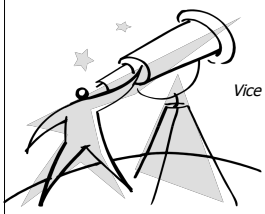
Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

Using Performance Improvement to Improve Patient Outcomes



Denise Murphy RN, MPH, CIC
Vice President, Quality and Patient Safety
Main Line Health System

September 2009

Hosted by Sharon Krystofiak
sharon@webbertraining.com

www.webbertraining.com

Performance Improvement

- ***Performance Improvement*** is the process of designing or selecting interventions which may include training directed toward a change in behavior, typically on the job.
- PI is a systematic process of discovering and analyzing human performance gaps, planning for future improvements in human performance, designing and developing cost-effective and ethically-justifiable interventions to close performance gaps, implementing the interventions, and evaluating the financial and non-financial results.

Performance Improvement: Art or Science?

- *PDCA/PDSA*
- *Six Sigma: DMAIC*
- *Toyota Production System (TPS) "Lean" Engineering: Get the waste out!*
- *Lean Six Sigma – the hybrid (Lean on the DMAIC framework)*
- *General Electric's Express Workout*
- *These approaches to PI are nothing without Change Mgt!*

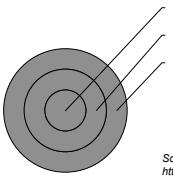
Bottom line…Improvement work in health care is getting much more analytical and based on scientific and mathematical principles!

Change Management

- ***Change management*** is the practice of administering changes with the help of tested methods and techniques in order to avoid new errors and minimize the impact of changes on an organization and individuals.
- Change management is a systematic approach to dealing with change, and has at least three distinct components:
  - *adapting to change,*
  - *controlling change, and*
  - *effecting change.*
- A proactive approach to dealing with change is at the core of all three aspects.

Change Management

- *Change Management is the process, tools and techniques needed to*
  - manage the people side of change processes,
  - to achieve expected outcomes
  - and to realize the change effectively…



WITHIN THE SELF
WITHIN THE TEAM
AROUND THE LARGER ORGANIZATION

Source: The Change Management Toolbook: Introduction http://www.change-management –toolbook.com

Human Factors Engineering

- *Human Factors Engineering* is based on sciences of physics and ergonomics and is essentially the study of man with his/her tools in the system (environment) in which they live or work.
- HFE is a multi-faceted discipline that generates information about human requirements and capabilities, and applies it to the design and acquisition of complex systems.
- Human factors engineering provides the opportunity to:
  (1) develop or improve all human interfaces with the system;
  (2) optimize human / product performance during system operation, maintenance, and support;
  (3) make economical decisions on personnel resources, skills, training, and costs.

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

Human Factors Engineering

Photo source: Barnes-Jewish Hospital,
Laurie Wolf, Human Factors Engineer

Implementation Science or *the Art of Execution*

1- Maintain focus on the "vital few" goals
- ✓ *Keep strategic plan simple, communicate goals often*
- ✓ *Employees must be clear about their roles in achieving the most critical 80% of the plan*

2- Develop tracking systems that facilitate problem solving
- ✓ *Set metrics; use charts, graphics and other tracking tools for planning and execution*
- ✓ *The right measures make expectations clear*
- ✓ *Each key success factor must have only one owner*
- ✓ *Conduct RCA* to drill down and uncover barriers to success*

3- Set up formal reviews
- ✓ *Conduct "toll gate" or milestone reviews*
- ✓ *Be specific about meeting structures, frequency, and agendas*
- ✓ *Personnel and resources needed should be at top of the agenda!*

Root Cause Analysis

Implementation Science or the *Art of Execution*

"If you've got the right people in the right roles and are still not executing, then look at your resources"
Tim Stratman, CEO RRD Direct

"The most creative, visionary strategic planning is useless if it isn't translated into action. Think simplicity, clarity, focus… and review your progress relentlessly."
Melissa Raffoni

Source: Three Keys to Effective Execution, Melissa Raffoni
Harvard Business School Publishing Corporation, 2003

Key Messages for Infection Preventionists

- We are doing good things in infection prevention and control; need more consistency
- This is a time of transition for the profession
  - Consumer awareness and expectations
  - Legislative, governmental mandates
  - MDROs, emerging diseases, global transmission
- Customers and payers demand proactive programs – must focus on *PREVENTION*

Source: Denise Murphy and Ruth Carrico. Am J Infect Control 2008: 36:232-40

Key messages continued

- Many programs getting to zero and sustaining!
- Sustainment goes beyond education and training or other traditional interventions
- Need a systems model that can design or *engineer prevention into patient care*

…an Infection Prevention System

Source: Denise Murphy and Ruth Carrico. Am J Infect Control 2008: 36:232-40

What is a SYSTEM?

The basics…

Integrated collection of facilities, parts, equipment, materials, technology, personnel and/or techniques which make an organized whole capable of supporting some purpose or function.

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

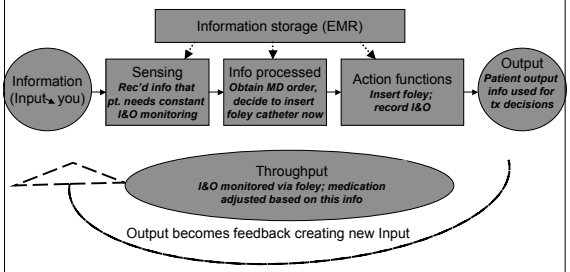
Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

Components of All Systems

- Interaction of elements
- Conversion processes
- Structure
- Purpose and goals and function
- Inputs or resources
- Outputs
- Environment
- Attributes
- Management, agents, and decision makers

Source: The practice of Ergonomics: Reflections on a Profession by David Meister

Basic Functions of a System



Modified from: Mc Cormick, EJ and Sanders, MS.
Human Factors in Engineering and Design. New York: McGraw-Hill Book Company, 1982.

What does a COMPLEX ADAPTIVE SYSTEM look like?

SOURCE: Carayon, P., Hundt, A., Alvarado, C., et al.(2006). Work system design for patient safety: SEIPS model. Qual and Safety in Health Care;15(supp 1):50-58.
(SEIPS = System Engineering Initiative for Patient Safety)

If people are not totally predictable, what can we build in to make processes (therefore, outcomes…..) more reliable?

- ✓ Simplification
- ✓ Standardization
- ✓ Automation
- ✓ Redundancy
- ✓ Recovery methods/strategies
- ✓ Visual queues
- ✓ Right resources, roles, responsibilities
- ✓ Autonomy/empowerment
- ✓ Supportive culture

Potential Model for Prevention of CLABSI Using a System Framework

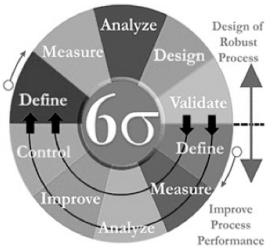
Barnes-Jewish Hospital's Value Stream Analysis – using principles of LEAN engineering aligned with a Six Sigma DMAIC (define, measure, analyze, improve, control) framework to

- map out,
- analyze,
- redesign
- and sustain

a more efficient, defect-free experience for the patient with a central line …and to eliminate CLABSI

The tools and methods…

Lean = WASTE Six Sigma = VARIATION



Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

LEAN APPENDIX

Principles of Lean Systems Engineering

VALUE: Exactly what customers are willing to pay for

VALUE STREAM: …is "everything that goes into" creating and delivering value to the customer. These are the steps/actions/processes that deliver value.

FLOW: Flow challenges us to reorganize the Value Stream to be continuous… one by one, non-stop, minimal waste.

PULL: Pull challenges us to only respond "on demand" to our downstream customers.

PERFECTION: Perfection challenges us to also create compelling quality ("defect free") while also reducing cost ("lowest cost").

Source: Adapted from Simpler Business Systems, Indiana, USA

Basic Elements of Lean

Flow: The continuous creation or delivery of value without interruption

5S: A complete system for workplace organization, including the process for sustainment

Visual Management: Using visual signals for more effective communication

Pull: Working or producing to downstream demand only

Standard Work: Identifying the "best practice" and standardizing to it, stabilizing the process (predictability)

1 by 1: Reducing batch size to one whenever possible to support flow

Zero Defects: Not sending product or service to downstream customer (internal or external) without meeting all requirements

What is the Value Stream Analysis Process?

A combination of Lean tools and techniques to:

- Analyze a process
- Prescribe a plan, with timeline and assignments, for transforming the process
- Achieve breakthrough results

Deliverables of a Value Stream Analysis Event (4 days)

Three Value Stream Maps

- *Current State:* A clear picture of how it is today
- *Ideal State:* What we envision long range (perfect?)
- *Future State:* What we will look like in 6-12 months

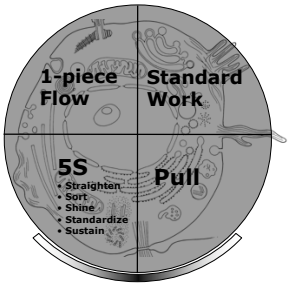
Key VS performance improvement indicators (metrics)

Detailed action plan of Rapid Improvement Events (RIEs), PI projects, and Just-Do-Its (JDI)

Flow cell - "the fundamental building block of Lean"

One by One:
- Batch size of *one*
- Most direct path
- Each item "flows" through the cell without stopping

Defect Free:
- No asking, no searching, no clarifying
- Can tell normal vs. abnormal at a glance
- Abnormal conditions trigger immediate action



Visual Management
(a completely transparent process is what enables a flow cell to operate)

Lowest Cost:
- Best way known today
- Pace to Takt Time
- Same way for all staff
- Everyone sees, knows and understands

On Demand:
- Produce to downstream request only
- Work fluctuates w/demand
- Perfect handoffs
  - one way to request
  - one way to receive

Source: Simpler Business Systems

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

What is Value \ What is Not

Value-adding:

- **ANY ACTIVITY THAT PHYSICALLY CHANGES THE MATERIAL BEING WORK ON AND INCREASES IT'S VALUE**

Non-value adding:

- **ANY ACTIVITY THAT TAKES TIME, MATERIAL, OR SPACE BUT DOES NOT PHYSICALLY CHANGE THE MATERIAL OR INCREASE IT'S VALUE**

Every activity required to move an item through a value stream falls into one of these two categories

Source: Simpler Business Systems

The 8 Operational *Wastes*

DEFECTS: (Wrong info. / Rework / Inaccurate information) Medication errors; misdiagnosis; wrong patient or procedure

OVERPRODUCTION: (Duplication / Extra information) admitting patients early for staff convenience; blood draws/tests/treatment done early, pre-op chart prep 90 days out

WAITING/DELAYS: (Patients / Providers / Material) ER staff waiting for admission; MDs waiting for test results; staff waiting for prescriptions/orders/transport/cleaning

NEGLECT OF HUMAN TALENT: (Unused Skills / Injuries / Unsafe Environment / Disrespect) Scrub Techs used as retractor holders; RNs kept from direct patient care

The 8 Operational *Wastes* (continued)

TRANSPORTATION: (Transactions / Transfer Moving) patients, meds, specimens, lab work, equipment

INVENTORY: (Incomplete / Piles) Dictation waiting for transcription; Medical supplies; Specimens awaiting analysis; Patients waiting for tests, treatment or discharge

MOTION: (Finding Information / Double entry) Looking for missing supplies, forms, patients; equipment not within reach

EXCESS PROCESSING: (Extra Steps / Quality Checks / Workarounds / Inspection / Oversight) Asking patients the same information multiple times; completing unnecessary forms/tests; Triage; verifying orders

Is the current state…

VALUE STREAM MAPPING

Valuable?
- Is the output of the process what the customer wants and needs?
- Are there items missing that can add value to the customer in the current process?
- Are there items that are making the process more efficient but not creating value?

Capable?
- Can each step be performed the same way with the same result every time?
- Is the result satisfactory from the standpoint of the customer?
- Can the steps be executed in similar locations with the same output every time?

Available?
- Can each step be performed every time it needs to be performed?
- Can each step be performed in the cycle time required?

Is the current state…

Adequate?
- Is there enough capacity to perform each step without waiting?
- Can the process accommodate changes to operating conditions and still meet customer requirements?
- Can the process produce similar quality outputs across a range of operating conditions? (Robust)

Flow?
- Do all the steps in the process occur in tight sequence or with little waiting?

Pull?
- Does the downstream step signal when a process should occur?

Level?
- Is demand leveled so that unnecessary variation is removed from the flow?

Ideal and Future State

- Built knowing the current state and its weaknesses and with clarity around the end goal (outcomes)
- *Built as if there were no barriers – in time, human factors, organizational constraints, cultural issues, resources, competencies, equipment, technology….*
- Ideal: a reliable, dependable and nearly-perfect system (maybe after years of work)
- Future State: what can be accomplished toward the ideal state in the next 12 months (& keep resetting)

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

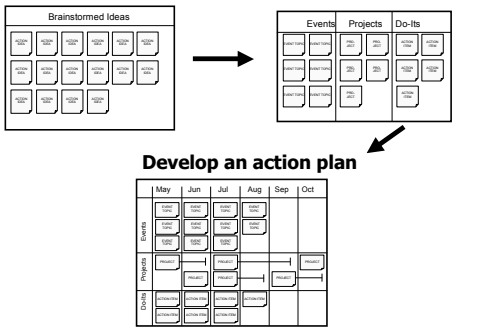
Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

Gap Analysis

Current State ⇢ GAP ⇢ Future State

Action Plans

Brainstorm Solutions → **Sort the action items** (Events / Projects / Do-Its) → **Develop an action plan** (May, Jun, Jul, Aug, Sep, Oct)



Central Line Insertion & Care Value Stream Analysis
February 25-27, 2008

Executive Champion/Sponsor: Denise Murphy;
Physician Champions: Richard Bach, MD (CCU) and David Warren, MD(HEIP);
Process Owner/Team Leader: Amy Richmond, Manager, Infection Prevention

Scope

The scope of this Value Stream Analysis will include the *central line insertion, access & care processes*

- From the decision to insert a central venous line to line removal

Note: Process mapping for PICC lines and dialysis catheters was done prior to VSA and information incorporated into VSA

Reasons for Action

BJH ICUs
- 2007 - 66 catheter-associated BSIs (CLABSI) identified
- 2007 – 2.2 CA-BSI/1000 catheter days (SIR 0.53)
  BJH Non-ICU areas
- CLABSI rates vary from 4 to 9 per 1000 catheter days
- Compared to non-ICU rates of 1.5 in med/surg and 2.1 in general medicine published in the 2006 NHSN report

CLABSI attributable mortality rate = 15% (#10 BJH pts in 2007)

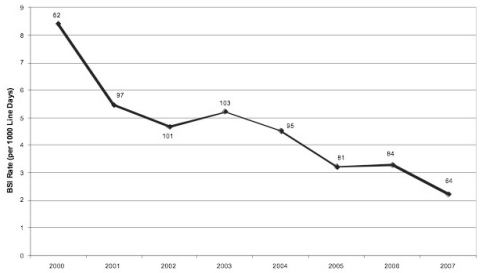
Bloodstream infections cost an excess of $36,000 and excess LOS = 12 days

CLABSI is publicly reported and CMS no longer pays excess costs

RIGHT THING TO DO FOR PATIENT SAFETY!!

Identify the Opportunity

ICU Central Line Associated Bloodstream Infection Rates
2000 to 2007

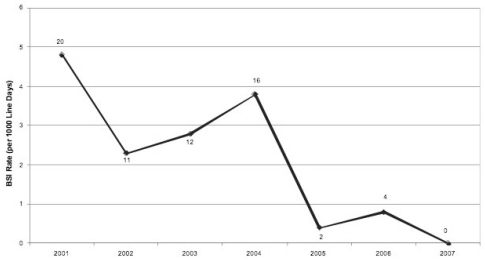


Source: Barnes Jewish Hospital Epidemiology and Infection Prevention Department

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

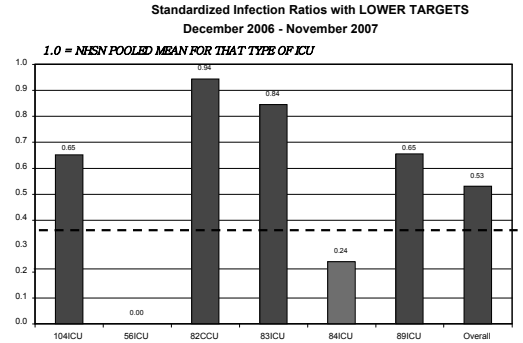
Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

Identify Current Success to Build Upon



Source: Barnes Jewish Hospital Epidemiology and Infection Prevention Department

Initial State



Source: Barnes Jewish Hospital Epidemiology and Infection Prevention Department

Initial State

Barnes Jewish Hospital Epidemiology Infection Prevention
Central Line Insertion and Dressing Scorecard

Unit	Inserter HH	Inserter Sterile gown	Inserter Mask	Inserter Cap	CHG used	Site air dried	Drape used	Dressing Dated	Sterile field maintained	Compliance w/all Recommendations
104ICU	90%	90%	90%	90%	100%	90%	100%	NC	90%	90%
82CCU	91%	94%	94%	94%	66%	79%	96%	15%	83%	83%
83ICU	84%	100%	100%	100%	98%	98%	98%	48%	NC	84%

* Is not required to meet all recommendations, NC = Not Collected by the Unit

Criteria for meeting all recommendations:
Site disinfected with CHG and air dried
Fulldrape was used
Inserter did the following: practiced HH,
Proper PPE (Sterile gown, gloves mask and cap)
Maintained a sterile field

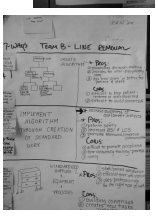
Solution Approach for this Event

Process Mapping
- Current: VA vs. Non-VA
- Future: VA vs Non-VA
- Ideal

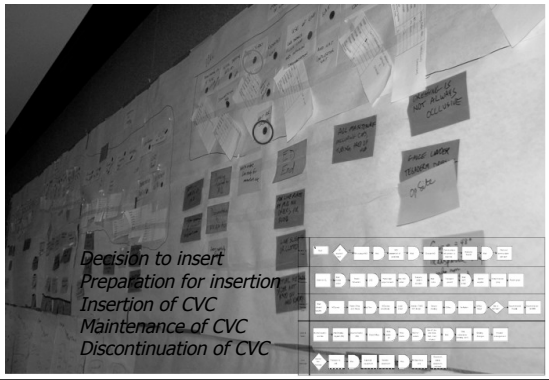
Gemba Walk

Solution Approach for this Event

Voice of the Customer
Identified Wastes
Affinity Diagram
Impact Matrix
Flow Cell

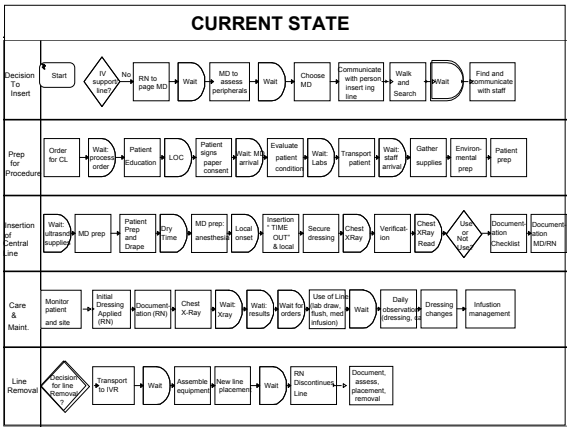


Current State Process Map



Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

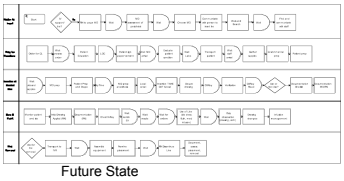


Future State

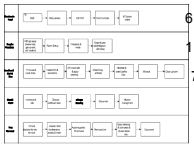
- Elimination of CLABSIs by 2010
- ICU CLABSI SIR of 0.38 for 2008 (no more than #30 CLABSI; 13 in 2009)
- >95% Compliance with CVC insertion and dressing change recommendations
- Identify and evaluate complications related to CVC insertion (other than infection)

Current State to Future State

Current State



Future State



6 fewer steps

11 fewer steps

7 fewer steps…

53 % fewer steps

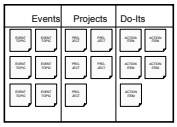
Gap Analysis

- Lack of RN competency with peripheral sticks
- Lack of dedicated vascular access experts
  - Lack of communication/command center
- Lack of standard algorithms: initial/daily screening, decision to insert, decision to remove
- Lack of staff to assist provider with insertion
  - Central line insertion requires an appropriately trained assistant
- Lack of standard work (SW) for line insertion/care
  - No SW for preparation/set up and break down
  - No procedure checklist for line insertion
  - No SW for documentation of line insertion, care and maintenance
- Supplies/Equipment not available as needed
  - Kits not standardized to contain what is needed
  - Supplies not available at point of care
  - Equipment (e.g. ultrasound) not readily available

Gap Analysis

- Lack of transparency regarding competency of provider to insert central lines
- Lack of core central line competencies for floor staff
- Lack of standardized central line education
  - Patients – only given post procedure
  - Staff
- Lack of standard environment for line placement (e.g. procedure room vs. pt room)
- Lack of technology to support the central line process
  - Transparency re insertion, maintenance & care (e.g. auto-population of task lists)
  - Lack of ability for rapid read of verification x-ray

Solution Approach



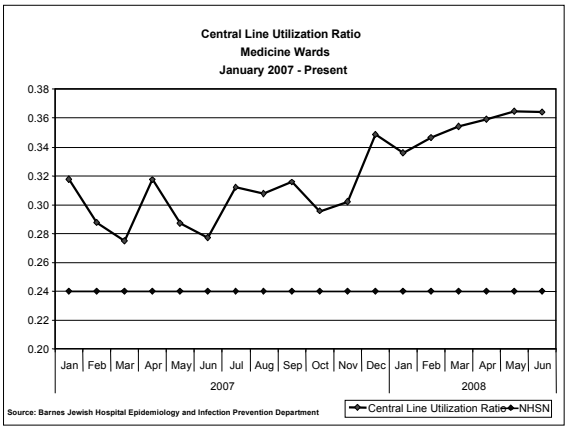
- *Just Do Its*
  - Problem/Gap:
    Standard full barrier drape not available in all patient care areas for CVC insertion
    - Full drapes available at point of care

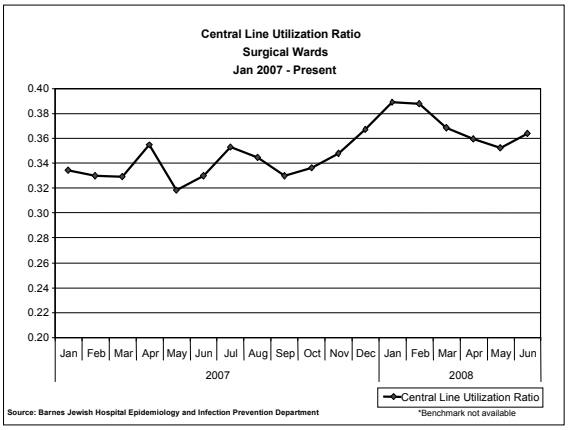
Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

Performance Improvement Project #1

- Problem/Gap: Varying staff skill levels placing peripheral IVs
- Initial State:
  - Multiple attempts – patient discomfort/dissatisfaction
  - Excessive utilization of central lines
  - Medication delays
- Future State: Increased staff skill levels in placing peripheral IVs; Develop and implement plan for multidisciplinary training to include "simulation" training
- Metric: Decreased CVC utilization rates





Performance Improvement Project #2

- Problem/Gap: Lack of standardized educational material for patients requiring central lines
- Initial State:
  - There is no standardized patient educational material pre-procedure
  - Although post-procedure material exists, there is no standardization for disseminating to patients
- Future State:
  - Create roles for patient and families relative to insertion and care of central lines
  - Create standardized educational materials and standardized process for dissemination to patient

Rapid Improvement Event #1

- Problem/Gap: No standardized process for determining when to insert or remove a central line
  - Over utilization of central lines
  - Increased risk for complications including BSIs
- Initial State: Fragmented process throughout the hospital, causing inconsistency and variation in the evaluation process
- Future State:
  - Standardized tool (e.g. algorithm) to predict the optimal vascular access mode for a patient
  - Consistent, reliable process that will provide appropriate vascular access utilization and monitoring
- Metric: 90% utilization of standardized tool to predict optimal vascular access mode for patients throughout hospitalization; decrease femoral line utilization

Rapid Improvement Event #2

- Problem: Lack of standard work (SW)
  - Preparation, Insertion (Provider & Assistant), Care, Removal, Documentation
- Initial State: Poor compliance with current policies, lack of CVC training for non-ICU staff
- Future State:
  - Insertion checklist
  - Standardized documentation
  - Std. work for prep, insertion, care, removal, documentation
  - Visual queues to alert staff about line maintenance process steps
  - A model that empowers staff (in all roles) to *STOP THE LINE* when they see non-compliance with infection prevention measures
  - Engineering/administrative controls that will eliminate steps, build in "mistake-proofing" at each critical step in line insertion process
- Metric: 95% compliance with insertion checklist

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

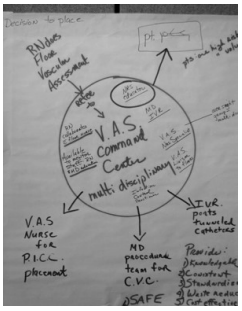
Rapid Improvement Events 3, 4

Problem: Lack of standard work (SW)
- Supplies/Equipment
  - CVC Kits
  - Carts

- Initial State:
  - Disorganization of supplies
  - Supplies not available at point of care
  - An abundance of wasted motion & time looking for equipment and supplies
- Future State: Standard CVC supply kits and procedure carts available at point of care
- Metric: 100% standardized CVC supplies and equipment in all areas where CVC insertion is performed (cart)

Rapid Improvement Event # 5

- Problem/Gap: Lack of coordinated approach to entire spectrum of vascular access (peripheral and central line)
- Initial State: No standardized approach; everyone works in silos, doing their own thing
- Future State: Vascular Access Coordinating Center with identified experts/best practice/standard work algorithms
- Metric: Decreased CVC Utilization



Decision Process for Vascular Access

Rapid Improvement Event #1

Scope

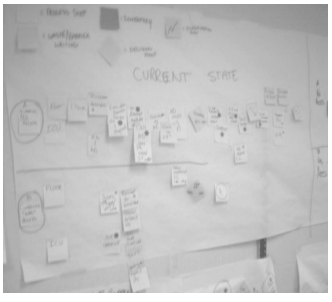
- Initial assessment for necessity of a central line
- Daily assessment for line necessity
  - Reasons why line is needed
  - When should a line be continued and/or discontinued

Reasons for Action

- No standardized process to decide whether to insert a central line or not
- The lack of standardization produces unnecessary procedures and increases risk for complications, including BSI
- Patient dissatisfaction

Initial State

- Throughout the hospital the decision to insert an IV access varies
- Initial assessment of line necessity or line type does not always meet the patient's need



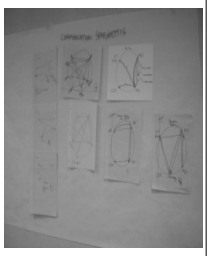
Red dot = waste/non-value added step
Green dot = value added step

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

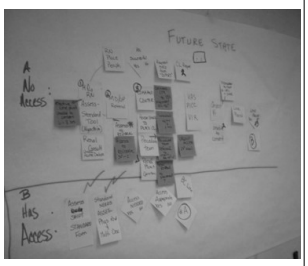
Initial State

Metric	Baseline
Peripheral IV Attempts	**33% (≥ 3 attempts) n = 21**
% of Staff Able to Verbalize Knowledge of Procedure Team and (PICC) Vasc Access Team	**Proc 33%** **PICC 87%**
# Central Line/PICC Lines: **Removed** **Wait time to remove** **PICC lines placed urgently@ DC**	 **3-5 per wk/unit** **½ hr – 3 hrs** **13%**
# of Communication Steps – Decision to Insert	**3 - 22**



Future State

- **To develop a tool that will predict the optimal vascular access device for each patient**
  - Standardized methodology will be utilized for line placement decisions
  - Urgent requests at discharge for PICC lines and Hohns will be decreased
- **To have a consistent and reliable process throughout the hospital that will provide appropriate vascular access utilization and monitoring**



Gap Analysis

- Vascular Access Competency
  - Multiple "sticks"
  - Lack of trust in skill level
  - No reliable back up available
- Lack of standard work-variation floor - floor
  - Determining appropriate vascular access
  - Daily assessment of access status
  - Line Removal
- Lack of transparency
  - No cues that patient has PICC or central line for discharge planning
  - No cues for line maintenance
- Lack of knowledge
  - Procedure team
  - Method of ordering a PICC/contacting Vascular Access Services
  - Line Care and Line Removal

- Standard Work
  - Algorithm and Daily Assessment Tool
  - Line Removal
  - Line Maintenance
- Transparency & Visual Cues
  - Compass – electronic documentation/task lists
  - EMTEK – IV flush
- Communication Plan
  - Vascular Access & Procedure Teams
  - Rollout

Rapid Experiments

- Problem:
  - Variation in process for determining appropriate IV access
- Experiment:
  - Developed a tool to assist in determining appropriate access, type, and ongoing necessity of line
  - Tool will be integrated into Eclipsys/Compass (CPOE)
  - Incorporated a daily assessment tool for line type and necessity
- Expected Impact:
  - Decrease BSI
  - Decrease LOS
  - Increase in patient and staff satisfaction
  - Standardized decision process for line placement
- Metric:
  - Decrease the % of PIV with attempts >2
  - RN/Resident comfort level w/determining appropriate access

Necessity for CVC – Scoring Tool

Intravenous Access Determination

Patient Name: DOB: Room #

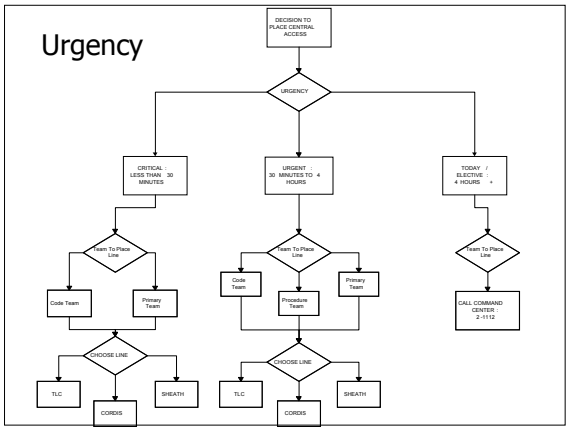
Circle all scores that apply to this patient

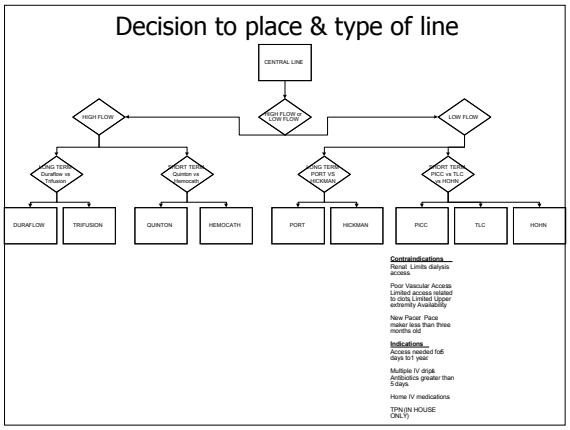
Absolute Indications for Central Venous Access (Central Line)	Score
Trauma / Code	15
TPN	15
Some IV access needed	15
Hemodynamic monitoring	15
Vasoactive drugs (i.e.Nolan, norepinephenine, epi, Thymoglob)	15
Preferred central line medications (Immunoglobulin, dopamine, dobutamine)	15
Chemotherapy requiring central line (i.e., ARA-C, Vincristine, Adriamycin)	15
Acute hemodialysis needed	15
Chronic hemodialysis access needed	15
Pheresis	15
If any of the above criteria apply, STOP: Refer to LIP* for central line Assessment	none
Poor vasculature (0-1 vessel remaining)	2
Current peripheral IV access failed OR Outside hospital access needs to be removed	1
1-2 attempts at peripheral access failed	1
Expert attempt / assessment failed	2
Current Central Line failed	5
Unable to use upper extremities (i.e. AV fistula/graft, mastectomy, amputee, thrombosis)	8
Obesity (BSA >)	4
Suboptimal current access (i.e. femoral, drainage, EJ catheter, placed emergently). STOP: Reassess need for	none
Total Score for Assessment section	
Anticipated Duration	
5-7 days	2
8-14 days	4
2-3 weeks	6
3-4 weeks	8
Greater than 4 weeks OR discharged with IV	10
Total Score for duration section	
Infusions	
Chemotherapy (not requiring central line)	2
Blood products	4
Vancomycin, Cipro, Oxacillin, Zosyn for >72 hours	8
Total Score for infusion section	
Misc. needs	
End stage renal disease, considering hemodialysis. STOP: Refer to LIP possible Renal consult	none
Multiple IV medications or incompatibility	6
Frequent routine blood draws (q 6 hours or more frequently for >24hours)	2
Combined score for all sections:	
Comments:	

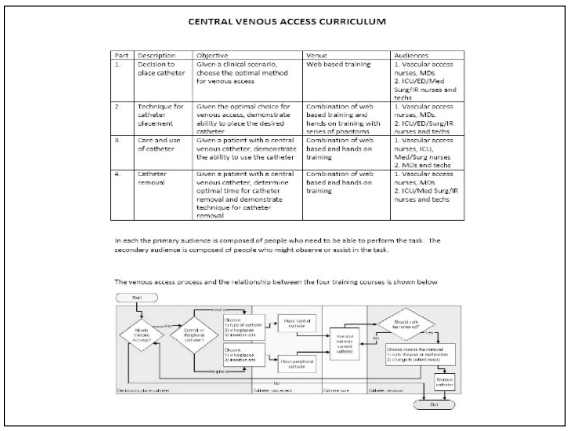
Score of 6 or less = Does not meet criteria for central line or continuation of existing central line
Score of 7 = Discuss need for central line with primary LIP
Score of 8-15 = Central line necessary, collaborate with LIP to obtain order or assess future needs

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass






CENTRAL VENOUS ACCESS CURRICULUM

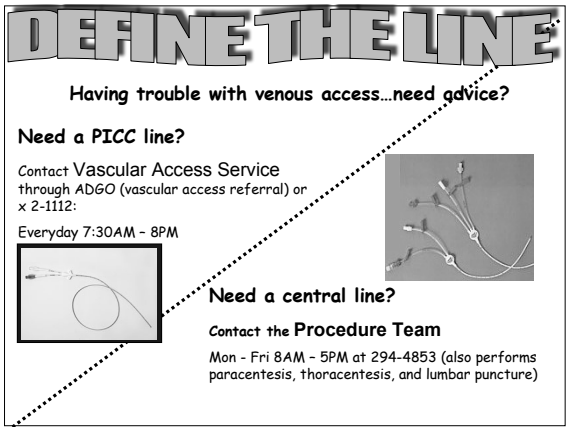
Part	Description	Objective	Venue	Audiences
1.	Decision to place catheter	Given a clinical scenario, choose the optimal method for venous access	Web based training	1. Vascular access nurses, MDs 2. ICU/ED/Med Surg/IR nurses and techs
2.	Technique for catheter placement	Given the optimal choice for venous access, demonstrate ability to place the desired catheter	Combination of web based training and hands on training with series of phantoms	1. Vascular access nurses, MDs 2. ICU/ED/Surg/IR nurses and techs
3.	Care and use of catheter	Given a patient with a central venous catheter, demonstrate the ability to use the catheter	Combination of web based and hands on training	1. Vascular access nurses, ICU, Med/Surg nurses 2. MDs and techs
4.	Catheter removal	Given a patient with a central venous catheter, determine optimal time for catheter removal and demonstrate technique for catheter removal	Combination of web based and hands on training	1. Vascular access nurses, MDs 2. ICU/Med Surg/IR nurses and techs

In each the primary audience is composed of people who need to be able to perform the task. The secondary audience is composed of people who might observe or assist in the task.

The venous access process and the relationship between the four training courses is shown below

Rapid Experiments

- Problem:
  - Varying knowledge of resources available for central line placement
  - Underutilization of experts for line placement
- Rapid Experiment:
  - Screen Saver – Vascular Access and Procedure Teams
  - Dissemination of informational flyers
  - Placement of flyer on CCTV
  - Article in *Physician News*
- Impact:
  - Increase efficiency of determining appropriate access
  - More time for staff to focus on patient care
  - Line placed in timely manner
  - Increased patient satisfaction
- Metric:
  - Increased (95%) staff/resident awareness of resources – Vascular Access Team and Procedure Team
  - Monitor # of requests for PICC placement and Procedure Team



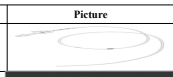
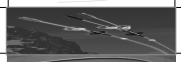
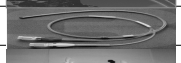
Rapid Experiments

- Problem:
  - Variation in the line removal process
  - Delays in patient discharge
- Rapid Experiment:
  - Created standard work for line removal
  - Created reference pictorial
  - Identification of available professionals in each department to remove lines
  - Created an education module for the standard process for line removal
- Expected Impact:
  - Increase patient satisfaction
  - Decrease infection
  - Decrease delays in discharge
  - Improve understanding of proper technique for line removal
- Metric:
  - # Central lines/PICC removed by nursing staff

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

Barnes-Jewish Hospital Central Line Grid

Name	Picture	Who places	Who removes	Flush
Hickman catheter		VIR	VIR	Heparin
Groshong Tunneled Catheter		VIR	VIR	Saline only
Power Hohn		VIR	VIR	Heparin
Hohn		VIR	VIR	Heparin
Neostar		VIR	VIR	Heparin
Arrow Triple Lumen Catheter		MD	MD, ICU RN, PACU RN, ED RN, 7200 RN, NP, PA, LCN	Heparin

Confirmed State

Metric	Baseline	Post Experiment	Target
Peripheral IV Attempts	33% (≥ 3 attempts) n = 21		0%
% of Staff Able to Verbalize Knowledge of Procedure Team and (PICC) Vascular Access Service	PICC 87% Proc 33%		95%
# Central Line/PICC Lines: Removed Wait time to remove PICC lines placed urgently@ DC	 3-5 per wk/unit ½ hr – 3 hrs 13%		 ½ hr 0%
# of Communication Steps – Decision to Insert	3 - 22	4-5	3 when command center implemented

PICC LINE REMOVAL EDUCATION FOR STAFF


Equipment needed

Wash hands


Remove dressing

Clean insertion area

with alcohol sticks

and Chloraprep


ETC.

Completion Plan

Action Item	**Who is Responsible**	**By When**
Post screen saver	Chad Hampton	4/24/08
Communication plan (Publications, Meetings)	Jamie Gagliarducci	Upon completion of final RIE
Place line removal training module on *Pathlore* (intranet)	Vicky Ferris, RN Angie Dixon	05/16/08
Central line removal pictures	Melissa Schultz, RN Vicky Ferris, RN	4/24/08

Rapid Improvement Events #3 & 4

- Problem: Lack of standard work (SW)
  - Supplies/Equipment
  - Preparation, Insertion (Provider & Assistant), Care, Removal, Documentation
- Initial State: Poor compliance with current policies, disorganization of supplies, lack of CL training for non-ICU staff
- Target State: Standard CL supply kits; standardized procedure carts on all floors; insertion checklist; standardized documentation; SW for prep, insertion, care, removal, documentation

Confirmed State

Metric	*Baseline*	*Post Experiment*	*Target*
Standardized CL Kits	**ICU 0% Nursing Division 0%**	**100%**	**100%**
POC CL Supplies – Procedure Cart	**ICU = 100% Nursing Division = 4.5%**	**100%**	**100%**
# Types of CL kits	**>3**	**1**	**1**
Motion (ft) to Gather Supplies	*Nursing Division = 3810 ft (.72 mi)*	*283 Ft*	*Decrease by 25%*
Time to Gather Supplies	**Nursing Division = 30-45 min (~.5 FTE/year)**	**2.2 min (8 min to restock cart)**	**5 min**
# Items to Gather	**17**	**2**	**Decrease by 50%**

Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Using Performance Improvements to Improve Patient Outcomes
Denise Murphy, RN, MPH, CIC, Main Line Health System
A Webber Training Teleclass

Standardized Central Line Kit

Needleless caps	3
Sterile Saline Flush	3
Filtered Needle or straw	1
Caps	2
Masks with Eye Protection	2
Sterile Gowns xl	2
Chloraprep 3 ml tinted	1
Lidocaine Label	1
Full Body Drape	1
Needle Driver	1
Sterile Towels	4
Sterile Pen	1
Op Site Dressing	1
Suture or Statlock	1
Safety Scalpel	1
Central Line Insertion Checklist	1
Benzoin	1

ORANGE = CVC Supplies/Equip in all store rooms, carts and bins!

Supply Transport Options



STOP INTERRUPTIONS DURING CVC INSERTION!


Cart RE-STOCKING procedure– Part of standard work!

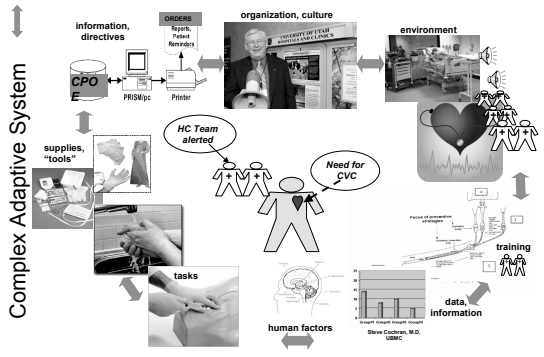
RIE: Standardized Kits and CVC Carts

(Source: Amy Richmond)

Item	Current annual cost	Estimated annual future cost
CL catheter	$14,938	$14,938*
CL Kit	$15,732.64 + (single supplies $25.54 ea)	$21,560
CL Carts	N/A	$39,521.88
Ultrasound	N/A	$92,000
Cost of CLABSI	$2,088,000 (58 BSIs in 4 PCA over 12 mos)	$1,368,000 (38 CLABSIs, **1/3** reduction)
TOTAL	**$2,118,670**	**$1,536,019**
Savings of $582,651		

*** Current cost for catheter tray. Cost for catheter minus items placed in new kit to be determined. Cost will also decrease due to elimination of catheter trays being opened to remove a single item.**

IP system?



Hosted by Sharon Krystofiak sharon@webbertraining.com
www.webbertraining.com

Who will lead this future IP System?

Infection Preventionists with…

- ✓ Advanced skills in
  - ✓ facilitation and group process,
  - ✓ building and leading teams
  - ✓ performance improvement tools and methods
  - ✓ change management
- ✓ Analytic skills, such as those required to do real-time point-of-care root cause analysis
- ✓ Refined understanding of systems thinking, complex adaptive systems/systems approach to problem solving
- ✓ Advanced leadership skills: e.g., negotiation, persuasion

Thanks to Amy Richmond, Team Leader; Pat Matt, PI Engineer (Facilitator) and the Teams at Barnes-Jewish Hospital who are committed to eliminating HAI.

murphyd@mlhs.org

The Next Few Teleclasses

29 Sep. 09	(Free Teleclass) Voices of CHICA – Part 2 Speaker: CHICA-Canada Board Members & Guests
01 Oct. 09	The Changing Face of MRSA – Evolving Epidemiology Speaker: Dr. Andrew Simor, Sunnybrook Hospital, Toronto
15 Oct. 09	The Socioeconomic Cost of Enteric Disease Speaker: Dr. Doug Scott, CDC
21 Oct. 09	(South Pacific Teleclass) National Work on the Prevention of Healthcare Acquired Infections in Australia Speaker: Dr. Marilyn Cruikshank, Australian Commission on Safety & Quality in Healthcare
22 Oct. 09	(Free Teleclass) Improving Infection Control in Developing Countries Speaker: Dr. Benedetta Allegranzi, World Health Organisation
29 Oct. 09	Prevention of Catheter-Associated Urinary Tract Infection: New Strategies from CDC/HICPAC Speaker: Russell Olmsted, St. Joseph Mercy Health System

www.webbertraining.com.schedulep1.php