IMPROVING PATIENT OUTCOMES

CREATING A LEAN CULTURE OF CONTINUOUS IMPROVEMENT

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ECCU2017

CITIZEN CPR FOUNDATION

DISCLOSURE AND CONFLICTS OF INTEREST

- **Christine L. Noller, JD, LLM**
- **Improving Patient Outcomes**
  - **FINANCIAL DISCLOSURE:**
    - No relevant financial relationship (s) exist.
  - **UNLABELED/UNAPPROVED USES DISCLOSURE:**
    - No relevant financial relationship (s) exist.

DISCLOSURE AND CONFLICTS OF INTEREST

- **David C. Berry, PhD, MHA, AT, ATC**
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  - **AFFILIATIONS**
    - American Red Cross Scientific Advisory Board
    - ILCOR First Aid Task Force Member

OBJECTIVES

- Be able to…
  - (1) define Lean.
  - (2) identify the assumptions and principles guiding the essential dynamics of Lean management.
  - (3) directly apply Lean methodology.
  - (4) identify strategies to support a comprehensive change in culture (i.e. a Lean culture of patient safety).
  - (5) describe strategies for implementing data collection and quality improvement via Lean's PDCA cycle in an ECC system.

INSTITUTE OF MEDICINE'S CROSSING THE QUALITY CHASM
A NEW HEALTH SYSTEM FOR THE 21ST CENTURY (2001)

Six Aims For Improvement

These aims are built around the cored need for health care to be

- ***Safe***. avoiding injuries to patients from the care that is intended to help them
- ***Effective***. providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit
- ***Patient-centered***. providing care that is respectful of and responsive to individual patient preferences, needs, values and ensuring that patient values guide all clinical decisions

INSTITUTE OF MEDICINE'S CROSSING THE QUALITY CHASM
A NEW HEALTH SYSTEM FOR THE 21ST CENTURY (2001)

- ***Timely***. reducing waits and sometimes harmful delays for both those who receive and those who give care
- ***Efficient***. avoiding waste, including waste of equipment, supplies, ideas and energy
- ***Equitable***. providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location and socioeconomic status

Committee on Quality Health Care in America, Institute of Medicine. (2001). Crossing the Quality Chasm : A New Health System for the 21st Century. Washington, D.C. National Academy Press

HIGH RELIABILITY IN HEALTH CARE

- ***High reliability***. consistent performance at high levels of safety over long periods of time
  - Examples of high reliability organizations ("HROs"): nuclear power industry, commercial air travel system, flight decks of aircraft carriers
- ***Collective mindfulness***. everyone who works in these organizations, both individually and together, is acutely aware that even small failures in safety protocols or processes can lead to catastrophic adverse outcomes

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*, Health Administration Press, 2012.

IN ADDITION TO COLLECTIVE MINDFULNESS HROS HAVE TWO OTHER COMMON FEATURES

- First, after organizations identify potential deficiencies in safety processes, they eliminate them through use of tools of robust process improvement ("RPI") to improve their processes

Committee on Quality Health Care in America, Institute of Medicine. (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, D.C. National Academy Press.

IN ADDITION TO COLLECTIVE MINDFULNESS HROS HAVE TWO OTHER COMMON FEATURES

- Second, the organizations relay on a "***CULTURE OF SAFETY***" to ensure the performance of improved safety processes over long periods of time and remain constantly aware of the possibility of failure.

Committee on Quality Health Care in America, Institute of Medicine. (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, D.C. National Academy Press.

THREE REQUIREMENTS FOR ACHIEVING HIGH RELIABILITY (LEADERSHIP COMMITMENT, SAFETY CULTURE AND RPI)

Emphasis on Leadership Commitment for without it, no important initiative for organizational change can succeed

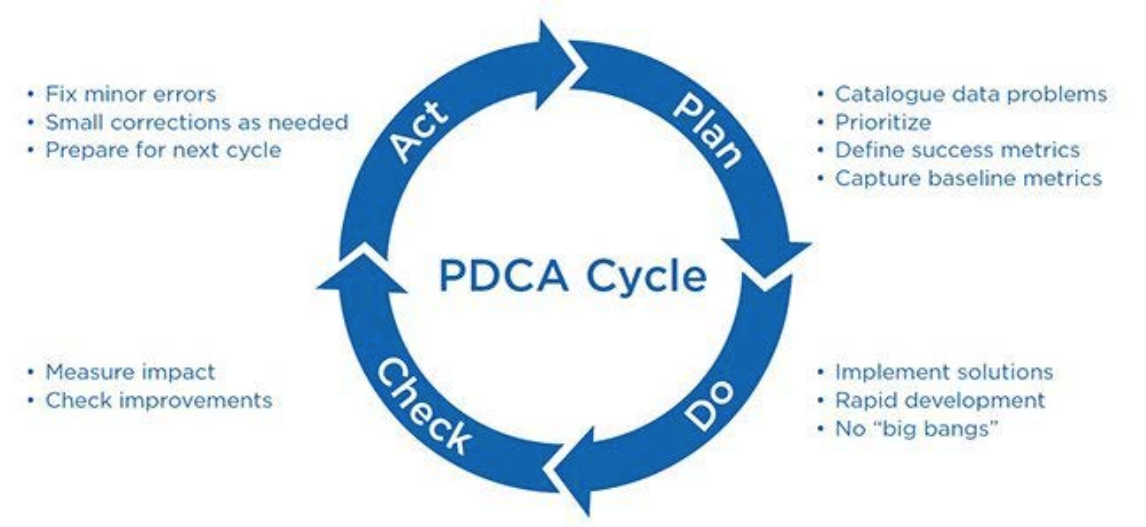
- **Safety culture** involves trust, report and improve
- All front-line workers must trust each other to feel safe when they identify a problem that may involve or uncover errors made by others. And must trust that management will fix the problem
- **HROs** receive regular reports on potentially unsafe conditions, poorly functioning safety procedures or simple changes in the environment that might lead to failures of safety systems
- RPI through **Lean**, **Six Sigma** and **Change Management**

Chassin MR, Loeb JM. The Ongoing Quality Improvement Journey: Next Stop, High Reliability. *Health Affairs*. 2001; 30(4):559-568.

LEAN PDCA CYCLE

- **Plan**. identify a problem and develop a plan to solve it
- **Do**. implement a plan on a small scale
- **Check (assess)**. evaluate the results and compare them to the desired results
- **Act**. analyze the results and adopt, abandon or alter the plan

Standardize

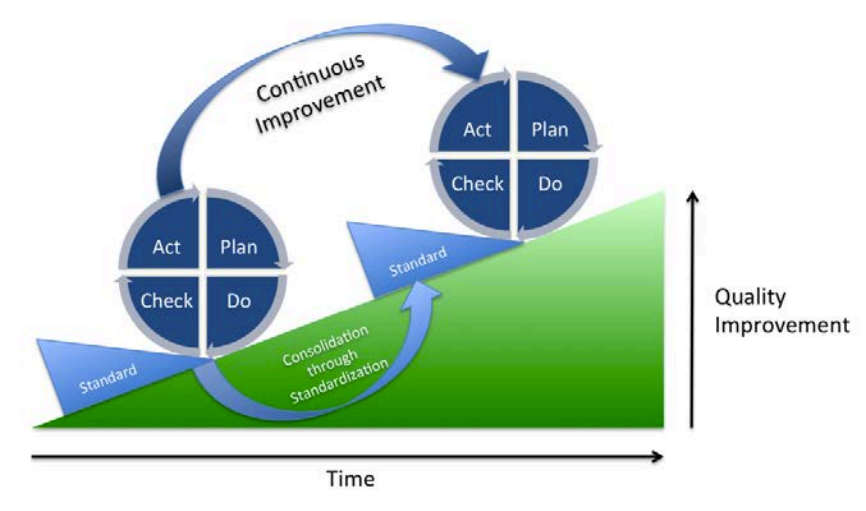


Align & Act

LEAN PDCA CYCLE

The cycle continues until the desire results are attained and the plan is adopted, at which point opportunities for additional improvement and investigated and the cycle is revisited.

Repeating the cycle constitutes continuous improvement.



RESPECT FOR PEOPLE (**EMPOWERMENT**) TOYOTA'S ANDON CORD

In a Lean culture respect for people means **acknowledging that all people are experts at what they do**.

They know the best way to do the job, what does and does not work and the problems associated with the job and they usually can offer sound recommendations on how to fix these problems or improve the job's processes.

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

RESPECT FOR PEOPLE (**EMPOWERMENT**) TOYOTA'S ANDON CORD

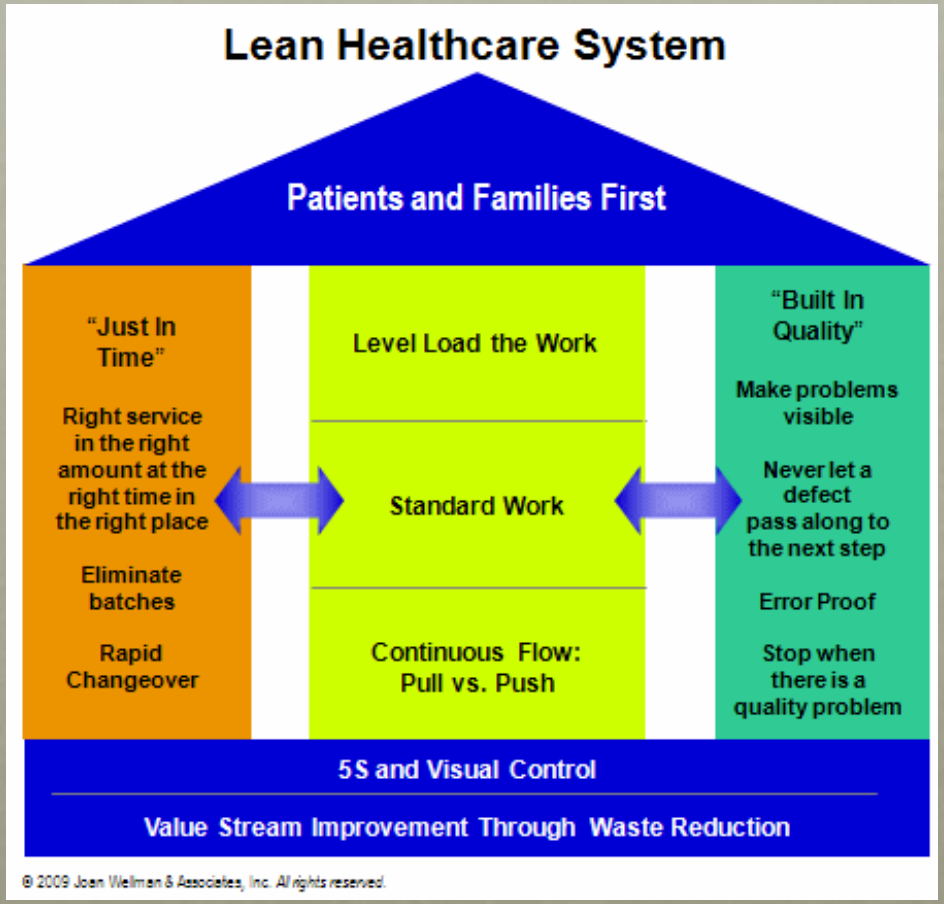
Management should solicit **staff members' input regarding problems, mistakes and inefficiencies affecting their duties**. By encouraging their input, management demonstrates respect for their knowledge and abilities.

When leaders encourage empowerment, employees see their work processes with new eyes. They question inconsistencies and look for opportunities to improve.

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

THREE KEY ELEMENTS OF LEAN

- Standard work
- User-friendliness
- Unobstructed flow

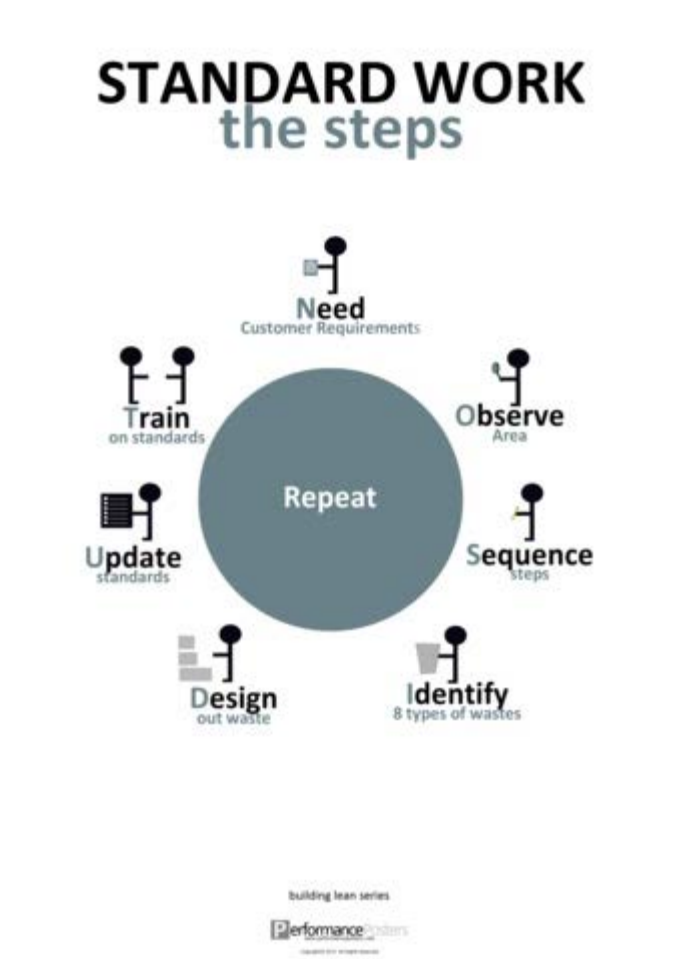


Black J, Miller D, Sensel J. *The Toyota Way to Healthcare Excellence, Increase Efficiency and Improve Quality With Lean*, Second Edition. Health Administration Press, 2016.

THREE KEY ELEMENTS OF LEAN
STANDARD WORK

In the absence of standard work, continuous improvement is **NOT** possible.

One of the major problems in healthcare is the lack of consistency in the delivery of patient care



THREE KEY ELEMENTS OF LEAN
STANDARD WORK

- By establishing standard work, hospitals and healthcare organization fulfill the criteria set forth by the IOM that care is safe, effective, patient centered, timely, efficient and equitable (IOM's Crossing the Quality Chasm)
- Standard work applies to processes involving testing, medication delivery, care transitions and administrative practices
- Processes must be scrutinized to identify and eliminate waste

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

THREE KEY ELEMENTS OF LEAN
STANDARD WORK - SEVEN CATEGORIES OF WASTE

- ***Delay***. encompasses any time patients or staff wait (waiting for bed assignments, waiting for treatment, waiting for diagnostic tests, waiting for supplies, waiting for a doctor or nurse)
- ***Over processing***. doing more work than is necessary to complete a task or performing redundant tasks (excessive paperwork, redundant processes, unnecessary tests, using IV when oral meds would suffice, multiple transfer)
- ***Inventory***. includes stockpiled goods and material (specimens awaiting analysis, ED patients awaiting bed assignments, excess supplies kept on hand "just in case," dictation awaiting transcription)

THREE KEY ELEMENTS OF LEAN
STANDARD WORK - SEVEN CATEGORIES OF WASTE

- ***Transport***. any unnecessary transportation of people, equipment, specimens and so on (transporting lab specimens, patients, medication, supplies)
- ***Motion***. excess movement, of which, the most common manifestation in healthcare is **searching** (searching for charts and supplies, delivering medications, traveling between wings to care for patients)

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

THREE KEY ELEMENTS OF LEAN
STANDARD WORK - SEVEN CATEGORIES OF WASTE

- ***Overproduction***. occurs when patients, medications, specimens and so forth are processed regardless of need, commonly referred to in Lean terminology as pushing - as opposed to pulling which is processing as need arises(mixing drugs in anticipation of patient needs)

- ***Defects***. includes medication errors, wrong site surgery, improper labeling of specimens, multiple sticks for blood draws, injury caused by restraints or lack of restraints

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS

Providing for the staff member or patient what is needed, when it is needed, in the quantity needed, on time, every time, 24/7/365.

Three most used tools to help generate user-friendliness are **(1) 5-S**, **(2) kanbans** and **(3) visual systems**.

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS - 5 S METHODOLOGY

Environment that has *"a place for everything and everything in its place, when you need it."*

- ***Sort***. what is needed to accomplish work, what is not ***needed***; **REMOVE** unneeded/wanted items
- ***Straighten***. find a place for all ***needed*** items and ensure that everything is put in its place
- ***Shine***. clean the workplace and **KEEP IT CLEAN**!
- ***Standardize***. develop a system to apply the first three S's to the entire workplace
- ***Sustain***. develop processes to maintain the gains (ie., ensure the workplace stays in order)

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS - 5 S METHODOLOGY

"...when it is in its place, work gets done efficiently and effectively. When it is not in place, work still gets done – but at a level of cost that is hard to justify".

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS - 5 S METHODOLOGY

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS - 5 S METHODOLOGY

A laboratory work area before and after conducting 5S Sort and Set In Order. Clutter and unused items have been removed

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS - 5 S METHODOLOGY

Emergency Special Order Supply Room Before 5-S

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS - 5 S METHODOLOGY

Emergency Special Order Supply Room After 5-S

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS – KANBAN

- Lean tool to replenish systems/supplies is a signal called a **KANBAN**
- Signal may be a card, a light, an empty bin, a color-coded square, or another **alerting device** or method
- Kanban may also be used to signal the need to advance a patient or a product to the next downstream process step

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS – KANBAN

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS – KANBAN

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS – KANBAN

- University of Chicago Medical Center
  - Each bin had two sections, with a separator in the middle.
  - When one side of the bin was empty, the clinician would pull the "Low Stock" card, and place it in a card holder by the door, an RFID (radio-frequency ID system).
  - Card contained the part number, the resupply level, the bin location, etc., and the card holder had an RFID reader on it which would automatically pick up the signal for a resupply.
  - ***All cards placed in the holder by 11 AM would be electronically updated into the inventory resupply system, sending a signal to the wholesaler Cardinal Health (in Waukegan, 45 minutes away).***

Handfield. Using RFID Two Bin Kanban at the University of Chicago Medical Center: Healthcare Analytics Innovation! NC Supply Chain Cooperative. 2013. https://scm.ncsu.edu/blog/2013/07/10/using-rfid-two-bin-kanban-at-the-university-of-chicago-medical-center-healthcare-analytics-innovation/

THREE KEY ELEMENTS OF LEAN
USER-FRIENDLINESS - VISUAL SYSTEMS
(INDICATORS, SIGNALS, CONTROLS AND GUARANTEES)

- ***Visual indicators***. bracelets for patients at risk of falling and NPO stickers on patient charts
- ***Visual signals***. lights and alarms are used to attract attention
- ***Visual controls***. can limit behavior but not prevent undesirable action (hazardous waste container limits improper disposal of hazardous waste but doesn't ensure proper disposal)
- ***Visual guarantees***. are mistake proof (color-coded gas ports are visual indicators, but keyed gas ports are visual guarantees because they stop staff from connecting a patient to the wrong gas)

THREE KEY ELEMENTS OF LEAN
UNOBSTRUCTED THROUGHPUT (FLOW)

- A process flows only as quickly as its slowest task (i.e., constraint)
- Only by standardizing processes and making them user-friendly can constraints be eliminated and flow established
- The ultimate objective of the value stream work plan is to address the constraints within the value stream, thereby creating flow
- Once a constraint to flow is eliminated, the next slowest process becomes the new constraint, and so on through the value stream

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

THREE KEY ELEMENTS OF LEAN
UNOBSTRUCTED THROUGHPUT ISSUES IN THE EMERGENCY DEPARTMENT

- Regardless of how quickly a patient is triaged and assessed in the ED, how quickly laboratory and diagnostic imaging results are received, how quickly a bed is assigned and how quickly transport can bring the patient to the unit, the patient will remain in the ED until the bed on the unit is empty, medications removed from the room and the room has been cleaned.
- Level of collaboration (along the value stream) across several departments of the hospital is evident

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

THREE KEY ELEMENTS OF LEAN
EMERGENCY DEPARTMENT EXAMPLE OF VALUE STREAM

- The ED, laboratory services, diagnostic imaging, admitting department, the receiving nursing unit, transport, environmental services, pharmacy, case management, doctors, nurses, technologists and other staff members must work together in the patient's best interest
- But everyone has other duties as well to perform (beyond this one patient)
- Pushing staff to work harder and faster will not eliminate constraints to flow (they're already working at or beyond the limit)
- Rather, by standardizing processes and making them user-friendly can constraints be eliminated and flow established

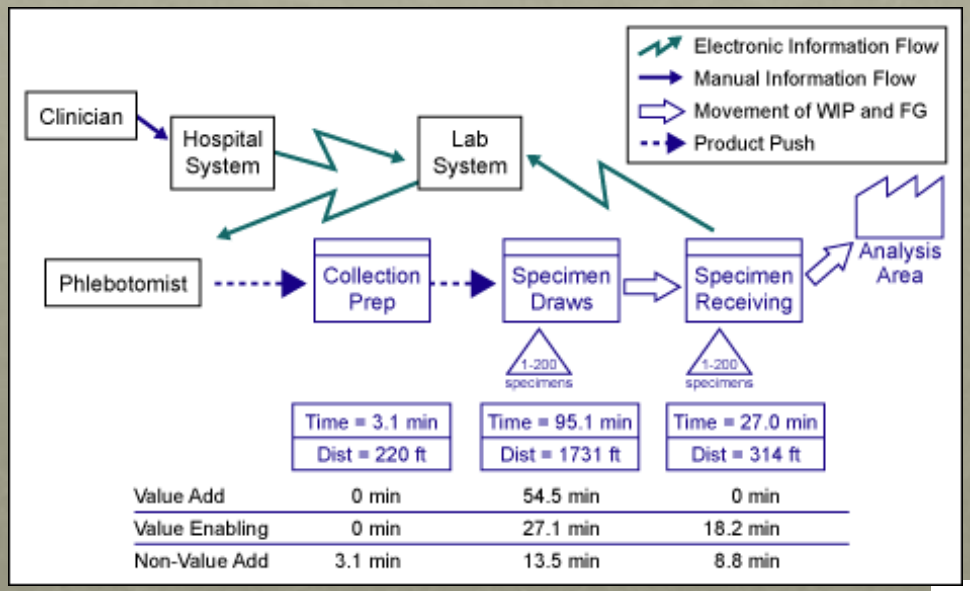
VALUE STREAM MAPPING

- A value stream encompasses all the processes necessary to provide a product or service
- Value streams usually cross departmental boundaries so improvement efforts are necessarily collaborative
- The value stream includes all departments involved in delivering value to the patient
- To be able to identify specific value streams from the strategic objectives of the organization (which include people, service, quality, resources and growth) leaders must identify what actions the hospital would need to take to demonstrate excellence in clinical care, enhance revenue, contain cost, etc.

VALUE STREAM MAPPING

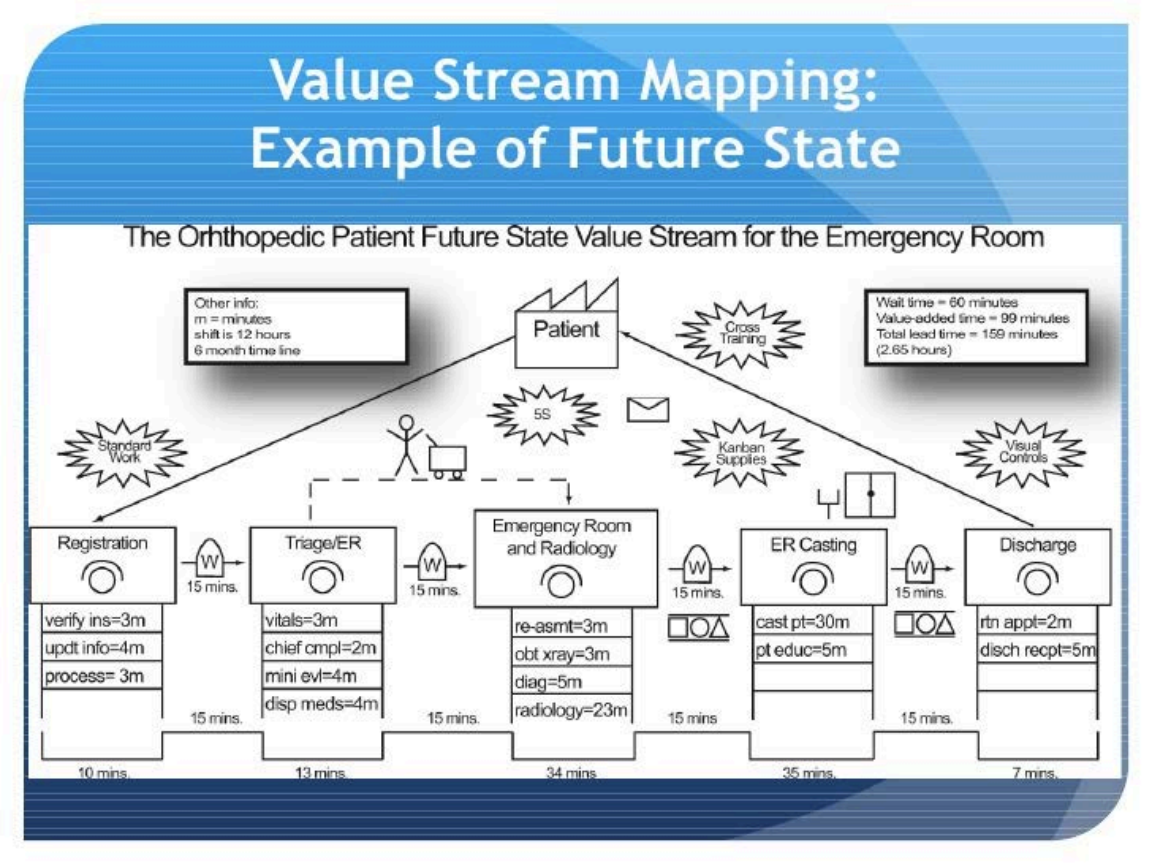
Once the value streams are identified, their current and future states need to be mapped

The current state map illustrates the value stream as it is presently operating



VALUE STREAM MAPPING

- The future state map portrays the desired state of the value stream
- In a value stream map a process box represents a process in the value stream through which there is patient or product flow. If the flow is interrupted or stops, a new process box must be drawn.

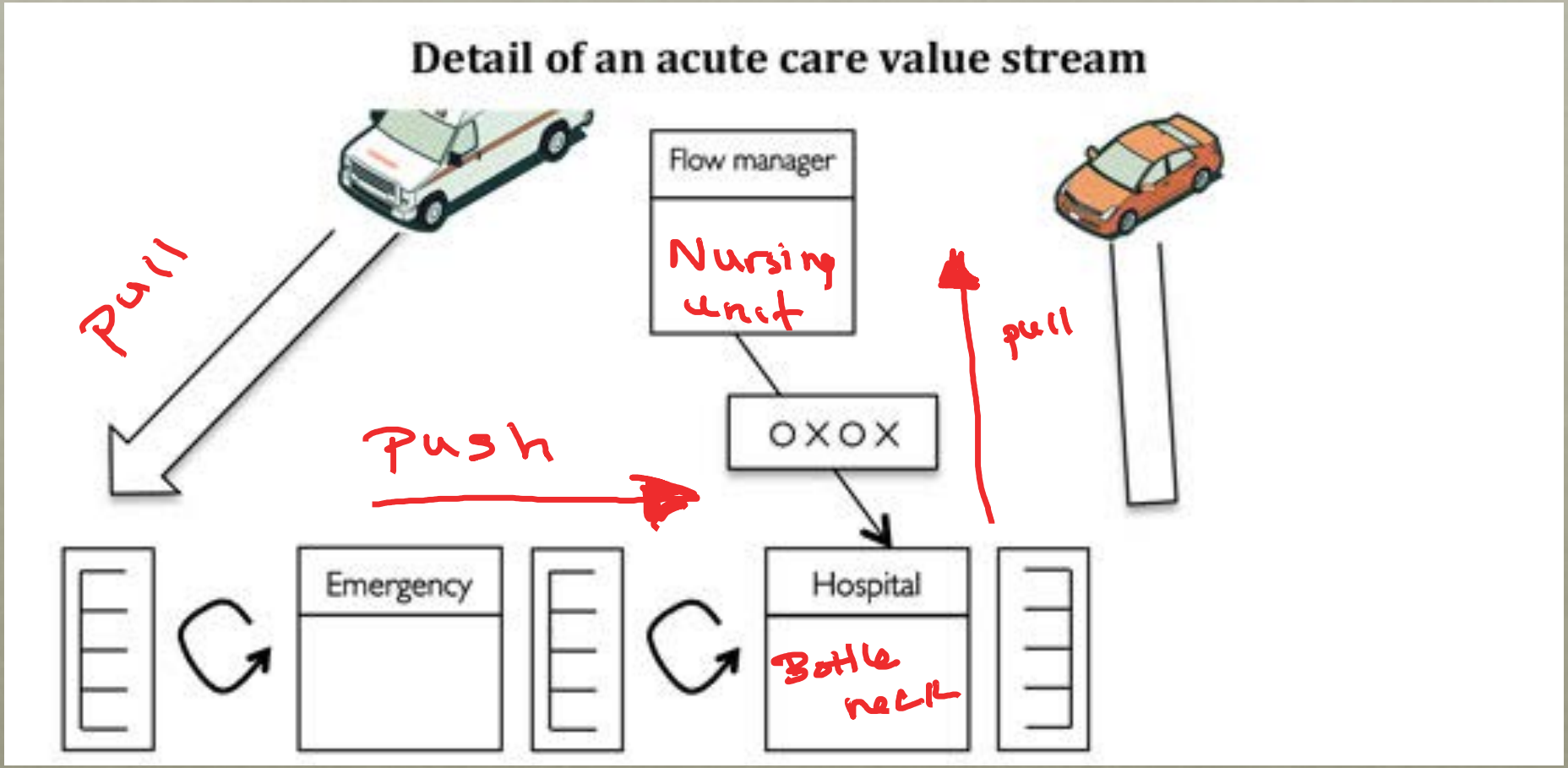


VALUE STREAM MAPPING

- In a value stream map a **process box represents a process in the value stream** through which there is patient or product flow. If the flow is interrupted or stops, a new process box must be drawn.
- In **a push system** (in which upstream processes feed patients into downstream processes regardless of whether the downstream processes are ready to take the patients), **interruptions involve wait times**.
- Record wait times between process boxes. Wait times are recorded separately from the times required to complete the process steps.

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

VALUE STREAM MAPPING



CURRENT STATE MAP

- Current-state value map depicts the value stream as it presently operates. It also exposes waste and provides a base-line from which improvement can occur.
- A properly drawn value stream map is the starting point for the implementation plan.
  - The map must accurately represent the value stream and should include all pertinent information about the process steps in the value stream (such as cycle times, wait times and changeover times).

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

FUTURE STATE MAP

- Future state map portrays the desired state of the value stream
- Is based on strategic objectives of improved patient flow, for example in an Emergency Department, of more efficient restocking of crash carts, improved rapid response team time, etc.
- It does not represent an ideal state as that is unrealistic and unlikely to happen
- Process improvement objectives should always follow SMART criteria, i.e., that they be specific, measurable, attainable, relevant and time bound

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

Flow, Takt Time and Cycle Time in Future State Mapping

Goal of future-state value stream mapping is to create flow through the value stream

To create flow, bottlenecks and other sources of waste must be identified and eliminated

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

FLOW, TAKT TIME AND CYCLE TIME IN FUTURE STATE MAPPING

- ***What is flow?***
  - Providing only what is needed to fulfill patient demand
- ***What is takt time?***
  - The rate of patient demand
  - Calculated by dividing available time by patient demand
- ***What is cycle time?***
  - The actual time required to provide a service to one patient

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

TAKT TIME AND CYCLE TIME EXAMPLE

- It takes 5-min to provide a service (ie., lab draw, outpatient registration, etc.) and the hospital has to process 100 patients per shift.
- Cycle time to provide the service to the patient (ie., 5 minutes)
- Takt time is calculated by dividing available time by patient demand (8 hrs. per shift x 60 min. per hr. = 480 minutes) – (2 breaks/ shift x 15 min. = 30 min.)= 450 min./100 patients
- Takt time = 450/100 = 4.5 minutes (the time allocated to service one patient), but the cycle time is 5 minutes so 100 patient can't be processed or serviced in an 8-hr. shift

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

Once Takt Time is Calculated for the Value Stream

- Opportunities to meet takt time (4.5 minutes per patient) and improve patient flow can be identified and highlighted on the value stream map.
- Future state map provides a visual picture of how the patient (or product) needs to flow through the value stream
- Current and future state maps identify the starting point and end points for process improvement

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

KAIZEN EVENT

- Also called Lean event, kaizen blitz or rapid improvement event, is best defined as the deployment of a team whose sole purpose is to implement Lean tools and concepts for the purpose of improving a process

- Kaizen events are commonly scheduled for three to five consecutive days. The Kaizen event is the primary method for implementing Lean tools and concepts in the value stream.
  - Should be conducted with the goal of developing standard work; creating user-friendliness; and establishing unobstructed throughput to improve efficiency, eliminate waste and establish flow.

Zidel, Thomas G., *Lean Done Right, Achieve and Maintain Reform in Your Healthcare Organization*. Health Administration Press, 2012.

Five Day Kaizen Event at University of Iowa Emergency Department

- Before the event
  - Educate ED managers and other participants about Lean principles and techniques
  - Kaizen team members included 2 ED physicians, 2 ED nurses, an ED PA, 2 physicians from other areas, two radiology technicians, a laboratory technicians, 5 industrial engineers and 5 external participants from a local business council
  - Next step each member of the Kaizen team observed ED patient flow and drew a process map of at least one portion of the total flow process, e.g., triage, lab order, or patient admission.

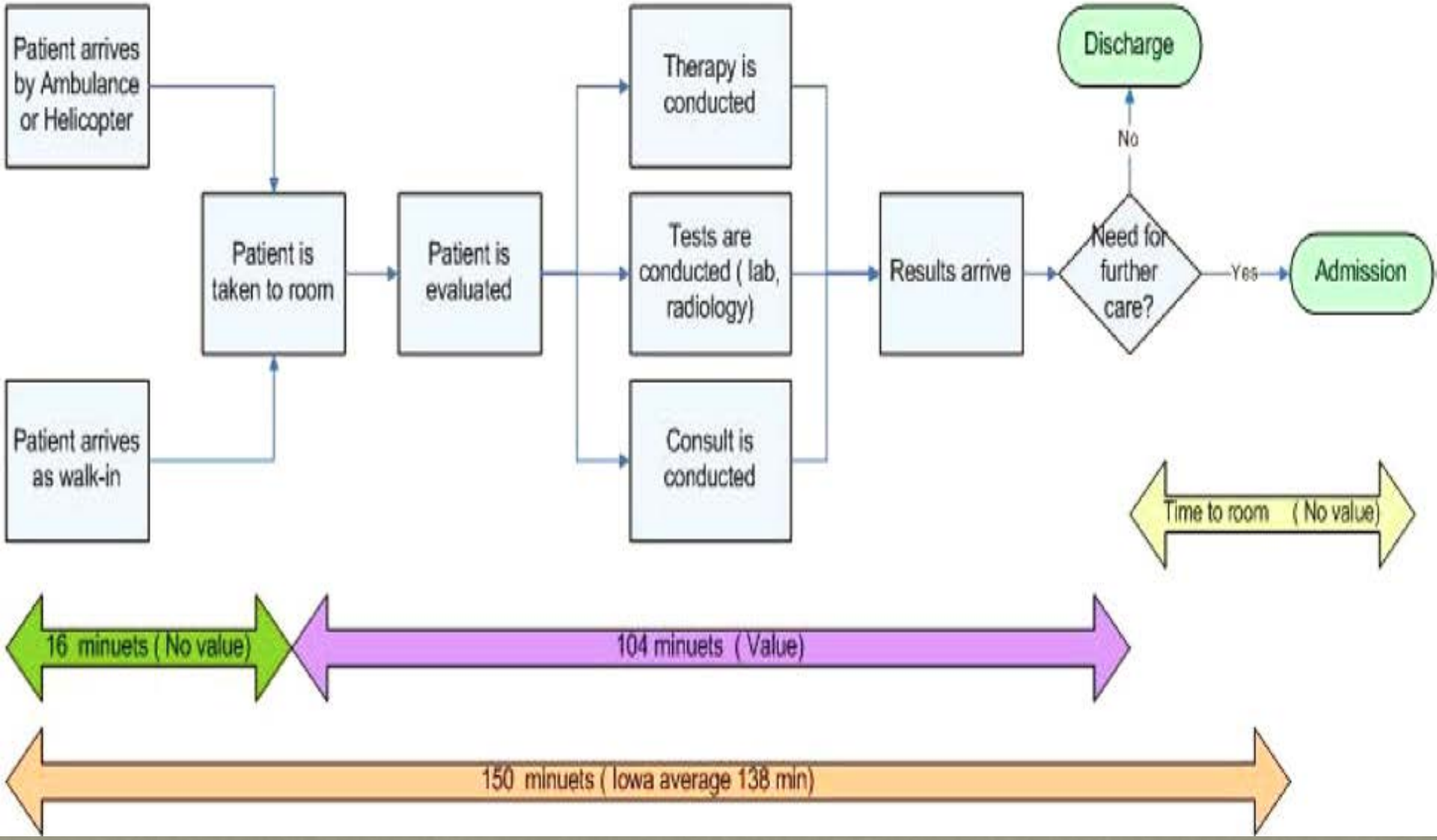
Dickson EW, Singh S, Cheung D, Wyatt C, Nugent A. Application of Lean Manufacturing Techniques in the Emergency Department. *Journal of Emergency Medicine*. 2009;37(2): 177-182.

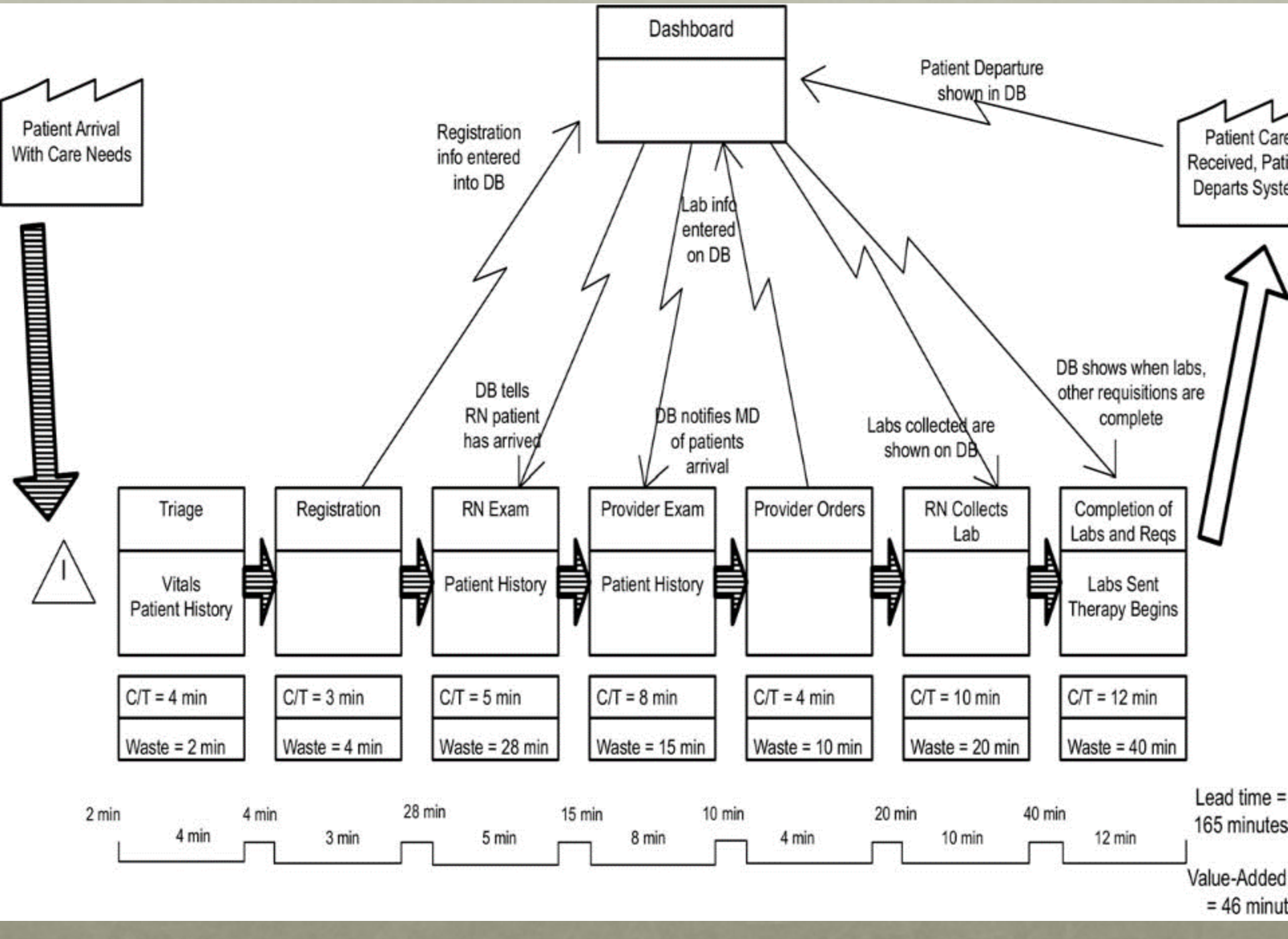
DAYS ONE AND TWO

- Process mapping followed by individual process step measurement and value analysis
- To determine team members asked, "Would the patient be willing to pay for this part of the process only?"
- From patient perspective waiting for lab test result or consultant arrival adds no value, whereas receiving the lab test result or having the actual consultation does add value
- Value stream map was then constructed that focused on the parts of the overall flow process that have the most waste and greatest potential to improve overall flow

Dickson EW, Singh S, Cheung D, Wyatt C, Nugent A. Application of Lean Manufacturing Techniques in the Emergency Department. *Journal of Emergency Medicine*. 2009;37(2): 177-182.

Emergency Treatment Center (ETC) General Process Flow Chart




Dashboard
Patient Departure shown in DB
Patient Arrival With Care Needs
Registration info entered into DB
Lab info entered on DB
Patient Care Received, Pati Departs Syste
DB tells RN patient has arrived
DB notifies MD of patients arrival
Labs collected are shown on DB
DB shows when labs, other requisitions are complete
Triage
Vitals Patient History
Registration
RN Exam
Patient History
Provider Exam
Patient History
Provider Orders
RN Collects Lab
Completion of Labs and Reqs
Labs Sent Therapy Begins
C/T = 4 min
Waste = 2 min
C/T = 3 min
Waste = 4 min
C/T = 5 min
Waste = 28 min
C/T = 8 min
Waste = 15 min
C/T = 4 min
Waste = 10 min
C/T = 10 min
Waste = 20 min
C/T = 12 min
Waste = 40 min
2 min
4 min
4 min
3 min
28 min
5 min
15 min
8 min
10 min
4 min
20 min
10 min
40 min
12 min
Lead time = 165 minutes
Value-Added = 46 minut

DAY THREE

- Focused on generating process improvement ideas from Kaizen team members and frontline caregivers, followed by process redesign
- Ideas were small and very specific to their ED, e.g. standardize and mark spot where the ultrasound unit located, putting chairs in front of the triage nurse so he/she doesn't have to walk as far to get patients not yet triaged and reduce the number of questions as part of registration

Dickson EW, Singh S, Cheung D, Wyatt C, Nugent A. Application of Lean Manufacturing Techniques in the Emergency Department. *Journal of Emergency Medicine*. 2009;37(2): 177-182.

DAYS FOUR AND FIVE

- Focused on new process implementation, refinement and re-measurement. Process improvement included:
- Utilization of all exam rooms and immediate placement of patients in rooms with bedside registration when possible
- Team approach where RN, resident and attending get the patient history at the same time to reduce duplication and staff time
- Redefined responsibilities of RN, CNA and intake coordinator
- Lab/x-ray tests ordered and sent earlier in the process
- Improved ED signage (in and out)
- Identified opportunities for involvement of other services earlier in the process

LEAN SIX SIGMA APPLICATION TO INCREASE RAPID RESPONSE TEAM UTILIZATION, UNIVERSITY OF CALIFORNIA, IRVINE MEDICAL CENTER

In 2012 UC Irvine Medical Center performed an intense review of RRT and code blue data by unit

- Discovered both lack of documentation of events and low rate of RRT deployment, with only 3 in January, 2013 and very few calls in 2012
- The rate of non-ICU code blue calls was relatively high, 3.32 codes per 1,000 patient discharges
- To improve RRT efficacy they formed a Lean Six Sigma (LSS) team to devise a strategic plan for improvement

Chandwani C. Increasing Rapid Response Team Utilization Proves to Be a Successful Strategy to Improve Patient Safety by Reducing Code Blue Rates and Code Mortality, 2016 Vanguard Award Application.

SURVEY OF HEALTHCARE STAFF TO IDENTIFY THE PRIMARY DRIVERS OF LOW RRT UTILIZATION RATES

- Lean Plan Phase. identify a problem and develop a plan to solve it
  - Here the problem was low RRT utilization
  - First, the team gathered data to identify the causes of the problem by surveying healthcare staff
  - Communication and lack of leadership were perceived as the greatest barriers to successful emergency response calls
  - 64% of survey respondents (including nurses and physicians) had never activated a rapid response

Chandwani C. Increasing Rapid Response Team Utilization Proves to Be a Successful Strategy to Improve Patient Safety by Reducing Code Blue Rates and Code Mortality, 2016 Vanguard Award Application.

ROOT CAUSE ANALYSIS, 5 WHYS

- ***Root Cause Analysis***. using the five whys techniques that consists of asking "Why" five times in order to delve deeply into each potential cause. "Why is asked until the root cause is revealed. Each "Why" leads to a subsequent question that finally results in root cause identification.
  - Why was the RRT activation rate so low?
  - Why? Staff members failed to activate the RRT
  - Why? Staff unfamiliar with specific criteria to activate the RRT
  - Why? Instead of activating the RRT they paged the on call resident to address sudden changes in patient condition unless a full code blue was initiated
  - Why? Hierarchical system of physician notification can lead to delayed decision making

ANALYSIS AND PLAN

- Delays prolonged the amount of time it took to get the appropriate resources to patients in need of aggressive intervention or reevaluation
- Team recognized that to improve patient safety they would need to change the encultured reticence to "go around" the primary team and rapidly deploy resources when needed, i.e. activate the RRT
- Conduct multi-disciplinary educational campaign targeted at all healthcare providers

Chandwani C. Increasing Rapid Response Team Utilization Proves to Be a Successful Strategy to Improve Patient Safety by Reducing Code Blue Rates and Code Mortality, 2016 Vanguard Award Application.

LEAN DO PHASE: IMPLEMENT THE PLAN ON A SMALL SCALE

- Nurses received clinical updates on RRT utilization rates and rapid response policy changes
- Thank you notes were sent to all individuals who activated a rapid response and no call was considered inappropriate or a false alarm
- Activation criteria were revised based on research in early warning systems and shared with all patient care providers
- Included "gestalt" criteria in addition to the physiologic parameters, thereby empowering staff to activate the RRT if they were concerned about the stability of safety of a patient regardless of whether the patient met any other markers

LEAN DO PHASE: IMPLEMENT THE PLAN ON A SMALL SCALE: CONTINUED

- Patients and visitors were permitted to call for a RRT, using the same operator driven process used by staff
- Updated RRT criteria discussed in nursing morning huddles and practice councils
- LSS team physician leaders visited all major departments, discussing RRT activation criteria and changes, as well as current utilization data with front line physicians
- Made substantive changes to emergency response procedures based on staff survey, including simplification and identification of key responders with code stickers, such as TEAM LEADER and ICU RN, which were added to code carts

MULTIDISCIPLINARY SIMULATION TRAINING (HRO APPLICATION FROM AVIATION INDUSTRY)

- One of the most impactful strategies for RRT improvement was multidisciplinary simulation training on emergency responses
- Nurses, residents, students, pharmacists and RTs engaged in joint code simulation sessions to improve team communication during these events
- Focused more on effective communication and team work in simulated chaotic environment than on ACLS algorithms
- Trained over 150 participants with 100% reporting it was a positive team building exercise and 100% feeling the team simulation training was relevant to their practice

LEAN CHECK PHASE

- During the project, the Critical Events Management Team reviewed all incident reports related to RRT activations
- Dedicated analyst created and maintained a dashboard of relevant data from emergency responses and tracked rapid response and code blue rates, for both ICU and non-ICU patient care areas

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LEAN ACT PHASE

- Individual providers were given feedback related to RRT calls
- Feedback not only highlighted that all calls are reviewed but reinforces the concept of universal utilization when activation criteria are met
- Results: RRT now responds to nearly 40 calls per 1000 patients discharged compared to 3 calls/1000 patient prior to LSS project
- Rate of code blues reduced from 6.333/1000 discharges (2012) to 5.14/1000 patients (2014) and 4.65/1000 patients (2015)

SUSTAINABILITY AND SCALABILITY

- To reinforce change, they continue to review all incident reports related to RRT calls and provide feedback when warranted
- All non-ICU code blue events are reviewed to determine if the patient met criteria for rapid response prior to code blue event providing feedback when warranted
- Continue to hold multidisciplinary simulation sessions on code training and have expanded efforts to all medical and surgical residents in the PGY-2
- GME office also continues to provide periodic RRT updates through series of mini emails targeted at quality and safety updates

MIAMI CHILDREN'S HOSPITAL LEAN CRASH CART PROCESS IMPROVEMENT

- Chose this process (for nursing to check each unit's crash cart per month-totaling 30 carts) as it was very tedious consuming 3 hours per nurse per crash cart per month
- Created a team with each unit bringing their carts to the meeting
- The team opened the carts to evaluate what was needed and what was excess to make it leaner and more efficient so that when they needed it in an emergency, it would go faster for them as it was very easy as it was very visual to see what they need, where it is when they need it

Miami Children's Hospital: The Lean Process, YouTube video, 2013

MIAMI CHILDREN'S LEAN CRASH CART PROCESS IMPROVEMENT RESULTS

- Nurse time spent on each crash cart checked every month decreased from 3 hours to 10 minutes
- $30,000 annual savings

Miami Children's Hospital: The Lean Process, YouTube video, 2013

QUESTIONS?

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CITIZEN CPR FOUNDATION

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