an hour of every shift the charge nurse on the floor will get report from off going charge nurse. After receiving report the charge nurse will then call the nursing supervisor for that shift to give an update on immediate beds available at that time. Nursing supervisor will collect a report of bed availability from every floor and then go to registration to discuss beds that are available at that time for immediate placement.
Registration will call charge nurse **directly** on their charge phone to place a patient. Charge nurse will give a bed placement to that patient on the first phone call from registration.
Charge nurse may **only** refuse placement for that patient for the following reasons:

1.) Patient is an inappropriate fit per diagnosis for room or floor (including but not limited to: telemetry on non telemetry floor, post op patient to room with infectious patient, VIP patient with no private room available)
2.) Floor not staffed for additional patients (at full capacity for nurses per patient ratio) with knowing there are no definite discharges to happen in the near future.

If the charge nurse does not accept a patient that registration tries to place on that floor for the above reasons a call must be placed to the nursing supervisor with a reason so documentation can be made.

If the charge nurse places a patient but needs more time before the patient comes to that floor due to issues that have emerged in that time (example: high acuity or emergent situations i.e. rapid response or code) a call must be placed to nursing supervisor to explain. Nursing supervisor will contact registration.

Policy for Standardizing Communication

As a part of a two day rapid cycle improvement project, to improve patient flow from the ER to a floor, we are hoping through the standardization of certain processes that this can happen. One area that was addressed was communication from the ER nurse to the floor nursing when patient report is given. We noted that now at times there are multiple phone calls due to information missed during the patient report which is an essential part of the patients care. In hopes to reduce this, we highly recommend the use of the SBAR form of communication. This is a policy and is available for everyone to view under Patient Care Services Policies found under "Hand-off communication and the use of SBAR."

The hope is when the charge nurse gives a bed assignment for a patient, the charge nurse will write down basic patient information on the SBAR form. This form is then handed to the nurse receiving the patient. The ER nurse giving report to the floor nurse will also have their SBAR form filled out with all information that the floor nurse will need to get a clear picture of their incoming patient.

Again we highly recommend its use in the hopes to improve patient flow from the ER to floor and ultimately to improve patient safety.

REFERENCES

Goodin, H. J. (2003, February 6). *The nursing shortage in the United States of America: an integrative*. Retrieved February 22, 2010, from Journal of Advanced Nursing: http://www.journalofadvancednursing.com/docs/1365-2648.2003.02722_1.x.pdf

Gowrisankaran, G., & Town, R. (1999). *Price, quality and competition in hospital markets.* Retrieved November 12, 2009, from NLM Gateway: A service of the U.S. National Institutes of Health: http://gateway.nlm.nih.gov/MeetingAbstracts/ma?f=102194761.html

Grumbach, K., Keane, D., & Bindman, A. (1993). *Primary care and public emergency department overcrowding*. Retrieved February 22, 2010, from American Journal of Public Health: http://ajph.aphapublications.org/cgi/content/abstract/83/3/372

Institute of Medicine of the National Academies. (2006). *The Future of Emergency Care in the United States Health System.* National Academy of Sciences.

Jacobs, Chase, & Aquilano. (2009). *Honors Operations Management: Bryant University.* McGraw-Hill Primis.

Jimmerson, C. (2007). *A3 Problem Solving for Healthcare: A Practical Method for Eliminating Waste.* New York: Productivity Press.

Kotelnikov, V. (n.d.). *Case Study: Toyota; Toyota Production System as a Sustainable Competitive Advantage*. Retrieved November 17, 2009, from 1000 Ventures: http://www.1000ventures.com/business_guide/cs_efficiency_toyota_ps.html

McNichols, T., Hassinger, R., & Bapst, G. W. (1999). Quick and continuous improvement through kaizen blitz. *Hospital Materiel Management Quarterly* .

Medeiros, D., Swenson, E., & DeFlitch, C. (2008). *IMPROVING PATIENT FLOW IN A HOSPITAL EMERGENCY DEPARTMENT.* IEEE.

MEDITECH Medical Information Technology, Inc. (2008, August 20). *MEDITECH and Forward Advantage Boost Greenwich Hospital's Bed Turnover Rates*. Retrieved February 22, 2010, from MEDITECH Customer Achievement: http://www.meditech.com/aboutmeditech/pages/customerachievegreenwichbedboard.htm

Mogg, D. (2009). St. Luke's Hospital of Kansas City. (A. Wicks, Interviewer)

Montanaro, M. *Introduction to Patient Flow: Design and Systems Development.* Woonsocket, RI: Thundermist Health Center.

Pontifical Institute of Mediaeval Studies, Toronto, Ontario. (1994, March 7). *Competition among hospitals in the United States.* Retrieved February 22, 2010, from PumMed.gov: http://www.ncbi.nlm.nih.gov/pubmed/10134580?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_SingleItemSupl.Pubmed_Discovery_RA&linkpos=1&log$=relatedreviews&logdbfrom=pubmed

Reger, R. K., Gustafson, L. T. , Demarie, S. M., & Mullane, J. V. (1994). Reframing the organization: why implementing total quality is easier said than done. *The Academy of Management Review, 19*(3), 565-584.

Robert Wood Johnson Foundation. (2008, June 4). *Bursting at the Seams: Improving Patient Flow to Help America's Emergency Departments.* Retrieved November 3, 2009, from Robert Wood Johnson Foundation: http://www.rwjf.org/pr/product.jsp?id=29684

Sheridan, J. H. (1997). Kaizen blitz. *Industry Week* , 18-27.

The William W. Backus Hospital. (n.d.). Backus. Retrieved March 20, 2009, from The William W. Backus Hospital Web site: http://www.backushospital.org/index.html

Wilson, M., Siegel, B., & Williams, M. (2005, May). Perfecting Patient Flow. Retrieved March 22, 2010, from Robert Wood Johnson Foundation: http://www.rwjf.org/files/publications/other/PerfectingPatientFlow.pdf

United States Environmental Protection Agency. (2009, October 14). *Kaizen Rapid Process*. Retrieved November 9, 2009, from U.S.E.P.A: Lean Manufacturing and the Environment: http://www.epa.gov/lean/thinking/kaizen.htm

Value Based Management.net. (2009, March 23). *Kaizen philosophy and Kaizen method.* Retrieved October 26, 2009, from Value Based Management.net: http://www.valuebasedmanagement.net/methods_kaizen.html

Wilson, M. J., & Nguyen, K. (2004, September). *Bursting at the Seams: Improving Patient Flow to Help America's Emergency Departments.* Retrieved November 2009, from Robert Wood Johnson Foundation: http://www.rwjf.org/files/research/Learning_Network5.pdf