Target based care in Neurosurgery

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NeuroSafe 2019

Disclosures

Funding:
NIH
Emerson Cancer Collective
Child Health Research Institute
American Epilepsy Society

Integra Lifesciences – consultant (trauma)

Brain & Behavior QAPI Elements

Brain & Behavior QAPI (Quality Assurance/Performance Improvement)

Purpose

Ensure an effective, ongoing data-driven quality assessment and performance improvement program as recommended by the Centers for Medicare and Medicaid (CMS). The QAPI will monitor and evaluate clinical outcomes and facilitate improvements of identified systems issues that impact quality, safety and effectiveness.

Scope

The team will provide a multidisciplinary approach for improving outcomes and processes within the Institute of Medicine's six domains of quality (safe, effective, efficient, timely, patient and family-centered, and equitable), guided by the Packard Quality Management System (PQMS).

Members

Neuroscience QAPI Chairs:
Med Director Stroke Program
Medical Director Neuro-critical care
CNS Neurosciences

Core Team, including Chairs

Division Chief of Pediatric Neurosurgery
Division Chief of Child Neurology
Neuro Radiology
Clinical Nurse Specialist- Pediatric Intensive Care Unit
Surgical Technician
OR Nurse Lead
Neurologist
NP Neurosurgery
Peer Review MD Leader
Medical Director(s)
Patient Safety Representative
Professional Practice Evaluation Program Manager
Family Advisor

Responsibilities

Develop and monitor process and outcome measures
Develop improvement initiatives based on outcome/process measures, opportunities surfaced in the daily management system, and goals deployed through the hospital.
Report results and lessons learned from initiatives on a regular basis

Sponsorship

Vice President, Procedures and Diagnostics Transplant, Brain & Behavior, Surgical Sub-specialties
Vice President Medical Affairs
Vice President Patient Care Services & CNO

Clinical Effectiveness

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PRIMARY OBJECTIVES = IMPROVE VALUE

- Reduction of unnecessary variation in practice
- Maintain & improve excellent clinical outcomes
- Reduce unnecessary resource utilization
- Preserve or improve efficiency/operations
- Good stewards of scientific discovery and innovation

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Target based care 1.0

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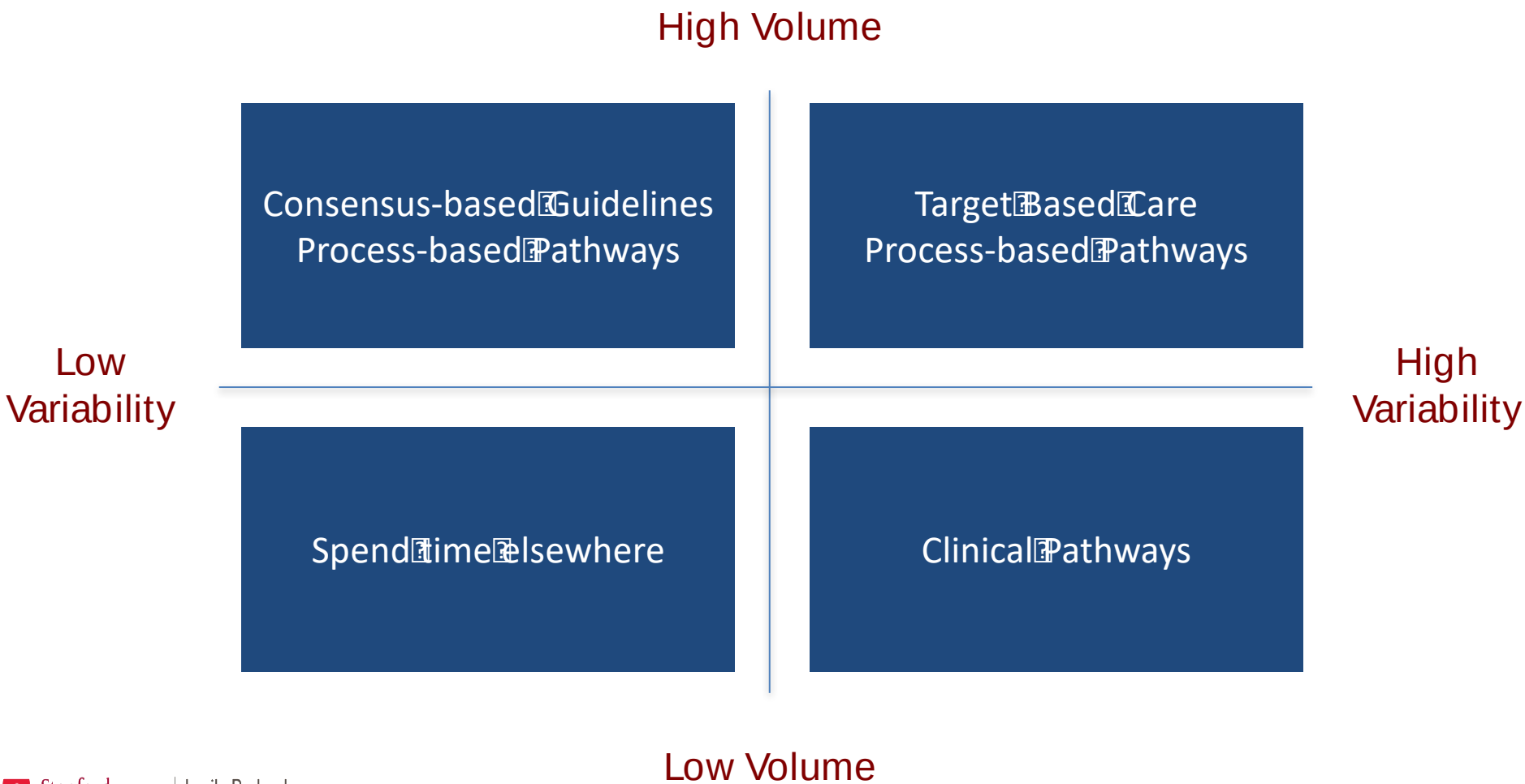
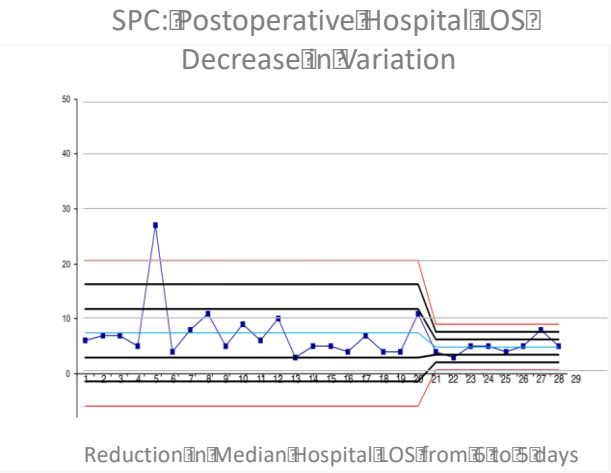
Choice of Candidate CE Tool

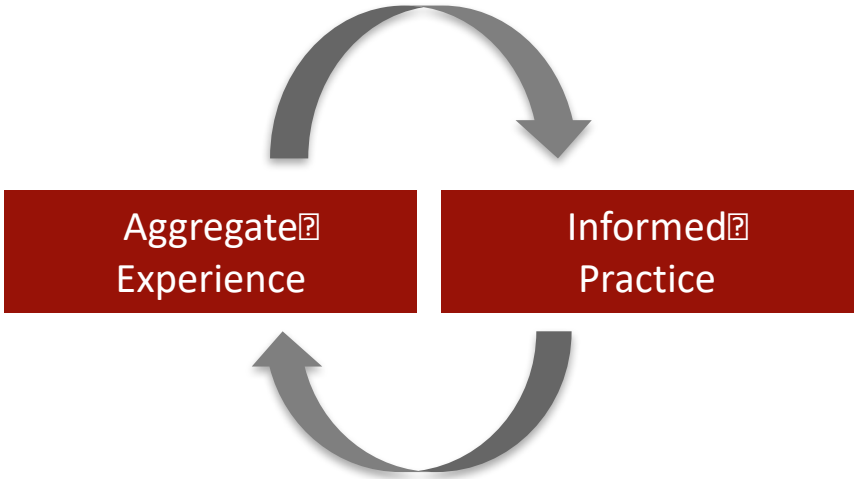
Based on volume and variability characteristics



Target Based Care



Transparency in practice



Decrease variation, Improve outcomes

Evidence Based Medicine → Practice Based Evidence

Performance Measures: Target Based Care

Performance Measures: Target Based Care

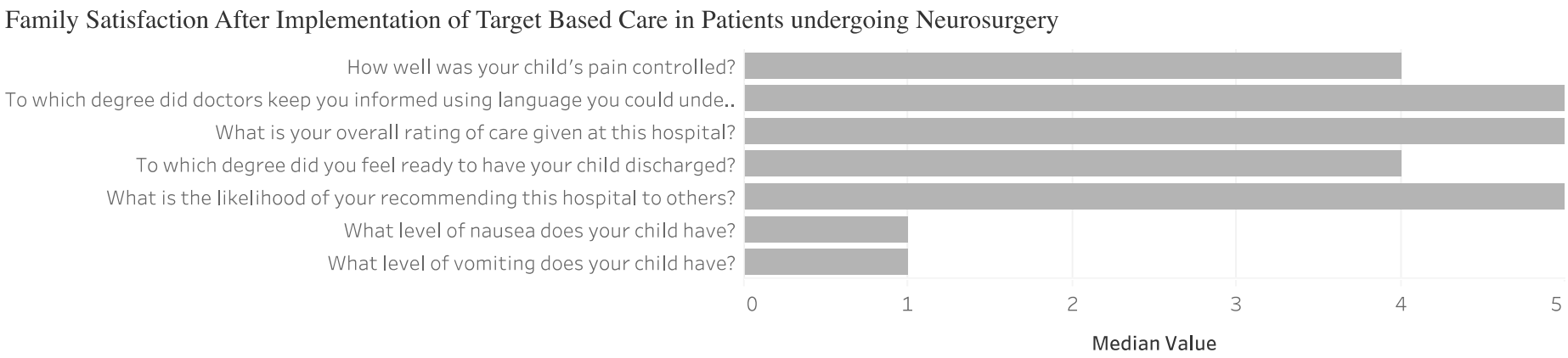
Launched 11/1/2017

- Craniosynostosis (endoscopic)
- Craniosynostosis (open)
- Chiari Malformation
- Posterior fossa (without EVD)
- Posterior fossa (with EVD)

Leveraging Aggregate Clinical Data at the Point of Care Reduces Variation for Pediatric Neurosurgical Patients

- Reducing variation in healthcare aims to optimize outcomes
- Develop standard protocols/pathways
- Decrease ICU and hospital LOS
- Program relies on provider decision making to achieve goals instead of prescriptive approach

Family satisfaction after target based care implementation



Bar chart demonstrating median respondent results to post intervention family satisfaction survey through 7-day post discharge standardized phone survey with questions measured on a Likert scale.
Question 1-5 Scale: 1=very poor, 2=poor, 3=fair, 4=good, 5=very good
Question 6-7 Scale: 1=none, 2=mild, 3= moderate, 4=severe
Includes responses from 30/33 completed patients (91% response rate)

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Leveraging Aggregate Data at the Point of Care Reduces Variation for Pediatric Neurosurgery Patients

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Challenges and Opportunities

Significant variation in clinical practice → inappropriate care, patient harm

Reducing variation can optimize outcomes, minimize waste

Clinical Pathways: significant time, resources

Target based care

- Non-prescriptive: providers make decisions to achieve set targets
- Effective: CVICU reduced ICU and hospital LOS by up to 44.6%
- Generalizable: this method was applied in a pediatric neurosurgical population

Alternative Approach: Target-Based Care

Provide comparative effectiveness "targets" at the point of care

Candidate Operation

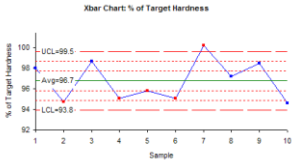
"Patients Like Mine" Historical Cohorts

Target Based Care

Median Intensive Care Days

Set Goal Transfer Date

Median Hospital Duration



Set Goal Discharge Date

Frontline Providers

5 Surgical Procedures Selected:

- Chiari decompression
- Endoscopic & open craniosynostosis repair
- Posterior fossa tumor resection with and without external ventricular drain (EVD)

Target Based Care Methodology

- EHR used to identify comparative cohorts
  - 2 year retrospective data
  - Target ICU and hospital LOS goals tailored for each surgery
- Targets made visible post-operatively at the point of care
- Outcome metrics: ICU and hospital LOS
- Balancing metrics: Hospital readmission and parental satisfaction

93 patients, 80 enrolled over over 13 months

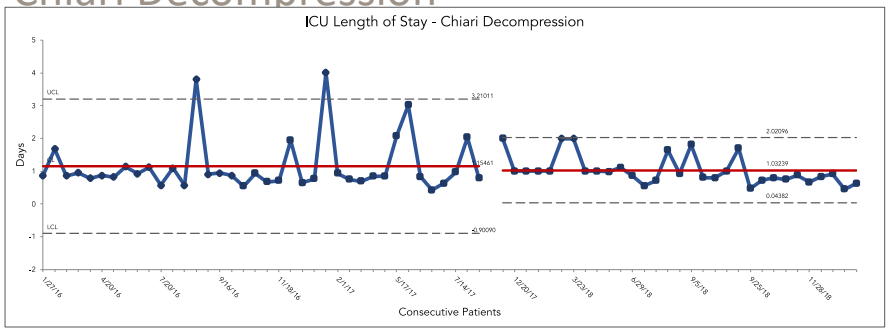
Exclusions:

- Repeat surgery (7)
- Expected post-op complexity (6)

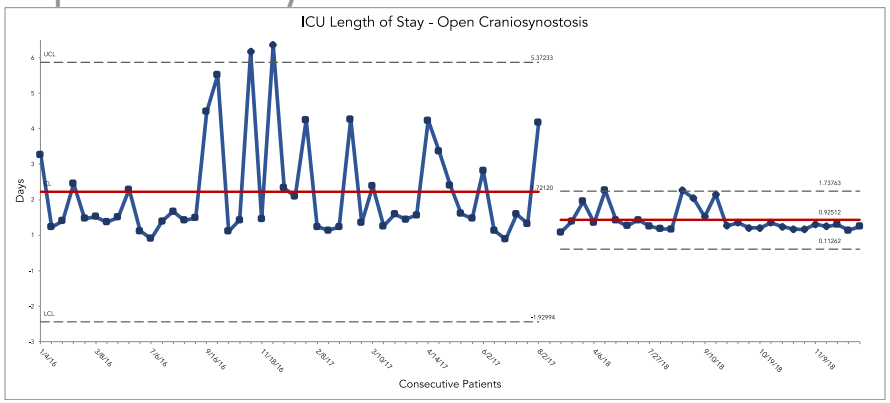
Procedure	LOS (days)	Pre-TBC, mean (SD)	Post-TBC, mean (SD)	Percent Reduction	p-value
Chiari Decompression (n, pre/post = 38/31)	ICU LOS	1.2 (0.8)	1.0 (0.4)	16.7%	0.5
	Hospital LOS	4.3 (1.2)	4.1 (1.0)	4.7%	0.3
Endoscopic Craniosynostosis (n, pre/post = 15/10)	Hospital LOS	2.5 (1.4)	1.3 (0.5)	48%	0.02
Open Craniosynostosis (n, pre/post = 46/27)	ICU LOS	1.8 (1.5)	0.9 (0.4)	50%	0.005
	Hospital LOS	4.3 (1.3)	4.1 (0.7)	4.7%	0.59
Posterior Fossa Tumor w/EVD (n, pre/post = 13/5)	ICU LOS	7.9 (3.2)	9.4 (2.5)	+ 19%	0.4
	Hospital LOS	17.5 (18.2)	12.5 (3.1)	28.6%	0.6
Posterior Fossa Tumor w/out EVD (n, pre/post = 10/7)	ICU LOS	3.9 (5.0)	2.1 (0.9)	46.2%	0.5
	Hospital LOS	9.2 (10.5)	6.1 (2.6)	33.7%	0.5

Reduced Variation

Chiari Decompression



Open Craniosynostosis



Observed to Expected Chart

- No increase in hospital readmission
- Family satisfaction remained high

Conclusions

- Providing data-based goals reduces:
  - Hospital LOS - endoscopic craniosynostosis repair
  - ICU LOS - open craniosynostosis repair
- Reduces variation across all surgeries

Limitations:

- Sample size remains small
- Pre/post design does not account for secular change

Next steps:

- Ongoing data collection, inclusion of other procedures

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Value Learning Collaborative

Impact of a "Pediatric Shunt Checklist" on Neurosurgery Implant infection rate

2015

Impact of a "Pediatric Shunt Surgery Checklist" on Neurosurgery implant infection rate

Team members: Gerald Grant, MD, Kelly Mahaney, MD

Project goal(s)

Aim 1: Achieve 100% compliance on the shunt checklist in ≥90% of neurosurgery implant cases last < 2 hours in length by August 31, 2019.

Aim 2: Reduce the 6-month infection rate for VP shunts by 40% from 3.5% to 2% by March 31, 2020.

Key suggestions from last meeting

✓ Team-wide education on Neurosurgery implant checklist for OR teams

✓ Incorporate review of the checklist in the Safety Stop and Time Out prior to the case start

✓ Clearly define the goals with metrics and a timeline

✓ Pull together teams to align roles, responsibilities and resources regarding project components

Impact of a "Pediatric Shunt Surgery Checklist" on Neurosurgery implant infection rate

Team members: Gerald Grant, MD, Kelly Mahaney, MD

Barriers/challenges encountered

- Intraventricular Vancomycin/Gentamicin (awaiting pharmacy finalization of build)
- Process of moving from completed checklist to completed data entry
- Responsibility of auditing OR traffic still rests with surgeon – need a 'Process Owner' for this question
- How best to ensure automation of capturing outcomes at 6 months (and 1 year) post-op?