Collaborative Healthcare Improvement of Patient Services “CHIPS”

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At The End of the Day…

• Patient care is only as good as the care that is delivered by frontline staff. The frontline staff or the places where patients, families and care teams meet are called *Clinical Microsystems*. 
Microsystems are the *building blocks* that come together to form Macro-organizations.

The health system can be no better than the small systems ...
Science-based Improvement

“Generalizable Scientific evidence” + “Particular Context” → “Measured Performance Improvement”

I. • control for context
   • generalize across contexts
   • sample design

II. • understand system “particularities”
    • learn structures, processes, patterns

III. • balanced outcome measures

IV. • certainty of cause & effect, shared importance
    • loose-tight coupling
    • simple-complicated-complex

V. • strategy
   • operations
   • people

DMIC
So, why focus on the “clinical microsystem?”

- Basic “building block” of health care as a system.
- Unit of clinical policy-in-use.
- Locus of most workplace “motivators” and many “demotivators”
- Most variables relevant to patient satisfaction controlled here.
- Where “good value” and “safe” care are made.
- Where most health professional “formation” occurs after initial preparation.
High Performing Clinical Microsystems

- **Leadership**
  - Leadership
  - Organizational support

- **Staff**
  - Staff focus
  - Education & Training
  - Interdependence of care team

- **Performance**
  - Performance results
  - Process improvement

- **Patients**
  - Patient Focus
  - Community & Market Focus

- Not a single bullet but rather a special blend.

DMIC
A Framework for Execution

Executing for System-Level Results: Part 1
by Tom Nolan, IHI Senior Fellow
Clinical Microsystem Idea

• Tightly organizes the unit around the needs of the patient

• The provider/patient interface efficiency is improved by
  – understanding purpose, patients, professionals, processes, and patterns important to that interface—\textit{5P’s}
  – Conducting small tests of change and measurement—\textit{PDSA cycles}
  – Creating evidence of the change—\textit{Balanced scorecard}
Clinical Microsystems

Small groups

Task Force  Team  Crew

Clinical value compass

5 P’s

Global Aim Template

DMIC
CHIPSTeam Members

- A former unit patient
- Attending Physician
- Resident (PGY 2)
- Unit Nurse Manager
- Day shift RN
- Night shift RN
- Case Manager
- Unit Secretary
- Patient Care Assist
- Housekeeper
- Transporter
Assess Your Clinical Microsystem Using the 5P Framework
Themes, Processes, Aims, and PDSA Cycles

Patient and Staff Satisfaction, Reliability & Consistency, Match Supply and Demand

Discharge Process

- PDSA
- Spec. Aim
- PDSA
- Spec. Aim
- PDSA
- Spec. Aim
- PDSA
- Spec. Aim

Falls and Patient Safety

- PDSA
- Voiding round
- Population
- Spec. Aim

Global Aim & Process

- PDSA
- Spec. Aim
- PDSA
- Spec. Aim
- PDSA
- Spec. Aim
- PDSA
- Spec. Aim

T- 2 hours
Execution Plan

First 6 months: Monthly action-based learning sessions one day each month for 3 hours in afternoon
  – 20 minutes from executive leadership for monthly briefings

• Weekly Team Meetings- applying learnings
• Celebration and Reflection with leadership
• Continue utilizing methodology in daily work
Benchmarks

- US Department of Defense
- Cincinnati Children’s Hospital
- Geisinger Health System
- Cooley-Dickinson Hospital
Theme: Infection- C diff

# of Pts with C difficile by week  4North        9/1/08-10/31/08

4 North C difficile weekly incidence
9/1-9/7 9/8-9/14 9/15-9/21 9/22-9/28 9/29-10/5 10/6-10/12 10/13-10/19 10/20-10/26
5 patients assessed from time of admission to time that new patient admitted to the same room using this questionnaire.
ROS + diarrhea, Stool c-diff #1 sent, ppx abx

**YES**

- Isolation, Contact Precautions

**NO**

- Universal Precautions

Stool c-diff #2, 3 sent, prophylactic ABTX

Stool C diff positive

Full course ABTX, contact precautions, designated equipment: Stethoscope, BP cuff
Process Map:

C diff resolved, Pt D/C

Terminal Cleaning?

New pt risk assessed

Admitted to same room

What is Terminal Cleaning?
Process Map for Patient #1:

+ Neutropenic

4-bed Room (regularly cleaned), 1 bathroom, 1 PCA

Pt admitted to 4N from home

Pt assessed on arrival by RN

Pt assessed by Intern, Resident, Fellow

Pt assessed by Attending

Dx: Neutropenic Fever, Dehydration, r/o C Diff

+ABTX use, +h/o C Diff, + diarrhea

+ABTX use, +h/o C Diff, + diarrhea

+ABTX use, +h/o C Diff, + diarrhea

Broad spectrum ABTX, +++

Hand-washing: pre: no, post: yes, no gown

Hand-washing: pre: no, post: no, no gown

Hand-washing: pre: no, post: no, no gown
Patient 1:

ROS +, diarrhea, Stool c-diff #1 sent, ppx +++

YES

No Isolation, + Contact Precautions

NO

Universal Precautions

Stool c-diff #2, 3 sent, Cont ppx ++++

Stool C diff positive

Full course +++, cont. contact precautions
Patient 1:

**Gloves:** yes, **Hand-wash:** Pre No, Post Yes, No gown, no designated equipment

**C Diff unresolved, pt moved to private room**

**Bed/Area terminally cleaned**

**New pt: not neutropenic, no h/o C diff, ABTX, or diarrhea**

**New pt admitted, developed C diff**

**Neighbor in room:**

Non-neutropenic female with ESRD on HD, had been admitted with dehydration, stage 4 pressure ulcer, FTT.

Being treated with IV Abtx, No hx of C diff; was stable pending dispo.

Patient 1 with C Diff was admitted to same room with staff not following contact precautions or universal precautions, with no designated equipment, sharing one bathroom, one PCA.

Developed C diff 3 days after Patient 1 was admitted to room.
Terminal Cleaning: Should take 45 min-60 min!
Change Ideas:

1. Notify Dietary of patients with C Diff
2. Sinks operated by foot pedals
3. Improve communication from ER on admission
4. Eliminate 4-bedded rooms
5. Check/clean equipment weekly
6. Sink outside every room
7. Adding additional Housekeepers
8. Motion-sesored toilet flush, soap, papertowels
9. Educate Housekeeping
10. C diff protocol sheet
11. Educate Housestaff
Plan/Do:
• 1st change idea was: Educate Housestaff
• We included all the staff on 4N:
  – Housestaff
    • Reminders about Contact precautions
    • Tracking C diff cases during Attending rounds
  – RNs/PCAs
    • Morning Huddle to discuss patients with C diff and Contact precautions
  – Visitors
    • Signs
Results:

4 North C difficile weekly incidence

Weeks

Number of Cases

Observations of Terminal Clean

- Quick
- No bleach used
- Equipment not cleaned
- Bathroom not cleaned
- Sink not cleaned
- Gloves not changed between cleaning dirty room and restocking with clean linen, etc.

2nd change idea: Adding additional Housekeepers
- Housekeepers wouldn’t be pressed for time and could clean more thoroughly.
- This idea is more difficult to test quickly.
New Plan/Do:

• We aim to improve the cleaning process
  – Educate housekeeping about C diff
  – Reevaluate the process of Terminal Cleaning

• To test our hypothesis in a short period of time:
  – Study 2 of our 4-bedded rooms, randomly assign:
    – Room 1: Terminally clean all “high-traffic” contaminated surfaces *daily*!
      • Toilet, Flush handle, Sink, Door knobs
    – Room 2 (control): cleaned with the current housekeeping schedule and protocol.

Track incidence of C diff in neighbors of C diff patient
Looking ahead…

• We will continue to track C diff cases
• Work on our next specific aim and test PDSA #2
  – Nosocomial UTIs in patients with Foley catheters.
Specific Aim

• By December 11th, we aim to decrease total falls from 27 to 13 absolute falls.

• Metric: falls
8N Total Falls 7/07- 12/08

2007
Mean: 3.8
Upper Control Limit: 15.24
Lower Control Limit: -8
Conclusion: Highly variable process

2008
Mean 1.8
Upper Control Limit: 3.13
Lower Control Limit: 0.47
Conclusion: - Variability, + control
8N Night Falls June 2007 - December 2008

Falls on Nightshift

Date

June 2007 - December 2008

6/07-12/07 Mean: 3
UCL: 6.667
LCL: -0.667
Conclusion: Highly Variable
Can improve significantly

6/08-12/08 Mean: 0.714
UCL: 1.71
LCL: -0.29
Conclusion: -Variability, +Control
Less room for improvement
PDSAs to date

• Plan: Voiding Rounds
• Do: PCAs direct voiding from 10 pm – 12 am
• Study: 1 fall, 55 y/o ETOH patient
• Act: Include psych dx, ETOH
• Study: 1 fall Diarrhea patient falls- 3 a.m.
• Act: Elimination Rounds initiated on nightshift tracked with “E” on hourly rounds sheet with verbal reminders
• Study: 0 night falls
• Act: In service education by Pharmacist on psychotropic meds, interactions, etc.
• Study: 0 night falls
Results

• Aim: 13 total falls over 6 months 5/20/08-12/11/08

• June-December 2007: 27 falls in 7 months

• Achieved Specific aim with 4 PDSA cycles

• Specific Aim #2:
  – By March 15, 2009 we aim to have total 5 falls on 8N in 3 months.
  – Metric: Falls
Experimentation to Standardization

- Elimination Rounds decrease night time falls
- Work on habit-building
- Test reminders/ huddles
- Aim: Maintain 0 falls at night by standardizing elimination rounds by PCA staff on 8N
- Lessons: Understanding variation
Day Falls- Continuing Assessment

• Assessment Methods
  – Chart Reviews
  – Process Mapping/ Direct Observation
  – “E” on hourly rounds sheets

• Data does not support that consults, discharge process or timeliness of PT evaluations are contributing to falls

• Goal: 4 PDSAs/ month
Theme

- Patient Safety
- Infection Control
- Decreasing Nosocomial Infection rates in MICU/ PCU
- Hunch: “Let’s work on improving MRSA Swabbing compliance so we can better track conversion rates!”
Facts about our practice

• Infection Control collects aggregate data
• Available metrics are not amenable to rapid cycle testing
• Sepsis - broad diagnosis that cannot be distilled down to a specific secondary diagnosis that is a pure metric
• MRSA Swabbing tests for MRSA Carrier status
  – Carrier status does not increase risk, but is a marker of transmission
• Isolation is the main practice in place to prevent transmission of MRSA
• MRSA conversion rates are a better way to monitor how well we are doing with our infection control practices
Metrics that Matter: 
**MRSA Conversion Rate**

- Patient subpopulation: MRSA Negative Patients
- Process: Prevent MRSA transmission
- Professionals: All MICU/ PCU Staff
- Patterns: MRSA Conversion rate not currently tracked.
- Innovation: New metric that may be a more practical metric to monitor
What is our MRSA Conversion Rate?
Challenge

MRSA Screening compliance currently only 40% in MICU and 46% in PCU, so we can’t even begin to assess the conversion rate until this is improved
Global Aim

We aim to improve our infection control practices in the MICU/PCU as measured by MRSA conversion rates.

• The expectation is that those admitted with a negative screen will be discharged with a negative screen.
• Conversion rate is a pure measure of our prevention practice, this will allow us to monitor our performance.
• By working to improve this process we hope to minimize exposure to pathogens thereby resulting in fewer nosocomial infections
• Decreased nosocomial rates will reduce costs to the health system and decrease the burden of illness for our patients
• It is important to work on this now because:
  – Nosocomial infections increase the burden of illness, increase inpatient length of stay, and significantly complicate the hospital course.
  – Reimbursement will soon cease for nosocomial infections
  – Improvements we generate can feed forward to the organization as a whole to improve infection control practices
Specific Aim

• We aim to improve MRSA swabbing compliance from current 40% to 100%, so that we have a reliable metric with which to track our work.

• Side effect: Also will monitor how successful we are at getting everyone involved with improvement efforts

• Metrics
  – MRSA Swabbing compliance
  – Conversion Rate
MRSA Swabbing

• What is the swabbing process?
  To be performed on admission, every Monday thereafter (unless positive), and then upon transfer from the unit
MRSA Swabbing Process

PEOPLE
  - MD
  - PA
  - RN
  - UR
  - Infection Control

PROCESS
  - consistency with ordering i.e. every Monday, every admission/discharge
  - reminders i.e. for orders, labels or swabs
  - gathering necessary supplies
  - work flow delay i.e. waiting for orders/ print out of labels

EQUIPMENT
  - swabs
  - labels

MRSA Swabbing Compliance
What are our ideas for improving compliance?

- Revise necessary forms to reflect new practice
- Re-education MD/PA to order as routine part of admissions process
- Charge RN to monitor
- Place swab in admission folder
- Stop sign on transfer summary
PDSA Cycle

• Plan
  – Revise Plan of Care Form
  – Educate staff: Nursing verbally, email, communication board
    PA memo, MD verbally, reinforced on daily rounds

• Do
  – Observations of swabbing
  – Education- read directions

• Study
  – Compliance of swabbing
  – Conversion rates

• Act
  – Next steps-educating new resident rotations
MICU Swabbing compliance Dec 1<sup>st</sup>-8<sup>th</sup>

40% to 100%
PCU Swabbing compliance Dec 1st-8th

Conversions

n % compliance

1-Dec
2-Dec
3-Dec
4-Dec
5-Dec
6-Dec
7-Dec
8-Dec
Next Steps:

• Infection Control (IC) on team
• We have begun collecting MRSA conversion data (anticipate 6 weeks for adequate sample)
• IC to provide Conversion rate; MICU/PCU will track weekly on run chart
• Work on improving compliance, so we can be sure we have a ‘pure’ marker for our performance
• Continue with the PDSA Cycles to test ideas for improving compliance
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• CPMRC
Creates Knowledge that Supports Other Tools

- Lean Six Sigma
- TapRoot © RCA Process
- FMEA
- Microsystem Framework

**People**

- Patients & Professionals
- Involved in Event

**Process**

- Event Process
- Clinical/Process Measures & Patterns

**Outcome**

- Reducing Variation & Resources
- Identification of Potential Cause of Process Failure
- Identification of Root Cause

**Action**

- Process Change to Reduce Variation & Resources
- Process Improvement
- Improvements to provide Patient Centered, Safe, Timely Effective, Efficient Care