



Improving Care in Medically Supervised Withdrawal Using Lean Six Sigma

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Disclosures:

We do not have any relevant financial relationships with any commercial interests.

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Objectives

- **Learning Objective 1:** Discuss the basis of the Lean Six Sigma quality improvement methodology
- **Learning Objective 2:** Describe how Lean Six Sigma can be applied to health care problems
- **Learning Objective 3:** Examine the results, outcome, and conclusion of the example quality improvement project

Lean Six Sigma Deconstructed

- What is Lean Six Sigma?
- History of Lean Six Sigma
- Benefits of Using Lean Six Sigma in your Processes
- Who can use Lean Six Sigma
- Our Approach

6σ

What Is Lean Six Sigma?

LEAN



Focuses on removing wastes and streamlining processes

SIX SIGMA



Focuses on preventing defects through problem-solving

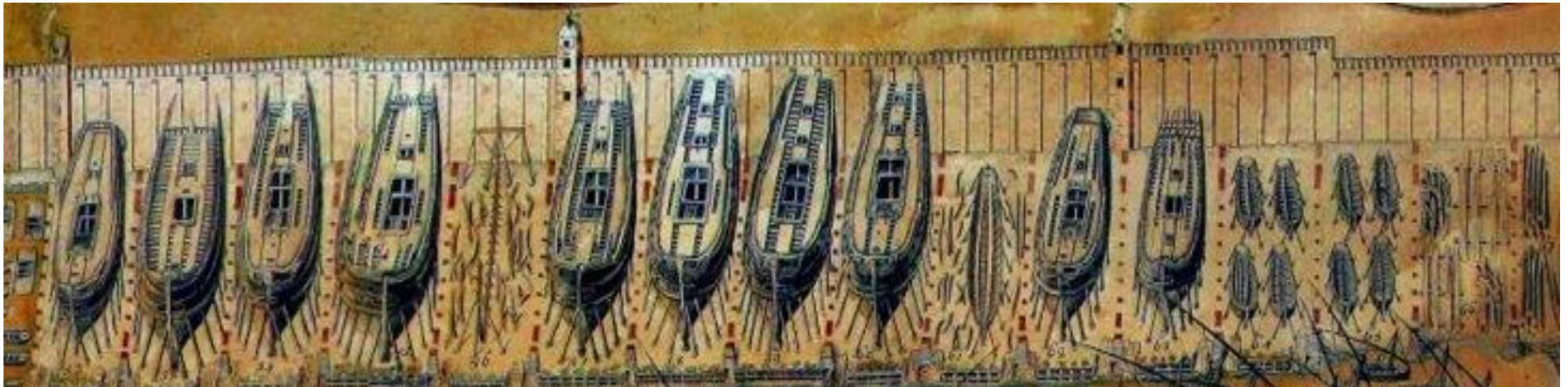
LEAN SIX SIGMA



Lean accelerates Six Sigma- Solving problems and improving processes are faster and more efficient.

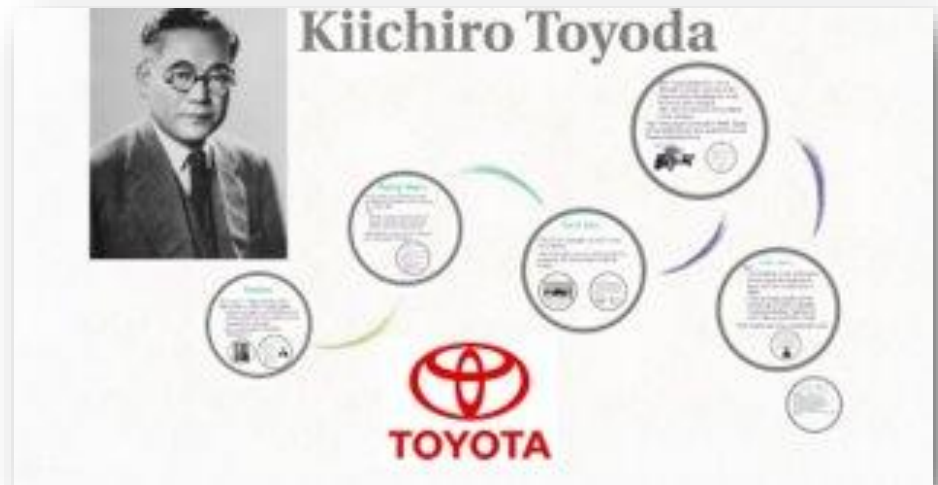
Lean History

- Lean thinking traced back to the Arsenal in Venice during 1450s
- Venetians adopted a standardized design for the ships
- Pioneered the use of interchangeable parts
- Hull completed first then “flowed” past the assembly point for each item needed to complete the ship



Lean History

- Present day, early 1900's, Henry Ford fully implemented the Lean practice with production of the Model T's
- Ford wanted to improve efficiency, but did not offer variety
- Mr. Toyoda and Mr. Ohno from Japan focused on high quality, efficiency and refining throughput times based on customers needs



Six Sigma History

- Introduced by American engineer Bill Smith @ Motorola 1986
- Today, the airline industry uses Six Sigma to ensure safety of its passengers
- Difficult for healthcare to achieve Six Sigma



Benefits of using Lean Six Sigma



Improved
customer
relationships

Improved
Quality

Reduced
Operational
Costs

Project Focused

Decisions based
on quantifiable
data

Reduced
Defects

LEAN SIX SIGMA is Not Just for Clinical Areas

Clinical

- Improves intake, sick call, medication management, chronic care, infirmity care, transitions in care
- UM processes, behavioral health processes

Human Resources

- Recruiting
- Turnover
- Onboarding
- Corrective action
- Payroll
- Employee safety
- Performance Evaluation

Finance

- Budget process
- Labor management
- Procurement process

Business Development

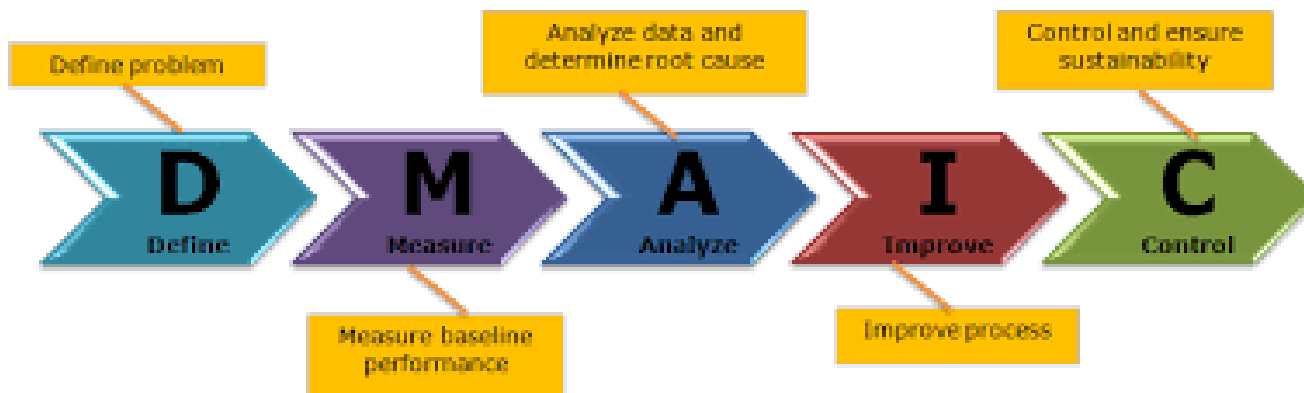
- New business processes and strategies

Information Technology

- Telemedicine/ telenursing
- Technology speed
- Service Ticket Response
- Equipment/ Hardware Management

New approach to process improvement

- Most organizations are great at problem identification
- Gap in sustaining improvement over time
- Determined best practice was to use DMAIC model to address complex problems or problems with high risk



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Applying Lean Six Sigma in Correctional Healthcare

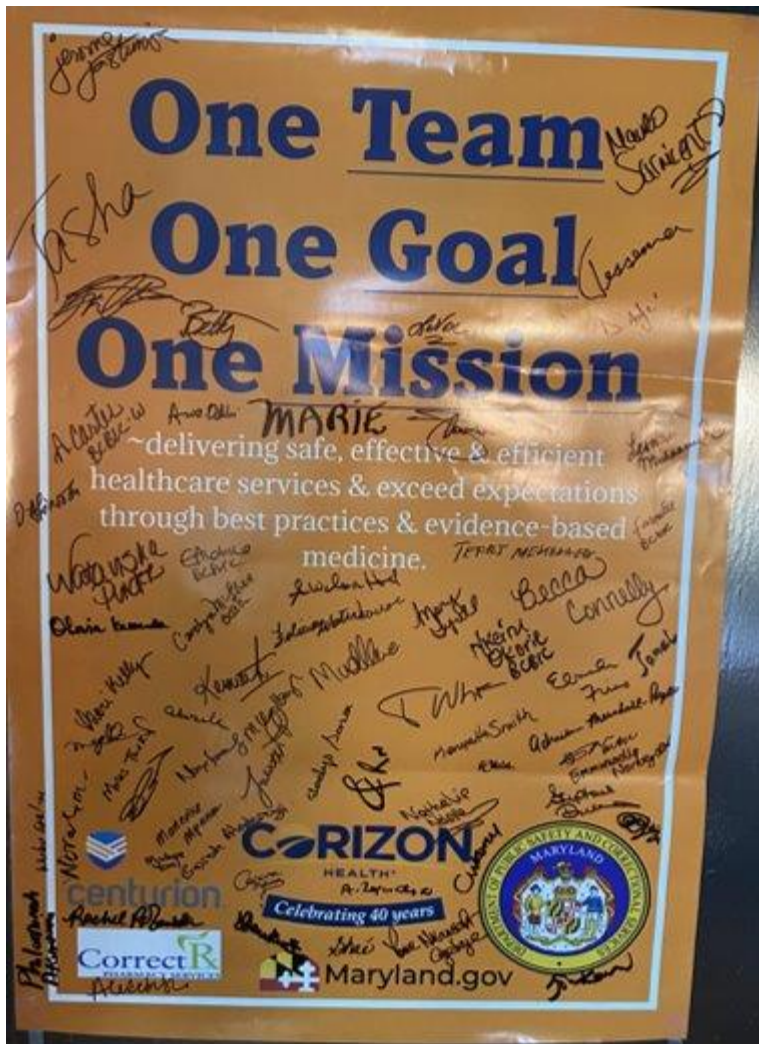


Executive Summary

Baseline Medically Supervised Withdrawal COWS/ CIWA assessment completion rates were 50% overall, 11% for TID orders. This causes tremendous risk to the organization, the Client, and most importantly the patient as this population is responsible for multiple sentinel events at BCBIC. The site had two deaths between February & May 2021. Because of this, Corizon's QIPS team initiated a Lean Six Sigma Black Belt (LSSBB) on February 24, 2021. The team's focus was on improving the Medically Supervised Withdrawal (MSW) process so that they are consistently performed, documented, and transcribed according to the Standard Operating Procedure (SOP).

The project partnered with Correct RX, DPSCS, & HCAM





One Team, One Goal, and One Mission means that together as one team with one goal of providing quality care using one mission.

DMAIC



Define

Project Description

Sallyport withdrawal monitoring and related medication orders are inconsistently performed, documented and transcribed. Orders have been transcribed in duplicate or missing altogether, and these errors are carried forward to Tower's Medically Supervised Withdrawal MARs.

Detainees reporting substance abuse during IMMS do not receive initial drug toxicology screening per (National Commission Correctional Health Care) NCCHC and (Code of Maryland Regulations) COMAR standards for Opioid Treatment Programs (OTPs). This causes delays in care, increases patient safety risk, and has led to sentinel event

Project Goal

Improve the Medically Supervised Withdrawal (MSW) process so that they are consistently performed, documented, and transcribed according to the Standard Operating Procedure (SOP).

Project Charter

MEDICALLY SUPERVISED WITHDRAWAL PROJECT CHARTER

| | | | | | |
|-------------------------------------|---|-------------------|--------------|-----------------------------|-----------|
| Region Name | <u>Maryland</u> | Site Name | <u>BCBIC</u> | | |
| Project Name | Medically Supervised Withdrawal Project | Start Date | 2/24/2021 | Anticipated End Date | 9/21/2021 |
| Project Timeframe: | <input type="checkbox"/> 1 week <input type="checkbox"/> 2 week <input type="checkbox"/> 3week <input type="checkbox"/> 30days <input type="checkbox"/> 60days <input type="checkbox"/> 90days <input type="checkbox"/> 120days <input type="checkbox"/> 150days <input checked="" type="checkbox"/> 180day <input type="checkbox"/> 1year | | | | |
| Core Process Area Addressing | <input checked="" type="checkbox"/> Intake <input type="checkbox"/> Urgent/Emergent <input type="checkbox"/> Sick Call <input type="checkbox"/> Medication Management / Pharmacy <input type="checkbox"/> Infirmary <input type="checkbox"/> Chronic Care <input type="checkbox"/> Health Assessment <input type="checkbox"/> UM <input type="checkbox"/> Behavioral Health <input type="checkbox"/> Other/Client | | | | |

Project Description

Sallyport withdrawal monitoring and related medication orders are inconsistently performed, documented and transcribed. Orders have been transcribed in duplicate or missing altogether, and these errors are carried forward to Tower's Medically Supervised Withdrawal MARs. Detainees reporting substance abuse during IMMS do not receive initial drug toxicology screening per (National Commission Correctional Health Care) NCCHC and (Code of Maryland Regulations) COMAR standards for Opioid Treatment Programs (OTPs). This causes delays in care, increases patient safety risk, and has led to sentinel event

Project Goal

Improve the Medically Supervised Withdrawal (MSW) process so that they are consistently performed, documented, and transcribed according to the Standard Operating Procedure (SOP). Compliance goal is > 90% by July 1, 2021.

Voice of the Customer

Customer Benefits

- | | |
|---|--|
| 1 | Safe and comfortable medically supervised withdrawal (MSW) |
| 2 | Reliable patient care without adverse events |
| 3 | Good quality care using standard operating procedures (SOPs) to ensure safe and comfortable MSW, no preventable adverse events, limit ER send outs |
| 4 | Meet compliance with Duvall Settlement Agreement |
| 5 | No preventable offsite medical trips, limited custody transfers, infirmarium admits, unit emergencies, delays in care |
| 6 | Document Nurse / Provider MSW rounds EPHR inferred per DPSCS policy. |
| 7 | COWS / CIWA assessments completed as ordered |

Voice of the Business

Organization Benefits

| 1 | Prevent adverse events, unnecessary discomfort, disruption of daily operations |
|---|---|
| 2 | Avoid legal issues, staying out of the press. |
| 3 | Improve quality, less liquidated damages, decrease in healthcare costs, improved relationship with client. |
| 4 | Staffing competency, retention, relationship between leadership and frontline staff, morale, decrease overtime. |



Gemba Walk Checklist

- ☒ What are you currently working on?
- ☒ Is there an established process for this type of work?
- ☒ Do you have any problems with the established process?
- ☒ Why is there a problem?
- ☒ How can you fix the problem?
- ☒ What do you do to recognize the root cause of the problem?
- ☒ Who do you speak with if there is a certain problem?



Provider Issues Identified w/ GEMBA Walk

Ongoing interruptions

Non-acute Phone calls

- Provider phone switchboard

Non-acute Nursing

- Skills - Wound Care, EKG, ace bandages
- Check EPHR orders from other Providers

Custody

- Sink (maced pts)
- “This guy said he didn’t get his medication”
- Bypassing nursing, straight to Provider

Office Space

- Urine Pregnancy Tests
- Psychology displaces SP

Provider Intake Visit

- Hand-written Intake Forms

Clinic Support

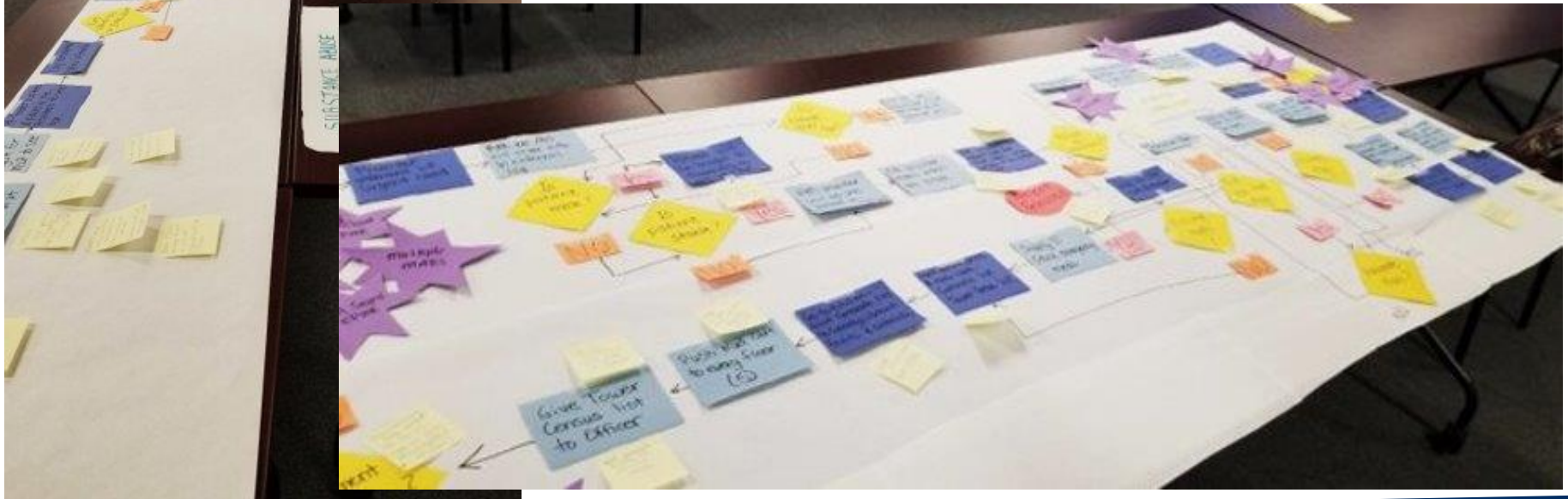
- Female Sallyport charts
- Charge
- Custody Resistance



Measure



Process
Map



Time Studies

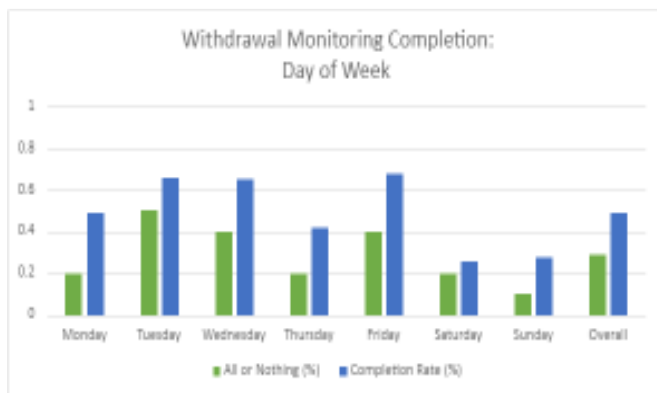
| | | | | |
|--------------------|----------|-------|-------|-----------|
| 5/25/21 (a) | 2118753 | 16:35 | 17:22 | 47 |
| | 2115856 | 17:23 | 17:43 | 20 |
| | 424362 | 17:30 | 17:41 | 11 |
| | 2101541 | 17:42 | 18:00 | 18 |
| | 21044483 | 17:55 | 18:07 | 12 |
| | 2117173 | 18:01 | 18:13 | 12 |
| | 2117317 | 18:08 | 18:21 | 13 |
| | 2105056 | 18:13 | 18:38 | 25 |
| | 2117203 | 18:30 | 18:45 | 15 |
| | 2117274 | 18:40 | 19:04 | 24 |
| | 21172813 | 19:01 | 19:10 | 9 |
| | 21173288 | 19:05 | 19:20 | 15 |
| | 2118468 | 19:30 | 20:11 | 41 |
| | 2115020 | 20:02 | 20:17 | 15 |
| | 2147345 | 20:10 | 21:12 | 62 |
| | 2116974 | 21:35 | 21:55 | 20 |
| | 2115883 | 21:30 | 22:08 | 38 |
| | 2117456 | 22:09 | 22:30 | 21 |
| | | | | 21 |



| | | | | |
|----------------------|---------|-------|-------|----|
| 5/26/2021 (b) | 2117159 | 8:57 | 9:04 | 7 |
| | 2117143 | 9:14 | 9:30 | 16 |
| | 2117169 | 11:02 | 11:11 | 9 |
| | 2117825 | 12:21 | 12:26 | 5 |
| | 3580943 | 12:42 | 12:57 | 15 |
| | 1897496 | 13:37 | 13:47 | 10 |
| | 2117255 | 2:10 | 2:20 | 10 |
| | 2117312 | 2:30 | 2:50 | 20 |
| | 2117331 | 14:47 | 14:54 | 7 |

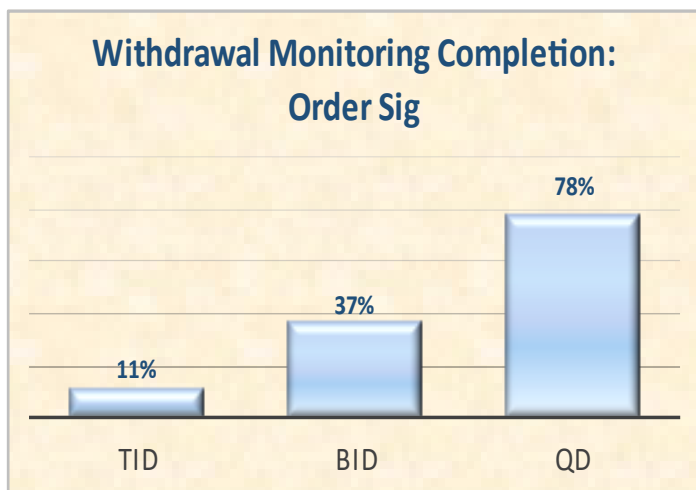
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Baseline Metrics



| | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday | Overall |
|---------------------|--------|---------|-----------|----------|--------|----------|--------|---------|
| All or Nothing (%) | 20% | 50% | 40% | 20% | 40% | 20% | 10% | 29% |
| Completion Rate (%) | 49% | 66% | 65% | 42% | 67% | 26% | 28% | 49% |
| Target | 90% | 90% | 90% | 90% | 90% | 90% | 90% | 90% |

| | TID | BID | QD | |
|------------------------|-----|-----|-----|-----|
| All or Nothing Sig (%) | 11% | 37% | 78% | 42% |



| Metric | Current State | | | Target | | |
|-----------------------------------|---------------|-----|-----|--------|-----|-----|
| "All or nothing" Overall (%) | 50% | | | 90% | | |
| "All or nothing" Day of Week (%) | 29% | | | 90% | | |
| "Completion Rate" Day of Week (%) | 49% | | | 90% | | |
| "All or Nothing Order Sig (%)" | QD | BID | TID | QD | BID | TID |
| | 78% | 37% | 11% | 90% | 90% | 90% |

Financials

Prediction: 10% in adverse events

Projected Savings: \$29K / 1000 pts treated

Legal: 14 MD events:
Prevention ~ 406K

Savings 3x if led to mortality ~ \$855K

**Caveat: figures based on closed cases*



Analyze

- ❑ Investigate Root Causes

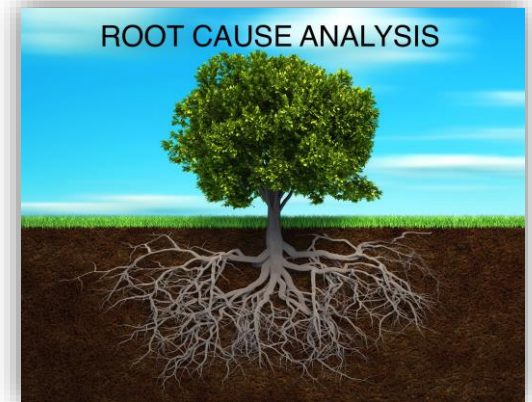
 - 5 Why's

 - Fishbone Diagram

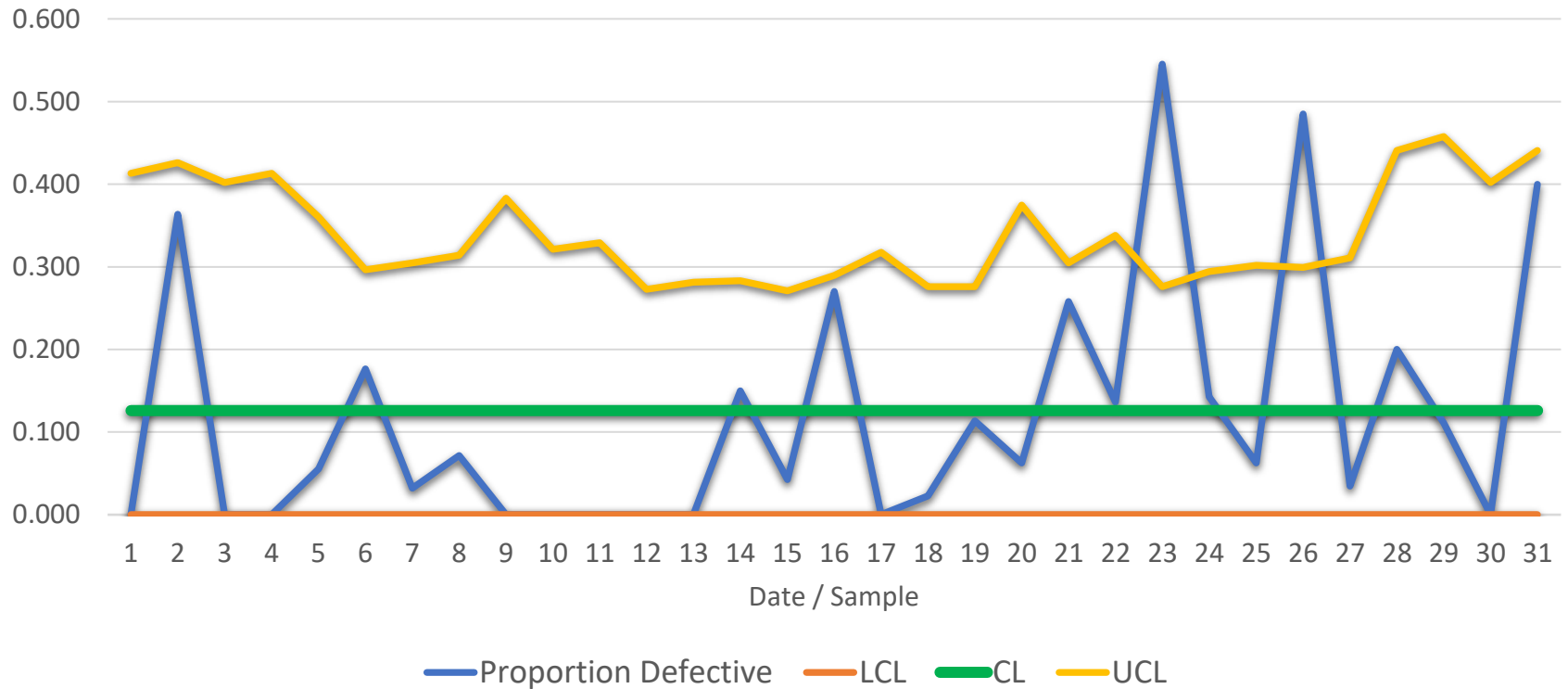
- ❑ Develop Root Cause Hypothesis Statement

- ❑ Collect data; analyze to support or refute hypothesis

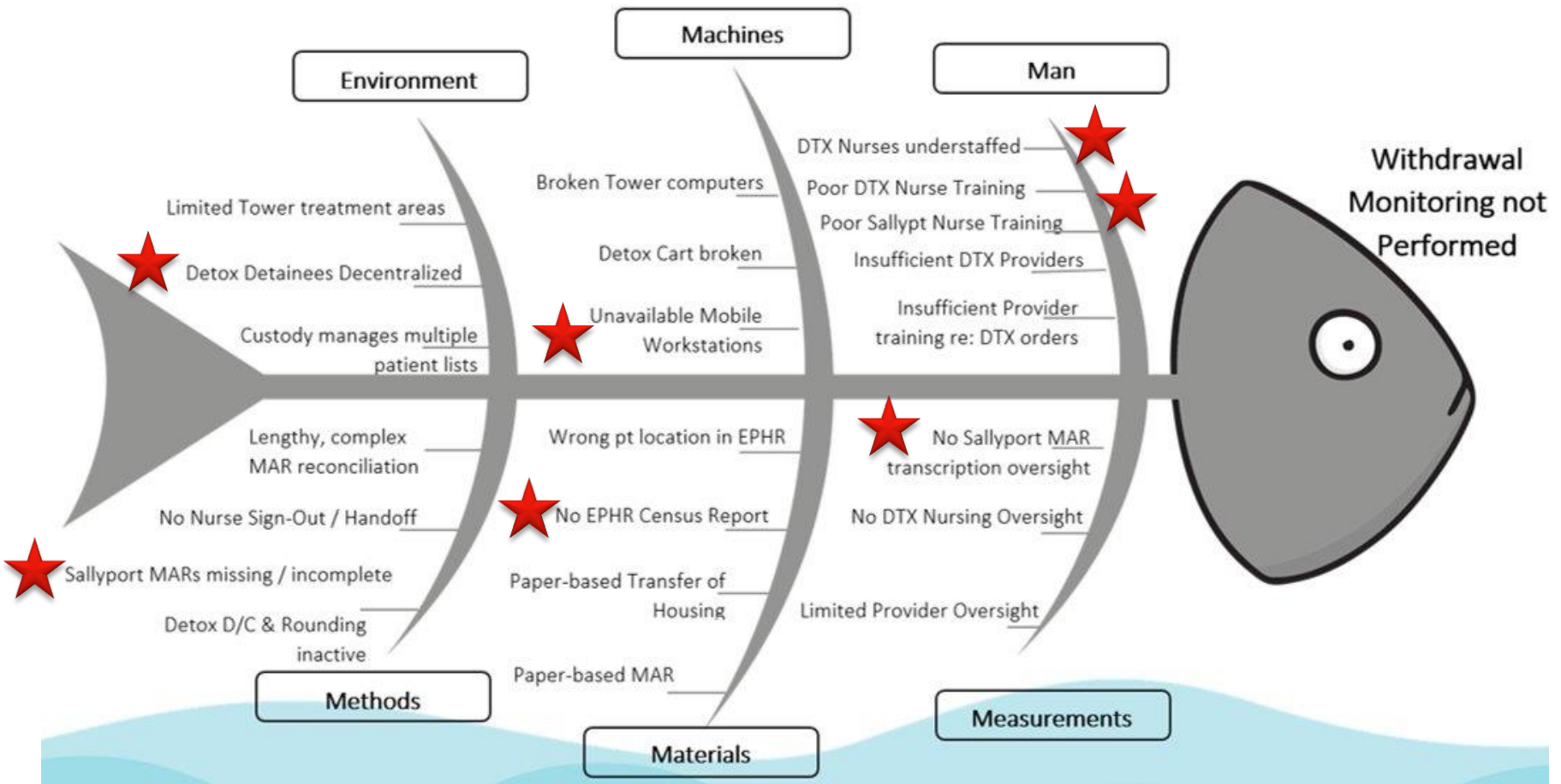
- ❑ Check if team has confidence in root causes to proceed to Improve Phase



COWS/CIWA July P chart



Fishbone Diagram





Fishbone Analysis

Insufficient Staffing
– not enough
dedicated staff for
MSW

Insufficient MSW
Training – too many
variances!

Poor accountability
& expectations for
MARs – transcribing
& lost / misplaced

MSW patients
decentralized

Limited treatment
space

No Census Crystal
Report

Lack of workstations
/ portables for real
time documentation

Limited MSW staff
oversight

Rounding process
not per policy

Nurses not cross
trained

Insufficient
providers & training

Insufficient
Gatorade/Fruit to
hydrate

5 WHYS

5 Whys

The 5 Whys is a simple analysis technique that moves past symptoms by asking “why” until reaching the true root cause of an issue.

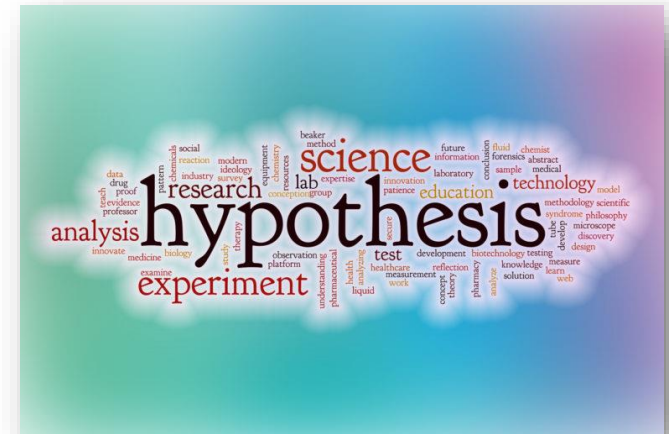


Root Cause Hypothesis

MSW monitoring & med administrations are Inconsistently performed, documented and transcribed due to:

- Lack of Standard Operating Procedures
- Insufficient Training & Accountability to procedures
- Critical staff shortages

Towers staffing shortages & decentralization of Medically Supervised Withdrawal housing have even greater impact.



Improve



- ☐ Brainstorm possible solutions
- ☐ Identify best solutions
- ☐ Test the solution at smaller level
- ☐ Hypothesis testing
- ☐ Develop full scale solution plan
- ☐ Source Selection Matrix

Solution Selection Matrix

| | 1 | 2 | 3 | 4 | 5 | |
|--|------------------|------|--------|------|-------|-----|
| Potential Solution | Potential Impact | Cost | Buy-In | Time | Total | |
| Weighted Criteria | 10 | 9 | 8 | 7 | 5 | |
| YELLOW theme for MSW. ★ | 5 | 5 | 5 | 4 | 5 | 188 |
| IMMS - YELLOW band for Etoh, Opiates, Benzos★ | 5 | 5 | 5 | 5 | 5 | 195 |
| Remove yellow band upon MSW discharge. ★ | 5 | 4 | 5 | 5 | 3 | 176 |
| Create MSW resource binder | 4 | 4 | 5 | 4 | 5 | 169 |
| SP Cell 18 - Addiction Medicine assessments | 4 | 4 | 4 | 4 | 2 | 146 |
| SP Cell 20 - Addiction Medicine waiting area | 4 | 4 | 5 | 4 | 5 | 169 |
| YELLOW Pharmacy – Committed MSW MARs & Meds★ | 4 | 4 | 5 | 3 | 4 | 157 |
| Act on Abnormal Vital Signs | 5 | 5 | 5 | 4 | 3 | 178 |
| Develop Crystal report | 4 | 4 | 5 | 4 | 3 | 159 |
| Dietary – Two bottles Gatorade per MSW patient | 4 | 4 | 5 | 3 | 3 | 152 |
| Correct Rx - MSW MARs on Yellow paper | 5 | 5 | 4 | 3 | 3 | 163 |
| Correct Rx - preprinted MARs | 5 | 5 | 5 | 3 | 3 | 171 |

Countermeasures

[illegible][illegible]

Addiction Medicine Provider Cross-Training

- BCBC Providers Bupe Waived by 12/31/21
- **New** Core Addiction Medicine Team Curriculum
 - 8 Addiction Medicine CME hrs
 - 40 hrs obs; 40 hrs supervised pt care
 - Chart review & knowledge quiz
 - Addiction Medicine Medication Resource Guide (All Provider Training – October, 2021)
- MSW Chart reviews & Nurse Huddles
- Foundation for HB116

If vital signs are outside of these parameters, **YOU MUST** notify a provider and document the encounter!

MD – Vital Sign Parameters

- ❖ Blood Pressure: <90/<60 or >160/>95
- ❖ Temp: <97.0 or >100.4
- ❖ Pulse: <55 or >110
- ❖ Respiratory Rate: <12 or >24
- ❖ Pulse Ox: <93%

Medically Supervised Withdrawal

- | | |
|---------------------|-------------------|
| ❖ Blood Pressure: | <90/60 or >140/90 |
| ❖ Temp: | <97.0 or >100.4 |
| ❖ Pulse: | <60 or >90 |
| ❖ Respiratory Rate: | <12 or >24 |
| ❖ Pulse Ox: | <93% |

MSW

+ MSW Nurse Training

+ Act on Abnormal

+ Code Yellow

+ MSW Crystal Report

+ Addiction Medicine Provider Curriculum

+ Yellow = MSW

+ MAR Handoff

+ Pre-Printed Order Sets

+ Cross-Trained Provider Pool

Booking Windows

Window
#1

Window
#2

Window
#3

Window
#4

Window
#5

HCAM
#6

HCAM
#7

- Reduce Time to Addiction Medicine
- Electrolyte-enhanced hydration
- Limit Officer Time waste
- Centralized patient care
- Upfront Insurance Enrollment
- Peer Recovery Specialists



Intake
Nurse

Intake
Nurse

Intake
Nurse

Corridor



Med Nurse

Intake
Provider

Bath
Room

Search
Room

Single Cells

Yellow = MSW

MSW Armband



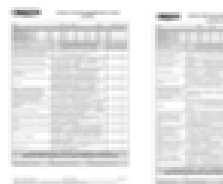
Bin



Triage
Folder



COWS/CWA



A.M.
Office

Corridor

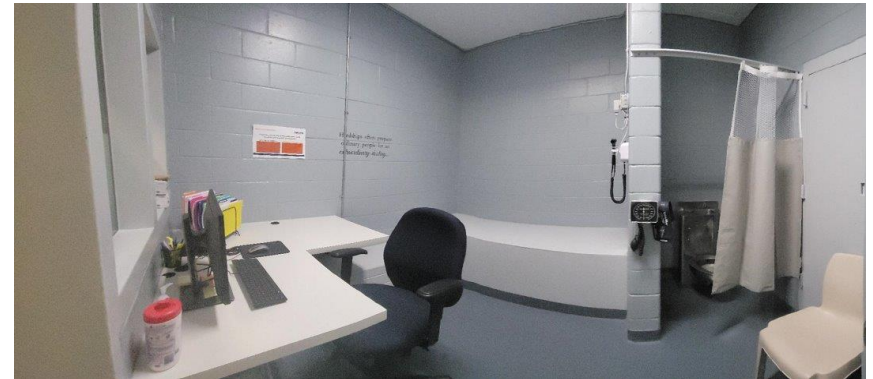
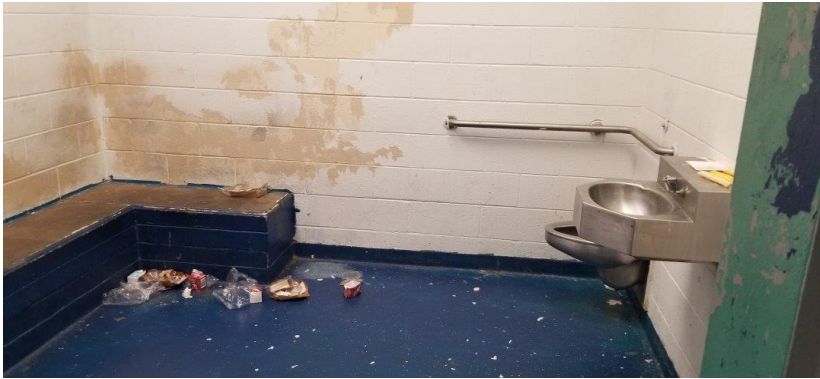


MSW
Group
Cell

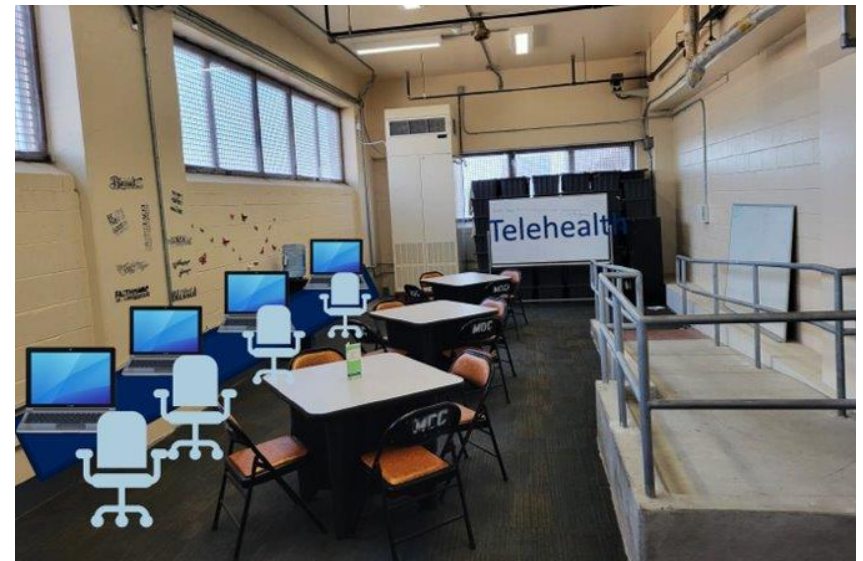
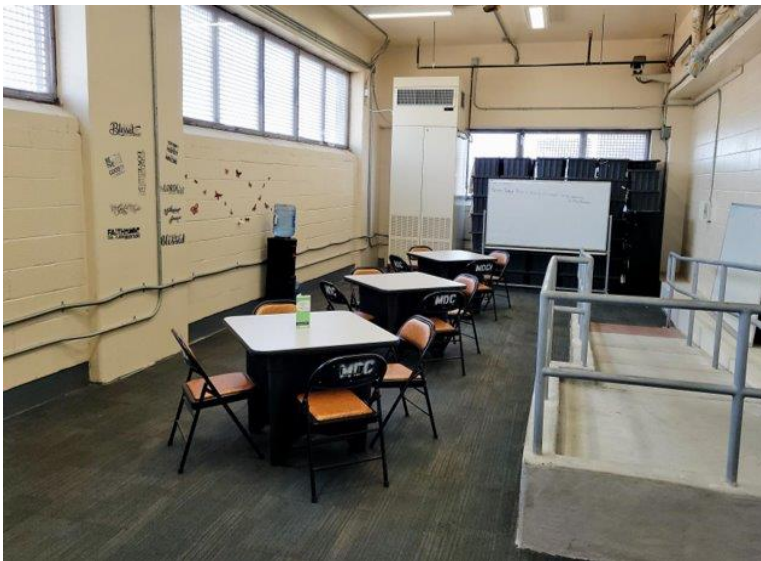


+ IT Solutions

- Semi-Automated MAC / CQI Report
- Consult Tasking in EPHR
- Fusion Templates
- **Pilot - Wireless Laptops for Provider & Nurse Multidisciplinary MSW Rounding*



Infrastructure Improvements



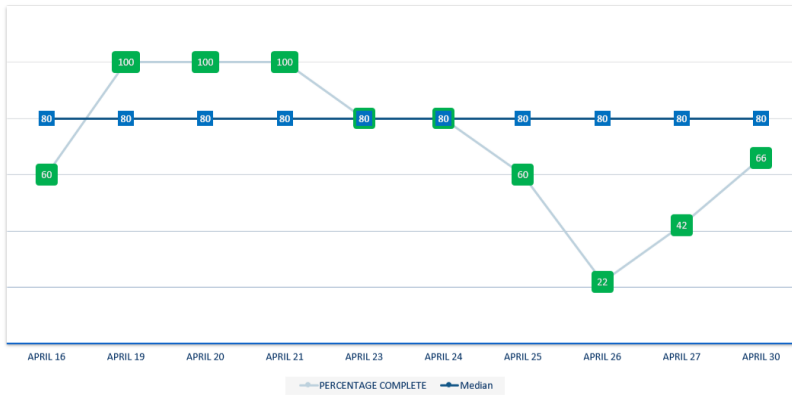
Control

- ❑ Develop a response plan
- ❑ Continuously monitor the process
- ❑ Use Statistical Process Control, Visual controls
- ❑ Estimate financial benefits
- ❑ Do annual review
- ❑ Maintain a report

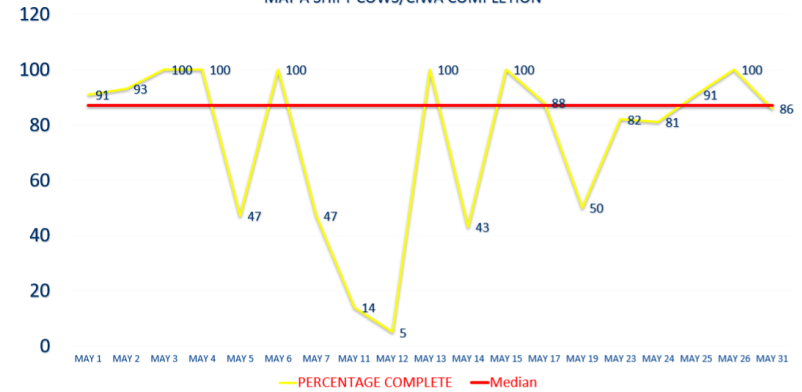


| Monitoring Plan | | | | | | Response Plan | | | |
|---|--------------------------------------|---|---------------------------------|------------------------|---------------------------|------------------------------|------|--------------------------|---|
| | | | | | | | | | |
| Name of the Measure | Input, P rocess or Outp ut? | What is the Target? | Method of Data Capture | Checking F requency | Person Respons ible | Upper/Lower Trigger Point | | Who Will Respo nd? | Reaction Plan |
| Towers COWS/ CIWA Assessme nts | P | 90% Compliance for towers completin g COWS/CIWA | 20 chart audit s per week | Weekly | Kiesha | LCL: 89% 100% | UCL: | Dr McIlree | Audit 20 charts per week for committed patients to check for completion of assessment & any abnormal vitals were reported. |
| Sallyport COWS /CIWA Assessm ents | P | 90% Compliance for Sallyport completi ng COWS/CIWA | 20 chart audit s per week | Weekly | Kiesha | LCL: 89% 100% | UCL: | Dr McIlree | Audit 20 charts per week for committed patients to check for completion of assessment |
| Vital Sign Document ation | P | Vitals are Entered as Instructed | 20 chart audit s per week | Weekly | Kiesha | LCL: 89% 100% | UCL: | Dr McIlree | Staff have been instructed to document vitals in a particular spot so that it trends for providers |
| Abnormal Vital Signs Reported | P | Abnormal Vitals are Reported | 20 chart audit s per week | Weekly | Kiesha | LCL: 95% 100% | UCL: | Dr McIlree | ALL abnormal vital signs must be reported to provider & documented in a SOAP note |
| Escalation Process | p | Escalation Process Followed | 20 chart audit s per week | Weekly | Kiesha | LCL: 95% 100% | UCL: | Mary Tyrell / RDON | Staff have been educated on using the Escalation Process when officer's refuse to bring patients for assessments |
| Repletion | P | Provide Patients Gatorade /Fruit | 20 chart audit s per week | Weekly | Kiesha | LCL: 89% 100% | UCL: | Dr McIlree/ Mr. Young | Dietary will provide equivalent of 2 bottles of Gatorade/day and fruit with each assessment |

APRIL B SHIFT COWS/CIWA COMPLETION

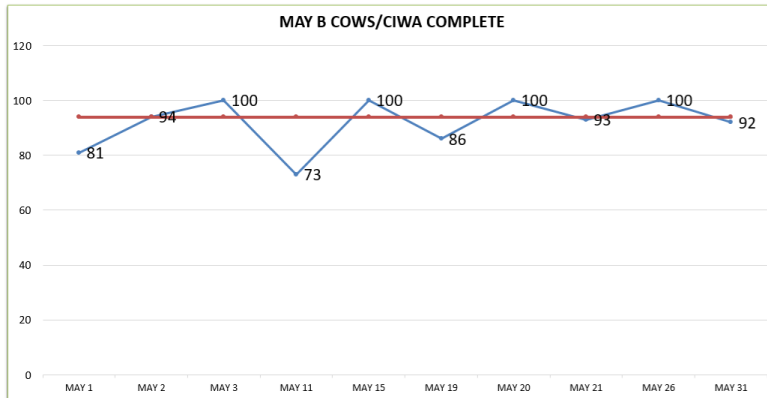


MAY A SHIFT COWS/CIWA COMPLETION

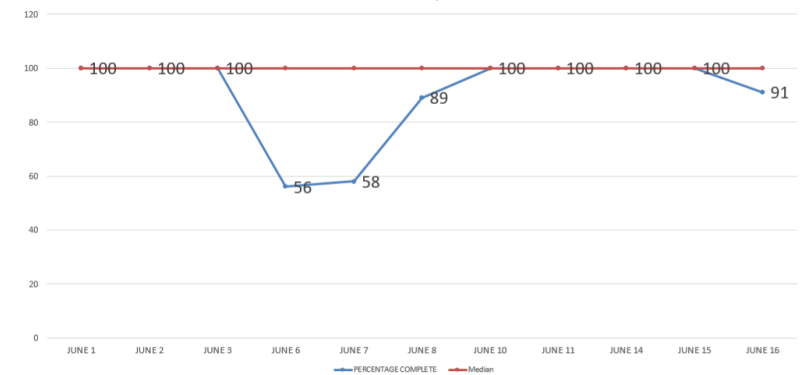


RUN Charts

MAY B COWS/CIWA COMPLETE



JUNE B SHIFT COWS/CIWA COMPLETION



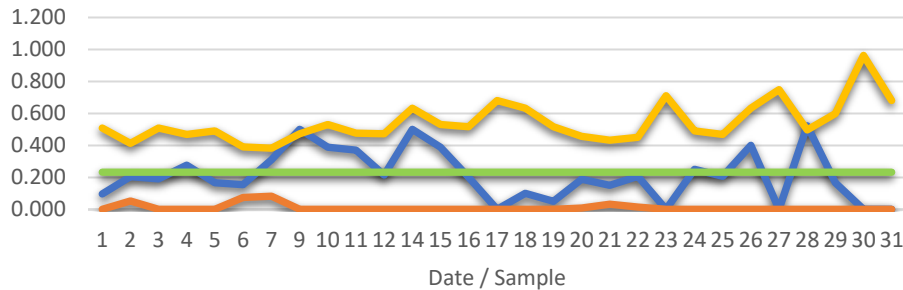
ANOVA Charts

| Anova: Single Factor | | | | | | |
|----------------------|----------|-------|----------|----------|----------|----------|
| SUMMARY | | | | | | |
| Groups | Count | Sum | Average | Variance | | |
| A SHIFT | 13 | 10.64 | 0.818462 | 0.046147 | | |
| B SHIFT | 13 | 10.77 | 0.828462 | 0.063647 | | |
| C SHIFT | 13 | 11.21 | 0.862308 | 0.032003 | | |
| ANOVA | | | | | | |
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 0.013728 | 2 | 0.006864 | 0.145223 | 0.865333 | 3.259446 |
| Within Groups | 1.701569 | 36 | 0.047266 | | | |
| Total | 1.715297 | 38 | | | | |

If you get a p value of less than .05% or 5%, then there is significant difference. This means that you can safely say at least 95% of the time you see a difference.

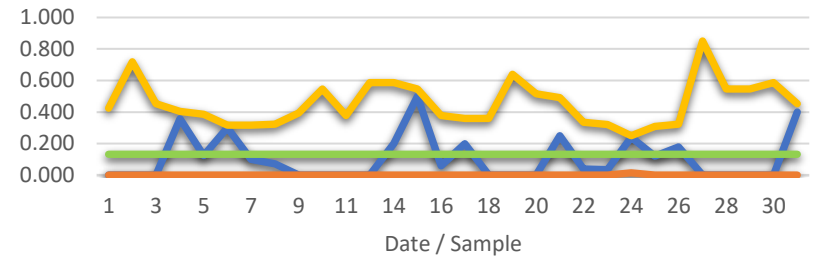
For the month of MAY there was not a significant difference between the shifts.

COWS/CIWA May P chart



— Proportion Defective — LCL — CL — UCL

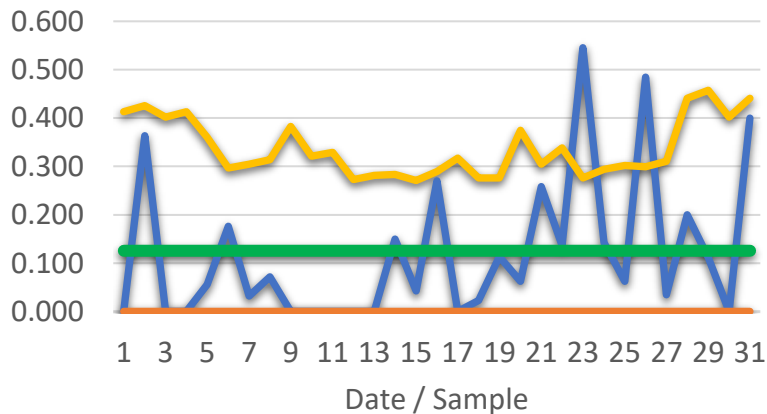
MSW COWS/CIWA June P chart



— Proportion Defective — LCL — CL — UCL

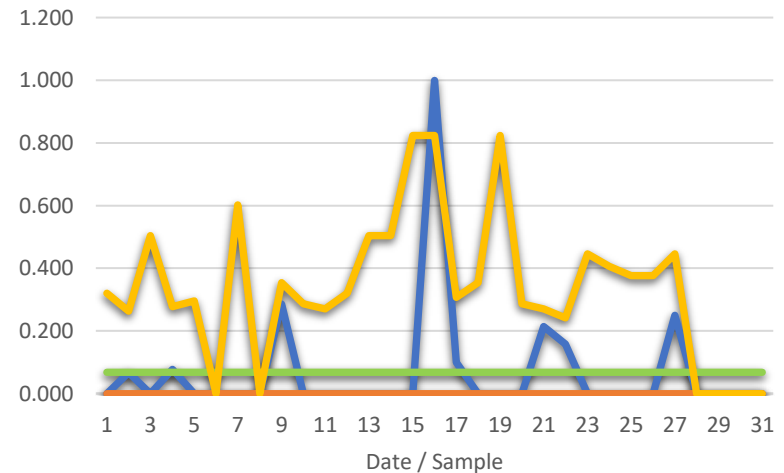
Control Charts

COWS/CIWA July P chart



— Proportion Defective — LCL — CL — UCL

MSW AUGUST P chart



— Proportion Defective — LCL — CL — UCL

COMMENTS / QUESTIONS



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