JUNE 2022

ERAS and Data Analytics

How to Practically Make It Work

Children's Hospital Colorado
Here, it's different.™

Project Model

- Children's recently underwent the ACS Children's Surgery Verification Certification (CSV)
- **Same key project elements as ERAS reporting**
  - Collaboration
  - Measure Development
  - Data Structure
  - Documentation
  - Measure Validation
  - Tableau Reporting
  - Continuous Development Cycle

Collaboration

Established Project Scope

- Our initial task was to prepare for the American College (ACS) of Surgeons Children's Surgery Verification Program
- Provided an FTE to hire a dedicated software engineer/data analyst to support periop quality and patient safety
- Allowed for specific focus on project

Collaboration

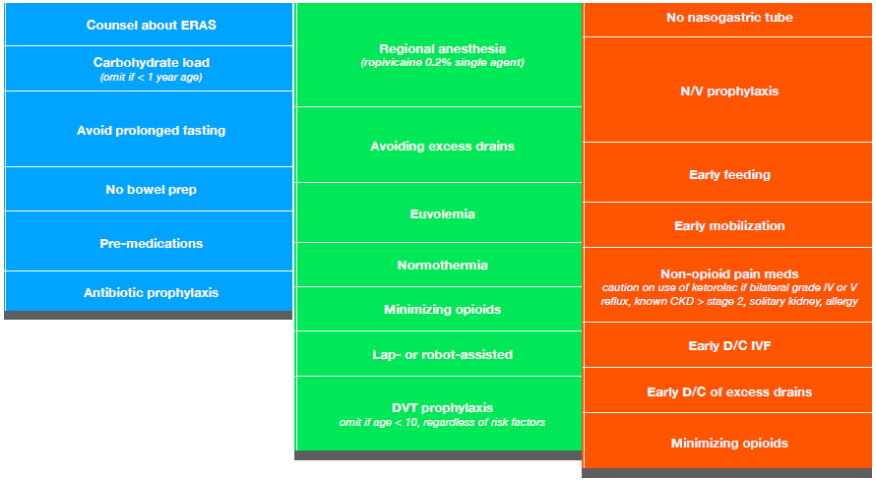
Engaged Multidisciplinary Team

- Senior leader sponsorship
- Pediatric Cardiac Anesthesiologist, Associate Chief, Division of Pediatric Anesthesiology
- Cardiac Intensive Care, Medical Director of Quality & Safety for Center for Children's Surgical Services
- Pediatric Surgery-Urology, Medical Director of Surgical Informatics
- Pediatric Surgery-General
- Patient Safety Improvement Lead
- Software Engineer/Outcomes Data Analyst

Measure Development

Measure Identification

- ACS Children’s Surgery Verification Certification provided a foundation of 15 measures
- Concurrently added additional measures
  - Examples: bathing prior to surgery and Emergency Department returns
- Children's Hospital Colorado has developed an ERAS protocol by specialty/operation



Measure Development

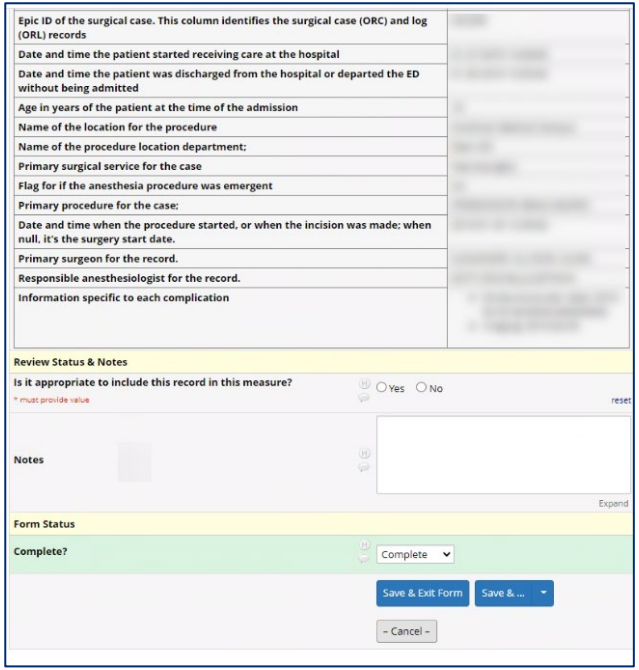
Measure Data Definition

- Discrete elements already available
  - ICD10 billing codes
  - Complications database (IRIS, QSRS)
  - County mortality database
  - EMR flowsheets
- Build additional data capture in EMR
  - Postop destination
  - Planned return to OR
- RedCap Projects (details next slide)

Measure Development

RedCap Projects

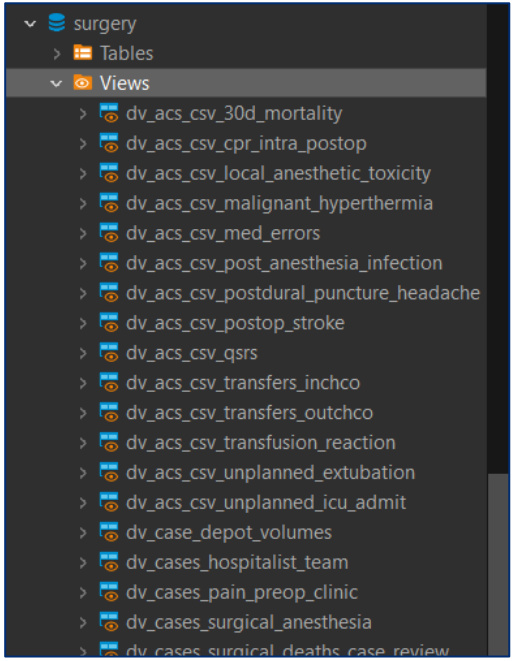
- Some measures can’t be cleanly captured using discrete data
- RedCap projects allow project specific review, flows into data warehouse
- Each case within broad population is reviewed in RedCap and adjudicated before being included in the measure
  - Example: postop stroke
- Replaces disparate Excel data collection where possible
  - Examples: transfusion reactions and SSI bundle compliance



Data Structure

Data Warehouse SQL Views

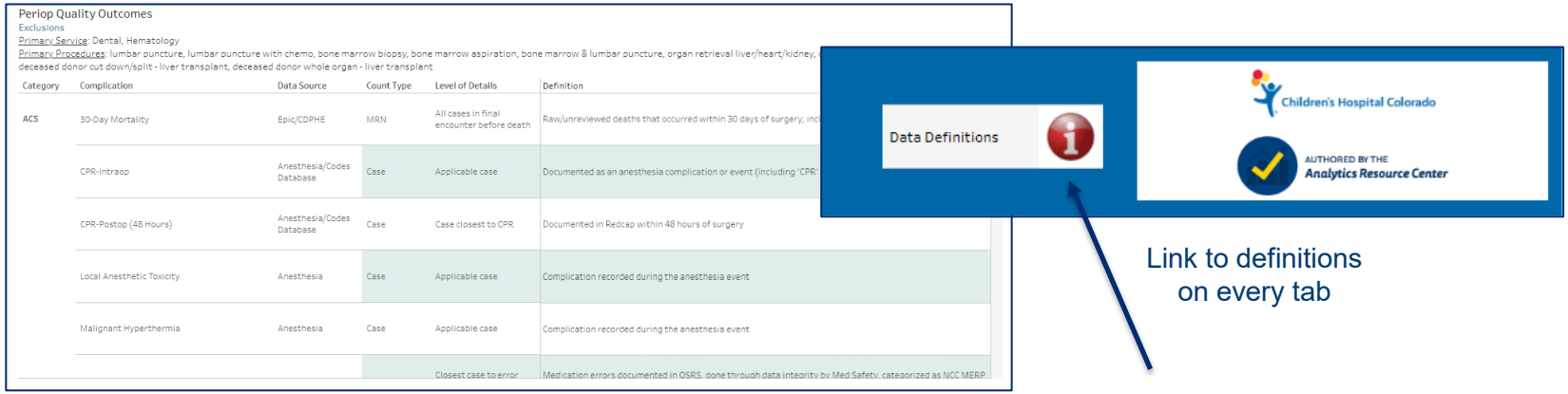
- Data warehouse is a virtual environment (Denodo)
- Separate SQL views for base population and each measure
  - Must be designed efficiently with a consistent base population
  - Feed RedCap projects
  - Available to analysts outside of periop quality and safety
    - Examples: Heart Institute and Research
  - SQL code pushed to Git for versioning and continuity



Documentation

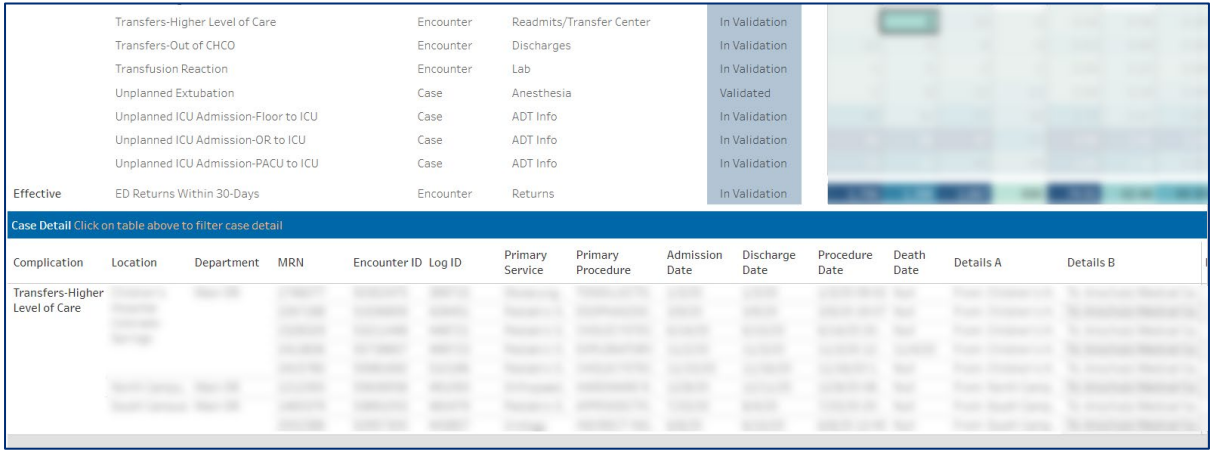
Documentation

- High-level data definitions easily accessed by users within reports
- Detailed technical data definitions for continuity
- Process documents for more detailed projects (data gathering to reporting)
    - Examples: SSI and NSQIP
- Data warehouse SQL documentation for use by other analysts



Measure Validation

- When a new measure is published to the Tableau report, a clinical subject matter expert validates it
- Tableau Report includes case level detail
- Additional review in EMR



	Transfers-Higher Level of Care	Encounter	Readmits/Transfer Center	In Validation
	Transfers-Out of CHCO	Encounter	Discharges	In Validation
	Transfusion Reaction	Encounter	Lab	In Validation
	Unplanned Extubation	Case	Anesthesia	Validated
	Unplanned ICU Admission-Floor to ICU	Case	ADT Info	In Validation
	Unplanned ICU Admission-OR to ICU	Case	ADT Info	In Validation
	Unplanned ICU Admission-PACU to ICU	Case	ADT Info	In Validation
Effective	ED Returns Within 30-Days	Encounter	Returns	In Validation

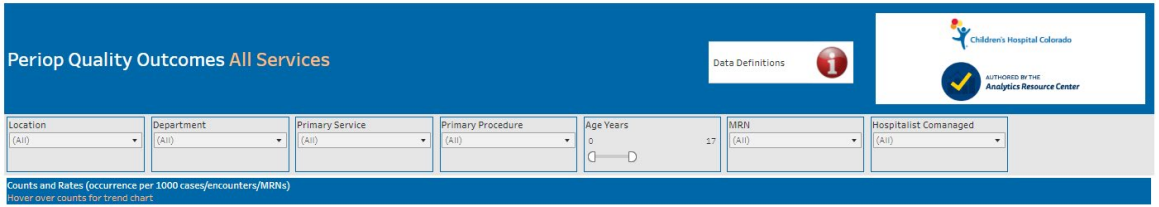
Case Detail Click on table above to filter case detail

Complication	Location	Department	MRN	Encounter ID	Log ID	Primary Service	Primary Procedure	Admission Date	Discharge Date	Procedure Date	Death Date	Details A	Details B
Transfers-Higher Level of Care													

Tableau Reporting

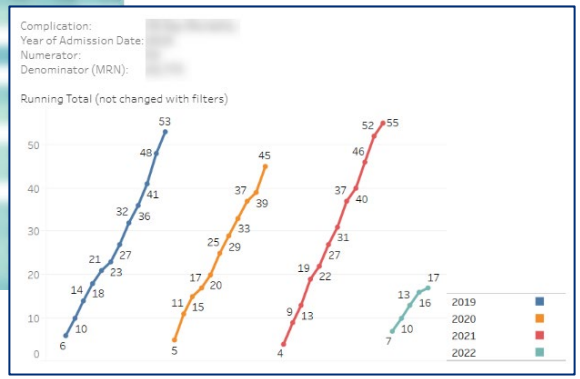
- Single, unified view in data warehouse brings individual measures together for use within Tableau
- Normalizes all column names, allowing shared filters across report
- Tightly controlled permissions
- Can embed related Tableau reports using URLs
- Can embed or link to Tableau reports in Epic dashboards

Periop Outcomes-ACS CSV Measures



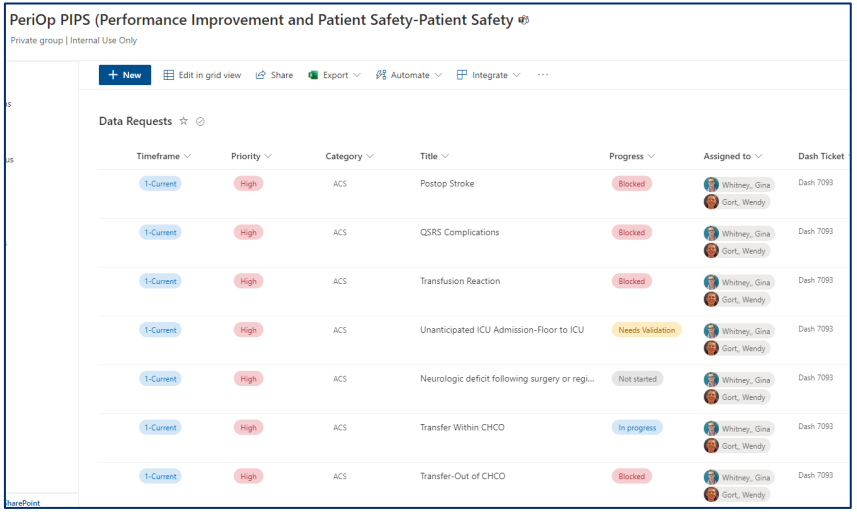
Category	Complication	Count Type	Data Source	Status
ACS	30-Day Mortality	MRN	Epic/CDPHE	Validated
	CPR-Intraop	Case	Anesthesia/Codes Database	Validated
	CPR-Postop (48 Hours)	Case	Anesthesia/Codes Database	Validated
	Local Anesthetic Toxicity	Case	Anesthesia	Validated
	Malignant Hyperthermia	Case	Anesthesia	Validated
	Medication Errors	Case	QSRS	Validated
	Postdural Puncture Headache	Case	Anesthesia/Coding	Validated
	Postop Stroke	Encounter	Coding	In Validation
	QSRS-Anesthesia Complications	Case	QSRS	In Validation
	QSRS-Burn	Case	QSRS	In Validation
	QSRS-Retained Foreign Body	Case	QSRS	In Validation
	QSRS-Specimen Handling	Case	QSRS	In Validation
	QSRS-Wrong Patient	Case	QSRS	In Validation
	Transfers-Higher Level of Care	Encounter	Readmits/Transfer Center	In Validation
	Transfers-Out of CHCO	Encounter	Discharges	In Validation
	Transfusion Reaction	Encounter	Lab	In Validation
	Unplanned Extubation	Case	Anesthesia	Validated
	Unplanned ICU Admission-Floor to ICU	Case	ADT Info	In Validation

Running total on hover



Continuous Development Cycle

- Weekly small-group meetings
- Review/validate measure development
- Assess RedCap projects
- Prioritize additional measures and projects
- Tasks and files tracked and documented with Teams channel



Achieved ACS Level I Children's Surgery Verification!

Children's Surgery Verification™
QUALITY IMPROVEMENT PROGRAM
A QUALITY PROGRAM of the AMERICAN COLLEGE OF SURGEONS

May 12, 2022

Children's Hospital Colorado
13123 East 16th Avenue, B323
Aurora, CO 80045

Dear Children's Hospital Colorado,

On behalf of the American College of Surgeons (ACS) Children's Surgery Verification Program (CSV), we would like to congratulate you and your team on achieving Level I Children's Surgery Verification. Congratulations for this notable achievement. Children's surgery verification formally acknowledges your commitment to providing and supporting quality improvement and patient safety efforts for children who require surgical services. As a verified program you have demonstrated that your center meets the needs of your patients by providing multidisciplinary, high-quality, patient-centered care.