2017 Denver Health Quality and Safety Annual Report

DENVER HEALTH™

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To the Denver Healthcare Community:

In a year marked by considerable growth in our patient services and ongoing improvements in our electronic health record, the family of Denver Health employees, volunteers, trainees, and students continue to drive improvements in the quality and safety of care we provide to all those who seek better health in our integrated delivery system. We are proud to present our 2017 Quality and Safety Annual Report, a summary of key initiatives and associated outcomes. We hope it will serve as a valuable resource to those seeking to better understand the complex landscape of both internal and external safety and quality measures. Most importantly, we hope the report will drive ongoing efforts to improve the value of the services we provide.

- Tom, Allison, Mary Ann, and Amber

Department of Patient Safety and Quality Mission:

To eliminate patient harm and maximize healthcare quality and value.

Department of Patient Safety and Quality Goals:

1. Foster a culture that supports continuous quality improvement, safety event learning, and waste reduction.

2. Use health system data to drive care improvements and high reliability.

EXECUTIVE SUMMARY

- Denver Health Medical Center ended 2017 with significant reductions in hospital acquired conditions as measured by the enterprise metric Target Zero. Compared to 2016, DHHA experienced 28% fewer events, far exceeding our goal of a 10% reduction. Compared to 2015, DHHA experienced 36% fewer Target Zero Events, including 28% or more reductions in individual counts of CLABSI, CAUTI, Injury Falls, and C. Diff infections over the two year period.

- The absolute number of active users of the DHHA patient portal, MyChart, far exceeded the target for 2017, reaching more than 44,000 by year end. This represented more than a 50% increase over 2016.

- The percent of current smokers at the end of 2017 who had been offered a tobacco cessation intervention within the prior 6 months from any DHHA location reached 50%, which represented a 28% increase over 2016.

- For the federal FY2018 CMS Readmissions Reduction Program, Denver Health performed in the best quartile of participating US hospitals with fewer than expected readmissions for COPD, Heart Failure, and Pneumonia.

- For the third year in a row, DHHA was penalized 1% of Medicare FFS inpatient payments for the CMS Hospital Acquired Condition Reduction program, reflecting higher than expected rates of selected patient safety indicators.

- For the CMS Value Based Purchasing program, DHHA earned back more than 75% of the withhold which resulted in a small (0.31%) penalty on Medicare FFS hospital payments.

- For the Program Year 2017 CMS Quality Payment Program (QPP), Denver Health received the maximum score of 100% reflected outstanding performance on a wide array of ambulatory quality measures.

- In 2017, for the Program Year 2016 CMS Electronic Health Record Incentive Program (AKA Meaningful Use), Denver Health successfully submitted 165 eligible providers for the Adopt, Implement, and Upgrade (AIU) payments and 256 eligible providers who achieved threshold on all objective measures, which will result in an estimated $5.7 million to Denver Health.

- Despite excellent performance in the domains of mortality, effectiveness, efficient use of medical imaging, and readmissions, Denver Health dropped from a 3-Star rating to a 2-Star rating on the CMS Hospital Quality Star Rating program. The decline reflects lower than expected performance in the domains of safety, patient experience, and timeliness of care.

- In 2017, Denver Health was among a select group of US hospitals to be recognized by the Joint Commission with the 2017 Pioneers in Quality award for the successful submission of 2016 electronic clinical quality measures.

- For the second year in a row (2017-2018), Denver Health was recognized by Healthgrades with the Distinguished Hospital Award for Clinical Excellence. Denver Health also received Specialty Excellence Awards in 2017 for Critical Care, Gastrointestinal Care, and Pulmonary Care.

- For the Colorado model year 2017-2018 Hospital Quality Incentive Program, Denver Health achieved 38/50 points resulting in an estimated incentive payment of $7.9 million.

- Through the deployment of consistent processes for hourly nurse rounding and enhanced leader rounding on hospitalized patients, DHHA experienced a 41% decrease in the number of documented grievances in 2017.

- With a full year's experience using electronic hand hygiene monitoring in selected DHHA inpatient units, the overall hand washing performance improved from 76.6% in 2016 to 80.3% in 2017 but remained lower than our goal of 85%.

- For all units, DHHA's central line utilization was significantly lower than NHSN benchmarks in 2017 based on the NHSN's standardized utilization ratio (SUR).

- For all units, DHHA's central line-associated blood stream infection (CLABSI) rate was lower than each of the prior two years based on NHSN's standardized infection ratio (SIR) and the individual unit SIR was either 0 or less than 1.0 for five of the six units.

- DHHA has vaccinated >98% of all employees/contractors against seasonal influenza every year since the 2011-2012 influenza season.

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1.1. Enterprise Metrics Supplied to the Denver Health Board

Denver Health and Hospital Authority (DHHA) identified three high priority safety and quality tactics for 2017: harm prevention, culture of safety improvement, and standardization of health care delivery and documentation practices. Figure 1.1 shows the associated metrics which were reported monthly to the board with discussion of improvement strategies for those metrics not meeting target. In summary, DHHA experienced remarkable reductions in hospital acquired conditions as measured by the Target Zero metric, improvements in the employee perception of willingness to recommend Denver Health to family and friends, marked improvements in MyChart utilization, and measures of tobacco cessation interventions and well child care that exceeded the targets. Measures of blood pressure control and primary care appointments after discharge did not achieve target. In response to the hypertension control performance, the hypertension workgroup has reviewed prescribing patterns to identify opportunities to optimize medications by providers. In 2018, provider education will be structured to target those opportunities and to increase referrals to clinical pharmacists who have special training to identify potential barriers to medication adherence and optimize medications.

Figure 1.1 Patient Safety and Quality Enterprise Metrics

Tactic	Metric	Performance				Target
		2015	2016	2017		2017
Harm Prevention	Target Zero: Total number of adverse events*	220	196	141	🟢	<175
Culture of Safety Improvement	Willingness to Recommend: % of employees who agree or strongly agree with, "I would recommend this organization to family and friends who need care."	74%	66%	73%	🟢	71%
Standardization of health care delivery and documentation practices	Well Child Care: % of children ages 3-9 years receiving at least one well-child check over the last 12 months	71%	71%	75%	🟢	74%
	Tobacco Intervention: % of current smokers with recent visit who have received a tobacco cessation intervention	23%	39%	50%	🟢	45%
	Hypertension: % of adults with hypertension who are at the target blood pressure	68.3%	65.1%	65%	🔴	70%
	Transitions of care: % of adult patients discharged from DHHA who have an appointment in primary care within 1 month of discharge	49.1%	53.8%	56%	🔴	65%
	MyChart Utilization: Number of DHHA utilizers who have an activated MyChart account	—	20,119	44,326	🟢	35,000

* Hospital acquired *Clostridium difficile* infection, Catheter-associated urinary tract infection, Central line-associated bloodstream infection, high harm medication safety events with patient harm or death, and publicly reported surgical site infections (colon surgery, hip arthroplasty, knee arthroplasty, abdominal hysterectomy, breast surgery)

1. DEPARTMENT OF PATIENT SAFETY & QUALITY OVERVIEW

1.2. Patient Safety and Quality Pillar Awards

In the spring of 2017, three multidisciplinary teams were recognized for excellent performance in completing specific quality and safety initiatives. The first team listed below tackled a decades-long problem of access to provider contact numbers for use by other clinicians. The second team expanded and restructured this annual report to reach a larger audience. The third team was instrumental in driving the target zero campaign and the resulting reductions in adverse events. Congratulations to all members of each team.

Figure 1.2: 2017 Patient Safety and Quality Pillar Awards

2017 PSQ Pillar Awards
1. For innovation and creativity in the development of a reliable online provider contact directory Provider Contact Directory Team Awardees: Aleka Trujillo, Eric Lavonas, Brian Jones, Bryan Leary, Sandra Taylor, Abraham Nussbaum, Laura Rendon, and Abdul Shabazz
2. For year-over-year improvements in the quality and scope of the Patient Safety and Quality Annual Report DPSQ Annual Report Team Awardees: Mary Ann McEntee, Amber Miller, Allison Sabel, and Kathy Thompson
3. For contributing to the formal launch and training associated with the 2017 Target Zero Campaign and for the associated improvements in patient safety Target Zero Steering Committee Awardees: Nathan Brainard, Kathryn Casey, Denise Delaney, Marc Fedo, Barbara Gold, Catherine Kleiner, Julie Makatura, Mary Ann McEntee, Amber Miller, Allison Sabel, Michelle Then, Carolyn Valdez, Kalena Wilkinson, and Heather Young

2. PUBLIC REPORTING & INCENTIVES

2.1. CMS Hospital Readmissions Reduction Program—FFY2018

The Affordable Care Act established the Hospital Readmissions Reduction Program requiring the Centers for Medicare and Medicare Services (CMS) to reduce payments to inpatient hospitals with excess readmissions starting in federal fiscal year (FFY) 2013. CMS utilizes claims data to determine readmissions within 30 days of discharge from the same or another inpatient hospital.

- Applicable Conditions — acute myocardial infarction (AMI), heart failure (HF), pneumonia (PN), acute exacerbation of chronic obstructive pulmonary disease (COPD), elective total hip and total knee arthroplasty (THA/TKA) and coronary artery bypass graft (CABG) surgery.
- Inclusion Criteria — Medicare Fee-For-Service (FFS) beneficiaries with Part A and Part B coverage who have continuous enrollment for the 12 months prior to admission to at least one month after discharge. Beneficiaries must be 65 years or older at admission.
- Exclusion Criteria — length of stay over 365 days, in-hospital death, left against medical advice, transferred to another acute care hospital, planned readmissions.
- Excess readmission ratios are risk-standardized for clinically relevant factors, such as patient demographic characteristics, comorbidities, and frailty.
- Claims data are snapshot approximately 90-days after the performance period ends.

- **Financial Impact**
  ◊ 3.0% maximum payment reduction , i.e. potential $440,000 loss for DHHA.
  ◊ Reduction applies to the Base Operating DRG payment amount (including wage-adjustment and new technology amounts) for discharges of Medicare FFS patients.
  ◊ DHHA will be penalized –0.02% for FFY 2018 discharges, which is estimated as a $2,900 loss (Figure 2.1).
  ◊ DHHA ranked in the best quartile of hospitals nationwide.

- **PI Activities**
  ◊ Continuation of an enterprise-wide patient flow initiative with executive oversight targeting all aspects of patient flow.

- **Future Impact**
  ◊ FFY 2019: CMS implemented a Socio-Demographic Status adjustment in which hospitals will be grouped into quintiles based on their ratio of full-benefit dual eligible patients to total Medicare FFS and Medicare Advantage patients. Hospitals will be compared to the condition-specific median excess ratio within their quintile.

Figure 2.1: CMS Hospital Readmissions Reduction Program

	FFY 2016		FFY 2017		FFY 2018	
	0.03% reduction		**0% reduction**		**0.02% reduction**	
Performance Period	7/1/11—6/30/14		7/1/12—6/30/15		7/1/13—6/30/16	
Condition	Number of Eligible Discharges	Excess Readmission Ratio	Number of Eligible Discharges	Excess Readmission Ratio	Number of Eligible Discharges	Excess Readmission Ratio
Acute Myocardial Infarction	39	0.9532	44	0.9756	43	1.0203
Chronic Obstructive Pulmonary Disease	61	0.9308	60	0.9623	48	0.9659
Heart Failure	82	1.0263	78	0.9529	93	0.9752
Pneumonia	34	0.9748	79	0.9360	85	0.9735
Total Hip and Total Knee Arthroplasty	24	0.9928	14	1.0259	14	1.0837
Coronary Artery Bypass Graft Surgery	N/A	N/A	0	N/A	0	N/A
Financial Impact	**- $4,265**		**$0**		**- $2,900***	

*Estimated by Colorado Hospital Association

2.2. CMS Hospital-Acquired Conditions (HAC) Reduction Program—FFY 2018

The Affordable Care Act established the Hospital-Acquired Conditions (HAC) Reduction Program to encourage hospitals to reduce preventable conditions that patients did not have upon admission to the hospital, but which developed during the hospital stay. Hospitals ranking in the lowest-performing quartile with respect to risk-adjusted HAC quality measures received a payment reduction beginning in FFY 2015. CMS publicly reports hospital-specific results on its Hospital Compare website.

- Patient Safety Domain — Agency for Healthcare Research and Quality (AHRQ) Patient Safety and Adverse Events Composite measure is a weighted average of the risk- and reliability-adjusted versions of 10 Patient Safety Indicators (PSIs). Figure 2.2-1 lists the PSIs in this modified PSI-90 measure. CMS is using version 6.0.2 (recalibrated) of the AHRQ PSI software, and hospitals' Medicare FFS claims for discharges during the performance period.

- Healthcare-Associated Infections (HAI) Domain—Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) uses chart-abstracted surveillance data reported by our Infection Prevention department. Standardized infection ratios (SIRs) provide risk-adjustment at hospital- and patient-care unit level.

- Major methodology changes in FFY 2018 eliminated the ability to make longitudinal comparisons in measure scores.
  ◊ Scoring methodology changed from deciles to Winsorized z-scores.
  ◊ PSI-90 updated from 8-measures to 10-measures (3 new, 2 respecified, and 1 removed).
  ◊ Reweighting of PSI component indicators to reflect the volume and harm of each event.
  ◊ Patient Safety domain time period was decreased from 24– to 15-months due to the implementation of ICD-10.
  ◊ Expansion of CAUTI and CLABSI measures to non-ICU units.

Figure 2.2-1: Patient Safety and Adverse Events Composite
PSI 03—Pressure Ulcer Rate
PSI 06—Iatrogenic Pneumothorax Rate
PSI 08—In-Hospital Fall with Hip Fracture Rate
PSI 09—Perioperative Hemorrhage or Hematoma Rate
PSI 10—Postoperative Acute Kidney Injury Requiring Dialysis Rate
PSI 11—Postoperative Respiratory Failure Rate
PSI 12—Periop Pulmonary Embolism or Deep Vein Thrombosis Rate
PSI 13—Postoperative Sepsis Rate
PSI 14—Postoperative Wound Dehiscence Rate
PSI 15—Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate

- **Financial Impact**
  ◊ 1% maximum payment reduction in FFY 2018 if total HAC Score above 75th percentile (i.e. 0.3712).
  ◊ Reduction applies to the Base Operating DRG payment amount after adjustments have occurred for the Hospital Value-Based Purchasing and Readmissions Reduction Programs for discharges of Medicare FFS patients.
  ◊ DHHA in lowest performing quartile for third year (Figures 2.2-2 and 2.2-3).
  ◊ Projected reimbursement reduction for FFY 2018 is -$300,000.

- **PI Activities:**
  ◊ DHHA's Clinical Documentation Improvement (CDI) team reviewed all PSI events to determine if the event was due to a coding error, inaccurate documentation, or true HAC.
  ◊ For efforts to reduce HAIs, see the Infection Prevention section of this report.

- **Future Impact:**
  ◊ FFY 2019: Patient Safety domain time period increased to 21-months.
  ◊ FFY 2020: Patient Safety domain time period returns to full 24-months.

Figure 2.2-2: Denver Health Performance on CMS Hospital-Acquired Conditions Reduction Program

Program Year	Subject to 1% Payment Reduction
FFY 2015	No
FFY 2016	Yes
FFY 2017	Yes
FFY 2018	Yes

Figure 2.2-3: CMS Hospital-Acquired Conditions Reduction Program FFY 2018

	Result	Winsorized-Z score
Patient Safety Domain (15% of score) Performance period 7/1/14—9/30/15		
AHRQ PSI 90 Composite	1.1357	1.1872
Healthcare-Associated Infections Domain (85% of score) Performance period 1/1/14—12/31/15		
Central Line-Associated Bloodstream Infection (CLABSI) SIR	1.6840	1.3371
Catheter-Associated Urinary Tract Infection (CAUTI) SIR	1.4350	0.8718
Surgical Site Infection - colon and abdominal hysterectomy SIR	2.3530	2.1044
Methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia SIR	1.0050	0.1039
Clostridium difficile infections SIR	1.1770	0.7189
Total HAC Score		**1.0512**

Payment Reduction Threshold = 0.3687

2.3. CMS Quality Payment Program (QPP)—FFY 2019

In October 2016, CMS finalized changes to regulatory reporting under the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA). No longer would payment increases for Medicare services be set by the Sustainable Growth Rate (SGR) law. Instead, CMS rewards high value, high quality Medicare clinicians with payment increases while simultaneously reducing payments to clinicians with subpar performance. Clinicians participate in the Quality Payment Program (QPP) via the Merit-based Incentive Payment System (MIPS) or Advanced Alternative Payment Models (APMs). QPP officially started on January 1, 2017.

MIPS combines legacy Medicare programs into a single, improved reporting program. The Quality category incorporates measures and payment adjustments from the Physician Quality Reporting System (PQRS) and the Quality portion of the Value-Based Payment Modifier (VM). The Cost category replaces the Cost component of the VM program. The Advancing Care Information (ACI) category replaces the Medicare EHR Incentive Program for Eligible Providers. The Improvement Activities category is new and allows clinicians to attest to activities that improve their clinical practice.

As a large enterprise with a single Medicare Tax Identification Number (TIN), DHHA needed to participate in MIPS through two mechanisms: group practice reporting via Electronic Health Record (EHR) and MIPS Alternative Payment Model. DHHA joined a Track I Medicare Shared Savings Program (MSSP) with the Community Health Provider Alliance (CHPA). CHPA's MSSP was established for Federally Qualified Health Centers (FQHCs) but DHHA was required to participate as an enterprise due to our single TIN. Unfortunately, CMS excluded any provider joining DHHA after August 31, 2017 from CHPA's MSSP so DHHA was required to also participate in MIPS as a group practice.

- ■ **Inclusion Criteria**
    - ◊ Group Practice: Medicare Part B FFS beneficiaries who received care covered by Physician Fee Schedule (PFS) services.
    - ◊ MSSP APM: Medicare FFS beneficiaries attributed to DHHA's FQHCs.

The QPP program will be evolving every year and a few of the major changes are shown below. As the weight of the cost category increases, the weight of the quality category decreases (Figure 2.3-1). The performance threshold to avoid a penalty increases from 3 points in 2017 to 15 points in 2018. No changes have been proposed to the exceptional bonus threshold. The MIPS maximum payment adjustment begins at +/- 4% in FFY 2019 and increases to +/- 9% for FFY 2022 and beyond (Figure 2.3-2).

Figure 2.3-1: MIPS Category Weights
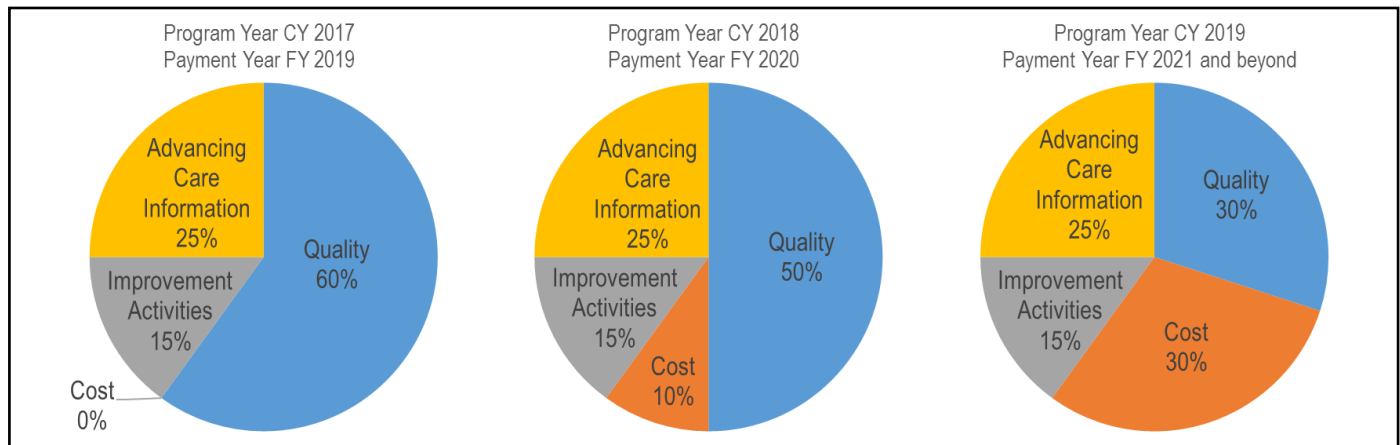
Figure 2.3-2: MIPS Maximum Payment Adjustments
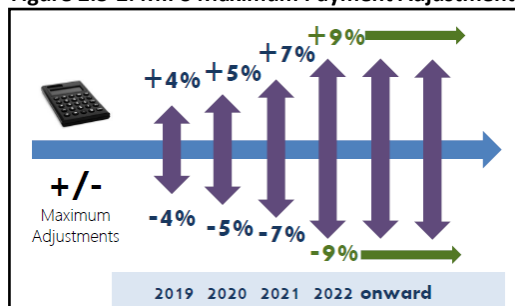
Source: CMS

2.3. CMS Quality Payment Program (QPP)—FFY 2019

CMS released preliminary performance feedback to group practices in April 2018 (Figure 2.3-3). DHHA received a 100% score and qualified for the Exceptional Performance Bonus. This bonus will apply to any providers not part of CHPA's MSSP, i.e. providers joining DHHA as of September 1, 2017. CMS has stated the preliminary score could change based on the all-cause readmission measure for the Quality category and benchmark updates for Quality measures that have met minimum threshold criteria. DHHA received the maximum points for the Quality category so the readmission measure will not be detrimental to our overall score.

The majority of DHHA's providers will participate in QPP as part of CHPA's MSSP. DHHA chose to report the Transition Measures because we have not achieved Stage 3 of the EHR Incentive Program. CMS has not yet released results for MIPS APMs.

- **Financial Impact**
  - ◊ Between 4.5% to 22% positive payment adjustment (based on the scaling factor) for providers not part of CHPA's MSSP.
  - ◊ If CHPA's MSSP provides high quality care and reduces total healthcare costs, a portion of the savings will be distributed to the participating institutions.
- **Future Impact**
  - ◊ Beginning in 2018, DHHA withdrew from CHPA's MSSP and will participate as a Group Practice in QPP.
  - ◊ DHHA will report Transition Measures in 2018 while we remain on Stage 2 of the EHR Incentive Program.

Figure 2.3-3: CMS Quality Payment Program CY 2017 / FFY 2019 —Denver Health Group Practice Submission

Quality (60%)							
Quality ID	NQF ID	CMS eCQM	Measure	Performance Rate	Performance Points*	Bonus Points	Category Score
143	0384	157v5	Oncology: Medical and Radiation-Pain Intensity Quantified	87.37%	10 / 10	1 E	
192	0564	132v5	Complications w/in 30 Days Following Cataract Surgery Requiring Additional Surgical Procedures	0%	10 / 10	1 E	
239	0024	155v5	Weight Assessment and Counseling for Nutrition & Physical Activity for Children and Adolescents	74.16%	10 / 10	1 E	
305	0004	137v5	Initiation and Engagement of Alcohol and Other Drug Dependence Treatment	1.38%	10 / 10	1 E	70 achieved = 70 possible
310	0033	153v5	Chlamydia Screening for Women	68.25%	10 / 10	1 E	
379	—	74v6	Primary Caries Prevention Intervention as Offered by Primary Care Providers / Dentists	27.83%	10 / 10	1 E	100*60 weight =
065	0069	154v5	Appropriate Treatment for Children with Upper Respiratory Infection	98.63%	n/a	1 H	
066	—	146v5	Appropriate Testing for Children with Pharyngitis	92.79%	n/a	1 H	**60**
238	0022	156v5	Use of High-Risk Medications in the Elderly	13.35%	n/a	1 H	
373	—	65v6	Hypertension: Improvement in Blood Pressure	33.93%	n/a	1 H	
458	1789	—	30-Day All-Cause Unplanned Hospital Readmission Rate	TBD	TBD / 10	—	

Advancing Care Information (25%)					
Measure	Performance	Base Score	Performance Points	Bonus Points	Category Score
Security Risk Analysis	Completed	Achieved	n/a	n/a	Base: 50
E-Prescribing	91.6% (356,001 / 388,853 prescriptions)	Achieved	n/a	n/a	Perform: 62
Provide Patient Access to View, Download, and Transmit	88.5% (136,073 / 153,766 patients)	Achieved	18 / 20	n/a	Bonus: 5
Health Information Exchange	48.2% (3697 / 7675 outbound transitions of care)	Achieved	10 / 20	n/a	50 + 62 + 5 = 100 possible
Patient-Specific Education	92.5% (141,364 / 152,819 patients)	n/a	10 / 10	n/a	
View, Download, or Transmit	16.6% (25,449 / 153,766 patients)	n/a	2 / 10	n/a	
Secure Messaging	17.2% (26,427 / 153,766 patients)	n/a	2 / 10	n/a	1.17*25 weight =
Medication Reconciliation	92.5% (274,905 / 297,143 inbound transitions of care)	n/a	10 / 10	n/a	29.25 —> 25 max
Immunization Registry Reporting	Active engagement with public health agency	n/a	10 / 10	n/a	
Specialized Registry Reporting	Active engagement with registry	n/a	n/a	5	**25**

Improvement Activities (15%)			
Improvement Activity	Priority	Points	Category Score
Implementation of co-location Primary Care Practices (PCP) and Mental Health (MH) services	High	20	100 achieved = 40 possible
Collection and follow-up on patient experience and satisfaction data on beneficiary engagement	High	20	
Engage patients and families to guide improvement in the system of care	Medium	10	2.5*15 weight =
Regularly assess the patient experience of care through surveys, advisory councils and/or other mechanisms	Medium	10	37.5 —> 15 max
TCPI participation	High	20	
FQHC quality improvement activities	High	20	**15**

OVERALL SCORE = (60 + 25 + 15) / 100 = 100%

* Performance points are based on the benchmark deciles with the best decile receiving 10 points. E End-to-End electronic reporting. H High Priority Measure.

2.4. CMS Hospital Value-Based Purchasing Program (VBP)—FFY 2018

In October 2012, Medicare began incentivizing hospitals to provide high-quality care through the Hospital Value-Based Purchasing (VBP) Program. Incentive payments are based on either how well the hospital performs on each measure compared to other hospitals during a baseline period or how much the hospital improves its performance on each measure compared to its performance during the baseline period.

- ■ **Financial Impact**
  - ◊ 2% payment withholding with the ability to earn back up to 3% based on performance.
  - ◊ Payment reduction applies to the Base Operating DRG payment amount for Medicare FFS discharges.
  - ◊ DHHA will receive a 0.31% reduction for FFY 2018 discharges which is estimated as a $41,000 loss (Figure 2.4-1).

- ■ **Future Impact**
  - ◊ FFY 2019: Total Hip Arthroplasty / Total Knee Arthroplasty Complications added to Clinical Care Domain. CLABSI and CAUTI updated to include non-ICU locations. AHRQ PSI-90 removed from Safety Domain.
  - ◊ FFY 2021: COPD 30-day Mortality Rate, 30-day Episode of Care for AMI Payment and 30-day Episode of Care for Heart Failure Payment added to program. Updated cohort for Pneumonia 30-day Mortality Rate.
  - ◊ FFY 2022: CABG 30-day Mortality Rate and 30-day Episode of Care for Pneumonia Payment added to program.
  - ◊ FFY 2023: Modified AHRQ PSI-90 (Patient Safety & Adverse Event Composite) added to program.

Figure 2.4-1: CMS Hospital Value-Based Purchasing Program (VBP) - FFY 2018

Clinical Care Domain (25%) Data Source: CMS Claims		Baseline Rate (10/1/09-6/30/12)	Performance Rate (10/1/13-6/30/16)	Achievement Threshold	Points*	Domain Points	Domain Unweight Score
MORT-30-AMI	Acute Myocardial Infarction (AMI) 30-day mortality rate	0.855	0.873	0.851	9 (A)		
MORT-30-HF	Heart Failure (HF) 30-day mortality rate	0.893	0.887	0.883	2 (A)	**15 / 30**	**50 / 100**
MORT-30-PN	Pneumonia (PN) 30-day mortality rate	0.881	0.892	0.883	4 (I/A)		

Patient & Caregiver Centered Experience of Care / Care Coordination Domain (25%) Data Source: HCAHPS	Baseline Rate (01/01/14-12/31/14)	Performance Rate (01/01/16-12/31/16)	Achievement Threshold	Points*	Domain Points	Domain Unweight Score
Communication with nurses	73.1%	72.0%	78.5%	0		
Communication with doctors	77.8%	75.9%	80.4%	0		
Responsiveness of hospital staff	57.4%	53.5%	65.1%	0	**0 / 80 for**	
Communication about medicines	63.1%	62.0%	63.4%	0	**metrics**	
Hospital cleanliness and quietness	63.8%	63.7%	65.6%	0		**11 / 100**
Discharge information	83.9%	84.3%	86.6%	0	**11 / 20 for**	
Care transition	44.6.%	41.7%	51.5%	0	**consistency**	
Overall rating of hospital	68.7%	66.2%	70.2%	0		
HCAHPS Consistency (based on Responsiveness of Hospital Staff)	57.4%	53.5%	n/a	11		

Safety Domain (25%) Data Source: AHRQ Patient Safety Indicators, CDC NHSN, and CMS Core Measures		Baseline Rate (AHRQ 7/1/10-6/30/12 NHSN 1/1/14-12/31/14) CMS 1/1/14-12/31/14)	Performance Rate (AHRQ 7/1/14-6/30/16 NHSN 1/1/16-12/31/16 CMS 1/1/16-12/31/16)	Achievement Threshold	Points*	Domain Points	Domain Unweight Score
PSI-90	Complication/patient safety composite	1.030	0.901	0.965	4 (I)		
CAUTI	Catheter-Associated Urinary Tract Infection	1.233	0.842	0.906	3 (I)		
CLABSI	Central Line-Associated Blood Stream Infection	0.440	0.796	0.369	0		
CDI	*Clostridium difficile* Infection	0.860	1.025	0.805	0	**11 / 70**	**15.7 / 100**
MRSA	Methicillin-Resistant *Staphylococcus aurerus* Bacteremia	0.497	1.103	0.767	0		
SSI-AbdHyst	Surgical Site Infection—Abdominal Hysterectomy	—	—	0.710	—		
SSI-Colon	Surgical Site Infection—Colon Surgery	1.665	1.481	0.824	1 (I)		
PC-01	Elective Delivery Prior to 39 Completed Weeks Gestation	0.000	0.015	0.020	3 (A)		

Efficiency and Cost Reduction Domain (25%) Data Source: CMS Claims		Baseline Rate (01/01/14-12/31/14)	Performance Rate (01/01/16-12/31/16)	Achievement Threshold	Points*	Domain Points	Domain Unweight Score
MSPB-1	Medicare spending per beneficiary	0.936	0.930	0.986	4 (A)	**4 / 10**	**40 / 100**

OVERALL SCORE = 25(50/100) + 25(11/100) + 25(15.7/100) + 25(40/100) = 29.2

(A) Achievement score higher. (I) Improvement score higher.

2.4. CMS Hospital Value-Based Purchasing Program (VBP)—FFY 2018

In order to determine if DHHA has improved its value-based care, a hospital's Total Performance Score should be compared to state and national results. CMS has added, removed, and updated measures annually so a hospital cannot directly compare its performance year over year. In addition, CMS applies an automatic reduction to the Base Operating DRG payments to finance the VBP program and the reduction increased over the first five years of the program making it difficult to directly compare the financial impact.

Figure 2.4-2 shows DHHA's performance compared to the Colorado and national average scores. Even though DHHA has yet to reach the average hospital score, the relative difference has been decreasing compared to the first two years of the program. DHHA received an incentive payment in FFY2017 and a small negative penalty the remaining years (Figure 2.4-3).

Figure 2.4-2: CMS Hospital Value-Based Purchasing Program—Denver Health compared to Colorado and National Average
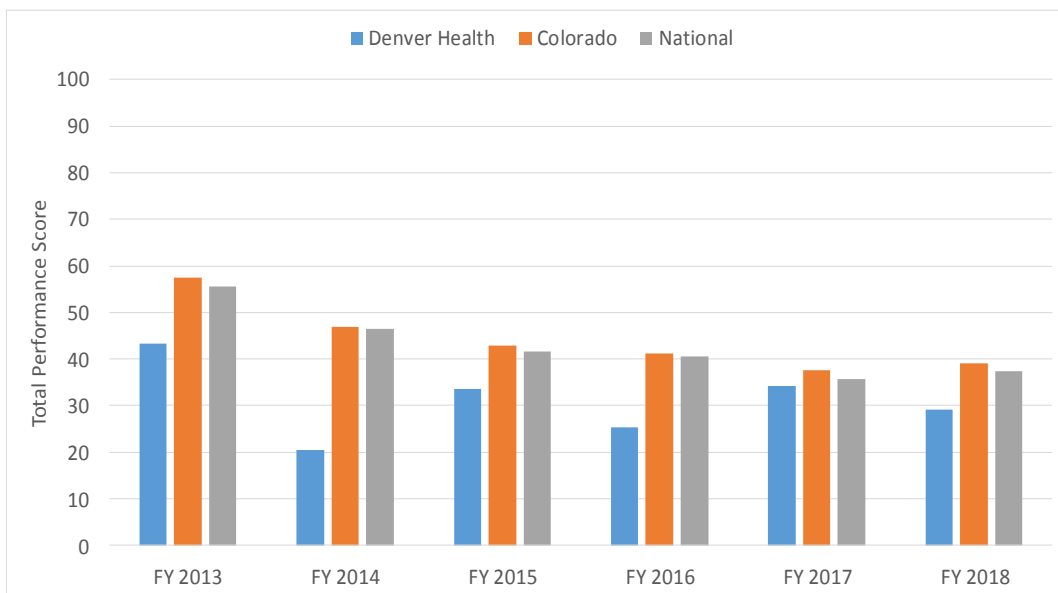
Figure 2.4-3: CMS Hospital Value-Based Purchasing Summary

Reporting Year	Base Operating DRG Payments			Financial Impact
	Automatic Reduction	DHHA Earned Back	DHHA Net Change	DHHA
FFY 2013	- 1.000%	0.793%	- 0.207%	- $34,417
FFY 2014	- 1.250%	0.538%	- 0.712%	- $107,256
FFY 2015	- 1.500%	1.297%	- 0.203%	- $29,688
FFY 2016	- 1.750%	1.225%	- 0.525%	- $74,583
FFY 2017	- 2.000%	2.104%	0.104%	$15,443
FFY 2018	- 2.000%	1.687%	- 0.313%	- $41,000*

* Estimated

2.5. CMS Value-Based Payment Modifier and Quality Tiering (VM)—PY 2018

CMS created the Value-Based Payment Modifier (VM) to provide differential payments based on the quality of care furnished compared to cost. CMS provides a Quality and Resource Use Report (QRUR) each fall utilizing data submitted to the Physician Quality Reporting System (PQRS) the prior year.

- **Inclusion Criteria**—Medicare FFS beneficiaries who received the plurality of their primary care services at DHHA.
- **Exclusion Criteria**—Encounters at Federally Qualified Health Centers since they do not participate in Physician Fee Schedule (PFS) services.
- **Financial Impact** (applied to total Part B PFS allowed charges for covered professional services):
    - ◊ -4% automatic payment reduction to services performed in CY 2018 for not participating in PQRS program in PY 2016, i.e. 2018 Value Modifier Penalty.
    - ◊ 0% to 19.8% payment adjustment in CY 2018 based on quality and cost performance during 2016, i.e. 2018 Quality Tiering Adjustment.
    - ◊ DHHA was average on quality and cost measures, and thus received no adjustment.
- **Future Impact**
    - ◊ This is the final year of the VM program. Its incentives and penalties are consolidated into the Quality Payment Program.

Figure 2.5-1: 2018 Value-Based Payment Modifier
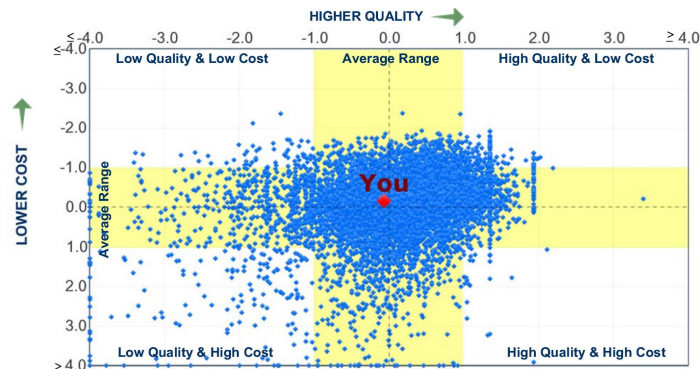
Source: 2016 QRUR

Figure 2.5-2: Quality Composite

Domain	Measure Name	Eligible Cases	Performance Rate	Bench-mark*
Effective Clinical Care	Chronic Obstructive Pulmonary Disease: Spirometry Evaluation	142	73.9%	79.5%
	Ischemic Vascular Disease: Use of Aspirin or Another Antithrombotic	259	88.8%	81.7%
Community/ Population Health	Influenza Immunization	2,191	50.3%	44.3%
	Pneumonia Vaccine for Older Adults	1,432	74.2%	53.5%
Patient Safety	Exposure Time Reported for Procedures Using Fluoroscopy	388	85.8%	83.6%
	Cataract Complications within 30 Days of Surgery Requiring Additional Procedures**	75	0.0%	0.8%
	Cataract Surgery with Intra-Operative Complications (Unplanned Vitrectomy)**	122	0.0%	0.3%
Communication & Care Coordination	Mammogram Reminder System	547	100%	90.2%
	Hospitalization Rate per 1,000 Beneficiaries—Acute Conditions**	311	4.91	7.17
	Hospitalization Rate per 1,000 Beneficiaries—Chronic Conditions**	82	51.23	48.42
Efficiency and Cost Reduction	Inappropriate Use of "Probably Benign" Assessment Category in Mammography Screening	547	0.00	1.63

Figure 2.5-3: Cost Composite

Measure Name	Eligible Cases	Per Capita Costs	Bench-mark*
Per Capita Costs**			
All Attributed Beneficiaries	310	$10,004	$12,380
Beneficiaries with Diabetes	50	$16,963	$18,420
Beneficiaries with COPD	29	$22,771	$29,613
Beneficiaries with CAD	45	$23,078	$22,117
Beneficiaries with HF	26	$31,628	$33,953
Medicare Spending per Beneficiary**	756	$19,436	$20,411

*Benchmark: National Mean
**Inverse Measure
Source: 2016 QRUR

*Benchmark: National Mean
**Inverse Measures
Source: 2016 QRUR

2.6. CMS Electronic Health Record (EHR) Incentive Programs (a.k.a. Meaningful Use)

The American Recovery and Reinvestment Act (ARRA) of 2009 established incentive payments to eligible hospitals (EHs) and eligible providers (EP) to promote the adoption and meaningful use (MU) of interoperable health information technology (HIT) and qualified electronic health records (EHRs). All participants are required to attest to a single set of objectives and measures. Successful participation in the program is based on meeting the thresholds for all objective measures and electronic submission of clinical quality measures (eCQMs). The criteria for successful participation in the EHR Incentive Program differs for EHs vs. EPs and for Medicare vs. Medicaid. DHHA participated in Modified Stage 2 of the programs in 2017.

Hospitals can participate in both the Medicare and Medicaid EHR Incentive Programs. Medicare encouraged hospitals by offering incentive payments for participation and penalized those hospitals that did not submit data. Beginning in program year 2017, Medicare stopped providing incentive payments. Medicaid encouraged hospitals by providing incentive payments for participation. DHHA received all Medicaid payments in the first three years of participation. DHHA currently only participates in the Medicare EH program because there are no penalties or remaining incentives with Medicaid.

In comparison, providers were required to select either the Medicare or Medicaid program (depending on their patient population). When possible, DHHA selected Medicaid for EPs because it provided incentive payments for participation whereas Medicare only penalized for lack of participation. DHHA's EPs could successfully demonstrate meaningful use to Medicare or Medicaid for the first time in 2016. In prior years, the EPs had only been able to show "adoption, implementation and upgrade (AIU)." The EPs then filed for hardship annually because our legacy ambulatory EHR was not ONC certified.

- ■ **Financial Impact**
  - ◊ DHHA has received incentive payments of approximately $25.5 million from the EHR Incentive Program, with nearly $12 million for the Eligible Hospital program and $13.5 million for the Eligible Provider program (Figure 2.6-1).
  - ◊ DHHA has avoided Medicare payment reductions of over $2.5 million by participating in both the hospital and provider versions of the EHR Incentive Programs.

Figure 2.6-1: Meaningful Use Incentive Payments by Program Year

Program Year	Eligible Hospital (EH)		Eligible Provider (EP)	
	Medicare	**Medicaid**	**Medicare**	**Medicaid**
2012	$0	$4,501,504	n/a	$4,632,500
2013	$1,155,115	$3,601,203	n/a	$0
2014	$916,026	$900,301	n/a	$2,231,250
2015	$602,916	n/a	n/a	$913,750
2016	$233,047	n/a	n/a	$5,682,250
2017	n/a	n/a	n/a	TBD
Total Payment	$2,907,104	$9,003,008	n/a	$13,459,750*
Total Payment by Program	**$11,910,112**		**$13,459,750**	
Overall Financial Impact	**$25,369,862**			

*Estimated

- ■ **Future Impact**
  - ◊ DHHA will continue to participate in the Medicare EHR Incentive Program for Eligible Hospitals to avoid penalties.
  - ◊ The Medicare EHR Incentive Program for Eligible Providers ended with Program Year 2016. The measures associated with this program and its financial incentives/penalties were consolidated into the Quality Payment Program (QPP).
  - ◊ The Medicaid MU EP program closed enrollment with Program Year 2016 but will provide incentive payments for up to five more years.

2.6. CMS Electronic Health Record (EHR) Incentive Programs (a.k.a. Meaningful Use)

Medicare Eligible Hospital Meaningful Use Program

As of January 1, 2018, CMS changed the submission mechanism for objective measures in the Medicare Meaningful Use program. CMS now utilizes its QualityNet portal in an effort to align with its other value based programs. Two objective measures (Clinical Decision Support and Computerized Provider Order Entry) were removed beginning in Program Year 2017.

Figure 2.6-2: Medicare Eligible Hospital EHR Incentive Program Objective Measures

Modified Stage 2 Objectives	Threshold	Program Year 2016 Score*	Program Year 2017 Score**	
Protect Electronic Health Information	Yes	Yes	Yes	
Clinical Decision Support				
Measure 1: Implement CDS Interventions	Yes	Yes	*retired*	
Measure 2: Implement Drug-Drug & Drug-Allergy Checks	Yes	Yes	*retired*	
Computerized Provider Order Entry				
Measure 1: CPOE—Medications	>60%	97.9%	*retired*	
Measure 2: CPOE—Labs	>30%	96.0%	*retired*	
Measure 3: CPOE—Imaging	>30%	98.1%	*retired*	
E-Prescribing	>10%	90.6%	82.4%	9,521 of 11,567 Prescriptions
Send Summaries of Care	>10%	48.1%	53.0%	2,951 of 5,575 Transitions
Patient Education	>10%	97.3%	99.6%	5,244 of 5,266 Patients
Medication Reconciliation	>50%	90.4%	93.4%	6,048 of 6,482 Transitions
Patient Electronic Access				
Measure 1: Patient Electronic Access	>50%	98.6%	98.8%	5,194 of 5,258 Patients
Measure 2: Patients Access Health Information	At least one patient	15.5%	17.9%	938 of 5,258 Patients
Public Health Reporting (Need 3 of 4)				
Immunization Registry Reporting		Yes	Yes	
Syndromic Surveillance Reporting	Meet 3 of 4 measures	Yes	n/a	
Specialized Registry Reporting		Yes	Yes	
Reportable Laboratory Result Reporting		Yes	Yes	

*Reporting period is 10/1/2016—12/31/2016
** Reporting period is 1/1/2017—3/31/2017

- **PI Activity**
  - ◊ Summaries of Care cannot be sent to external providers if their addresses are not available within Epic. DHHA's Epic team loaded over 3,000 additional providers into our system in November 2017. DHHA recognized that the provider files had not been regularly maintained and created a new Epic position to focus on this large effort.
  - ◊ Enterprise-wide efforts to encourage patients to access health information via MyChart.

- **Future Impact**
  - ◊ CMS delayed mandatory participation in MU Stage 3 until Program Year 2019, allowing DHHA to participate in Modified Stage 2 during Program Year 2018.
  - ◊ Stage 3 has a higher threshold for discharge medications electronically prescribed (>25% prescriptions).
  - ◊ There are several new measures in Stage 3, including: patients receive a secure message using MyChart (threshold >5% patients), patient generated health data incorporated into Epic (threshold >5% patients), request/accept Summary of Care for new patients (threshold >10% patients), and clinical information reconciliation of medications, allergies, and problem list (threshold >50% of new patients).

2.6 CMS Electronic Health Record (EHR) Incentive Programs (a.k.a. Meaningful Use)

Medicare Eligible Hospital Meaningful Use Program

Hospitals may report clinical quality measures (CQMs) via attestation or electronically. Attestation requires manual submission of aggregated data for 16 CQMs through QualityNet but the submission can only be used for the Medicare EHR Incentive program. Electronic submission requires transfer of patient-level files for four eCQMs and satisfies requirements of both the EH MU program and Inpatient Quality Reporting program. DHHA has submitted CQMs electronically since the option became available. DHHA selected different measures to report to CMS in 2017 from the prior year due to the retirement of two eCQMs and inaccurate results due to changes in the Epic system (Figure 2.6-3).

Figure 2.6-3: Medicare Eligible Hospital EHR Incentive Program Clinical Quality Measures

Measure ID	Electronic Clinical Quality Measure	Program Year 2017*
eEHDI-1a	Hearing Screening Prior to Hospital Discharge	98.7% (735/744)
ePC-05	Exclusive Breast Milk Feeding Patients	52.3% (307/586)
eVTE-1	Venous Thromboembolism Prophylaxis	96.2% (1478/1535)
eVTE-2	Intensive Care Unit Venous Thromboembolism Prophylaxis	98.8% (778/787)

* Reporting period is 1/1/2017—3/31/2017

- ■ **PI Activity**
  - ◊ If mechanical prophylaxis for venous thromboembolism is contraindicated, providers simply do not order it. However, CMS requires discrete documentation by the provider or pharmacist for not ordering the item and this was not possible within our Epic system. The Epic team adjusted all admission order sets to include an order "Mechanical prophylaxis contraindicated" with a selection of acceptable reasons.

- ■ **Future Impact**
  - ◊ CMS delayed mandatory participation in MU Stage 3 until Program Year 2019, allowing DHHA to participate in Modified Stage 2 during Program Year 2018.
  - ◊ For Program Year 2018, Medicare is requiring the submission of four eCQMs for one quarter during the calendar year and any continuous 90-day period during the calendar year for objective measures.
  - ◊ CMS proposed dramatic changes to the EHR Incentive Program for hospitals in the 2019 IPPS Proposed Rule.
    - Rename the program as "Promoting Interoperability (PI)"
    - Retire eight eCQMs from MU and IQR beginning in 2020 — DH reported EHDI-1a to CMS in 2017
      - ♦ CMS 53 (AMI-8a) Primary PCI Received Within 90 Minutes of Hospital Arrival.
      - ♦ CMS 26 (CAC-3) Home Management Plan of Care Document Given to Patient/Caregiver.
      - ♦ CMS 55 (ED-1) Median Time from ED Arrival to ED Departure for Admitted ED Patients.
      - ♦ CMS 32 (ED-3) Median Time from ED Arrival to ED Departure for Discharged ED Patients .
      - ♦ CMS 31 (EHDI-1a) Hearing Screening Prior to Hospital Discharge.
      - ♦ CMS 113 (PC-01) Elective Delivery.
      - ♦ CMS 107 (STK-8) Stroke Education.
      - ♦ CMS 102 (STK-10) Assessed for Rehabilitation.
    - Switch from threshold-based scoring for objectives to a performance-based scoring system similar to how objectives are scored for MIPS.
    - Added two new components to E-Prescribing objective—optional in 2019 and mandatory in 2020
      - ♦ Query of Prescription Drug Monitoring Program (PDMP).
      - ♦ Verify Opioid Treatment Agreement.
    - Retired three objectives from Stage 3
      - ♦ Clinical Decision Support.
      - ♦ CPOE for medication orders, laboratory orders, and imaging orders.
      - ♦ Coordination of Care through Patient Engagement (patient access, secure messaging, patient-generate data).

2.6 CMS Electronic Health Record (EHR) Incentive Programs (a.k.a. Meaningful Use)

Medicaid Eligible Provider Meaningful Use Program

The Department of Health Care Policy and Financing (HCPF) transitioned to a new Registration and Attestation system for Colorado's Medicaid program. This new system experienced significant problems including development delays, software bugs, missing historical information, and programming malfunctions. HCPF was unable to accept submissions to the 2016 Medicaid EHR Incentive program until October 2017 and allowed submissions until April 2018 to rectify all issues. It is unknown when HCPF will accept submissions for the 2017 EHR Incentive Program. Therefore, all 2017 data are estimates until DHHA can confirm each provider's eligibility for the program.

For each provider, a 90-day period was identified where the EP met the thresholds of all objective measures. Nine eCQMs which are appropriate for the EP's patient population during the same 90-day period are submitted to Medicaid. The eCQMs must also cover 3 of the 4 domains. Figure 2.6-4 shows the percentage of providers compliant with each objective measure. Figure 2.6-5 shows the percentage of patients or encounters passing each quality measure for Q4 2017. This is preliminary data because providers who fail an objective measure in Q4 2017 may pass all objective measures in another 90-day period. Furthermore, eligibility for the 2017 Medicaid program has not been assessed, i.e. percentage of Medicaid patients and percentage of non-hospital based encounters.

Figure 2.6-4: Medicaid Eligible Provider EHR Incentive Program Objective Measures

Modified Stage 2 Objectives	Threshold	Program Year 2016 Compliant Providers*	Program Year 2017 Compliant Providers**	
Protect Patient Health Information	Yes	100%	100%	(493/493)
Clinical Decision Support (CDS)				
Measure 1: Implement CDS Interventions	5 CDS	100%	100%	(493/493)
Measure 2: Implement Drug-Drug & Drug-Allergy Checks	Yes	100%	100%	(493/493)
Computerized Provider Order Entry				
Measure 1: CPOE—Medications	>60% orders	99%	99%	(492/493)
Measure 2: CPOE—Labs	>30% orders	100%	99%	(492/493)
Measure 2: CPOE—Imaging	>30% orders	100%	100%	(493/493)
Electronic Prescribing	>50% prescriptions	97%	99%	(490/493)
Health Information Exchange—electronically transmit Summary of Care to receiving provider for each transition of care or referral	>10%	81%	100%	(493/493)
Patient Specific Education	>10%	100%	100%	(493/493)
Medication Reconciliation—performed for patients transitioned into the EP's care	>50%	97%	98%	(488/493)
Patient Electronic Access				
Measure 1: Patients provided electronic access to View, Download, or Transmit their information within 4 business days of the information being available to the provider	>50%	99%	77%	(381/493)
Measure 2: Patients access their health information	1 patient (2016). >5% (2017)	100%	63%	(312/493)
Secure Messaging	1 patient (2016). >5% (2017)	100%	84%	(417/493)
Public Health Reporting: Immunization Registry, Syndromic Surveillance, Specialized Registry	2 registries	100%	100%	(493/493)

*Reporting period is 10/1/2016—12/31/2016

** Preliminary results based on Quarter 4 2017 encounters

- **PI Activity**
  - ◊ Enterprise-wide efforts to encourage patients to sign up for MyChart and access their information.

- **Future Impact**
  - ◊ CMS delayed mandatory participation in MU Stage 3 until Program Year 2019, allowing DHHA to participate in Modified Stage 2 during Program Year 2018.
  - ◊ Stage 3 has higher thresholds for many measures, including >60% medications electronically prescribed, >60% labs ordered by CPOE, >60% radiology exams ordered by CPOE, >80% patients have timely access to MyChart, >35% patients receive patient-specific education, >10% patients view their health information, >25% patients receive a secure message, >50% transfers/referrals have Summary of Care sent to receiving provider.
  - ◊ There are several new measures in Stage 3, including patient generated health data incorporated into Epic (threshold >5% patients), request/accept Summary of Care (threshold >40% new patients), and clinical information reconciliation of medications, allergies, and problem list (threshold >80% new patients).

2.6 CMS Electronic Health Record (EHR) Incentive Programs (a.k.a. Meaningful Use)

Medicaid Eligible Provider Meaningful Use Program

Figure 2.6-5: Medicaid Eligible Provider EHR Incentive Program Clinical Quality Measures for Quarter 4 2017 Encounters

Domain	CMS ID	Measure Name	Numerator	Denominator	Compliance
Efficiency and Cost Reduction	146	Appropriate Testing for Children with Pharyngitis	436	478	91%
	154	Appropriate Treatment for Children with Upper Respiratory Infection	1541	1567	98%
Patient Safety	68	Documentation of Current Medications in the Medical Record	27,086	30,988	87%
	156	Use of High-Risk Medications in the Elderly: One Medication	295	4587	6%
		Use of High-Risk Medications in the Elderly: Two Medications	107	4587	2%
Community and Population Health	138	Tobacco Use: Screening and Cessation Intervention	20,699	22,383	92%
	147	Influenza Immunization	14,901	24,899	60%
	153	Chlamydia Screening: Women 16-20 years of age	1441	1972	73%
		Chlamydia Screening: Women 21-24 years of age	1698	2209	77%
	155	Weight Assessment & Counseling: Age 3-11 years old—BMI Percentile, Height, & Weight	8836	9470	93%
		Weight Assessment & Counseling: Age 3-11 years old—Counseling for Nutrition	7109	9470	75%
		Weight Assessment & Counseling: Age 3-11 years old—Counseling for Physical Activity	5290	9470	63%
		Weight Assessment & Counseling: Age 12-17 years old—BMI Percentile, Height, & Weight	7241	7703	94%
		Weight Assessment & Counseling: Age 12-17 years old—Counseling for Nutrition	5602	7703	73%
		Weight Assessment & Counseling: Age 12-17 years old—Counseling for Physical Activity	5108	7703	66%
Effective Clinical Care	61	Cholesterol—Fasting LDL-C: High Risk Population	4306	9662	45%
		Cholesterol—Fasting LDL-C: Moderate Risk Population	2445	7088	34%
		Cholesterol—Fasting LDL-C: Low Risk Population	7234	19,027	38%
	62	HIV/AIDS Medical Visit	1119	1299	86%
	65	Hypertension Improvement in Blood Pressure	988	1799	55%
	74	Primary Caries Prevention Intervention: 0-5 years old	6563	11,556	57%
		Primary Caries Prevention Intervention: 6-12 years old	2407	9004	27%
		Primary Caries Prevention Intervention: 13-20 years old	979	9357	10%
	75	Children Who Have Dental Decay or Cavities	2788	29,917	9%
	122	Diabetes Hemoglobin A1C Poor Control	1905	6285	30%
	125	Breast Cancer Screening	4502	7073	64%
	126	Use of Appropriate Medications for Asthma: 5-11 years old	412	506	81%
		Use of Appropriate Medications for Asthma: 12-18 years old	405	570	71%
		Use of Appropriate Medications for Asthma: 19-50 years old	528	699	76%
		Use of Appropriate Medications for Asthma: 51-64 years old	210	268	79%
	127	Pneumococcal Vaccination Status for Older Adults	4234	5106	83%
	134	Diabetes: Medical Attention for Nephropathy	5587	6285	89%
	137	Initiation/Engagement of Alcohol & Drug Dependence Treatment: Ages 13-17, initiated treatment	9	94	10%
		Initiation/Engagement of Alcohol & Drug Dependence Treatment: Ages 13-17, multiple services	3	94	3%
		Initiation/Engagement of Alcohol & Drug Dependence Treatment: Ages 18 & older, initiated treatment	81	3223	3%
		Initiation/Engagement of Alcohol & Drug Dependence Treatment: Ages 18 & older, multiple services	9	3223	0%
	148	Hemoglobin A1C Test for Pediatric Patients	40	79	51%
	163	Diabetes: LDL Management	1963	6285	31%
	164	Ischemic Vascular Disease: Use of Aspirin or Another Antithrombotic	1051	1343	78%
	165	Controlling High Blood Pressure	4988	8466	59%
	182	Ischemic Vascular Disease: Complete Lipid Profile	1086	2414	45%
		Ischemic Vascular Disease: LDL-C < 100 mg/dL	892	2414	34%
Person/Caregiver Experience	157	Oncology: Pain Intensity Quantified	160	187	86%

- **Future Impact**
  - ◊ CY 2018: CMS retired six measures from MU/MIPS (CMS-ID 61, 62, 126, 148, 163, 182).

2.7. CMS/The Joint Commission Clinical Quality Measures

CMS Inpatient Quality Reporting (IQR) Program

The Hospital Inpatient Quality Reporting (IQR) Program provides consumers with quality of care information so they can make informed decisions about healthcare options. The program offers financial incentives to hospitals to report the quality of their services. Hospitals that fail to report will face a 2 percentage point reduction in the annual market basket update. DHHA has successfully participated in the IQR Program since its inception.

For the FFY 2019 payment determination, there were 50 required measures (6 chart-abstracted, 31 claims-based, 6 NHSN, 1 patient experience survey, 2 structural measures, 4 electronic). CMS mandated hospitals report at least four of the 15 electronic clinical quality measures (eCQMs) that align with the Medicare EHR Incentive Program in order to satisfy the IQR Program. As shown in Figure 2.6-3 in the prior section, DHHA submitted cases from Q1 2017 for ePC-05, eEHDI-1, eVTE-1, and eVTE-2.

CMS conducts validation studies of chart-abstracted process measure sets and Healthcare-Associated Infection (HAI) measures. Hospitals can be randomly selected or specifically targeted based on failing last year's validation study. If a hospital fails validation (<75% agreement), it loses the annual market basket update.

DHHA was randomly selected for the FFY 2018 IQR Inpatient Data Validation program. Clinical process of care measure sets included Acute Myocardial Infarction (AMI), Emergency Department (ED), Immunization (IMM), Stroke (STK), and Venous Thromboembolism (VTE). Central Line-Associated Bloodstream Infection (CLABSI) and Catheter-Associated Urinary Tract Infection (CAUTI) events reported to NHSN were validated along with Surgical Site Infection (SSI) cases from Medicare claims data for patients who had colon surgeries or abdominal hysterectomies. A CMS contractor validated 18 medical charts per quarter for Q3 2015, Q4 2015, Q1 2016, and Q2 2016. DHHA passed validation with an overall score of 92%.

- **Future Impact**
  - ◊ IQR CY 2018: Same requirements for successful participation in the IQR Program. AHRQ PSI 90 updated to modified version of composite measure. Communication About Pain composite measure added to HCAHPS survey.
  - ◊ FFY 2019 Inpatient Data Validation Program: DHHA was neither randomly selected nor targeted for the program.
  - ◊ FFY 2020 Inpatient Data Validation Program: DHHA was randomly selected for the program, covering Q3 2017, Q4 2017, Q1 2018, and Q2 2018. Chart-abstracted measure sets included in validation are ED, IMM, VTE, and Sepsis (SEP). HAI measures included in validation are CLABSI, CAUTI, SSIs, Methicillin-Resistant *Staphylococcus aureus* (MRSA) laboratory-identified (LabID) events, and *Clostridium difficile* Infection (CDI) LabID events.

The Joint Commission ORYX Initiative

The Joint Commission's (TJC) ORYX initiative integrates outcomes and other performance measures into the accreditation process. In 2017, TJC ended the flexible reporting option where hospitals could select their reporting mechanism and measure sets. Instead, DHHA was required to submit nine chart-abstracted measures and six of 13 available eCQMs. Some of the chart-abstracted measures aligned with the CMS IQR program (ED-1, ED-2, PC-01, VTE-6, and IMM-2). However, TJC required four additional perinatal care measures. TJC originally mandated hospitals report six eCQMs but later in the year allowed hospitals to submit only four eCQMs to align with CMS's midyear change. In order to learn as much as possible about the eCQM process, DHHA decided to submit six eCQMs (eED-1, eED-2, eEHDI-1, eSTK-6, eVTE-1, eVTE-2). Chart-abstracted measure sets are reported for the entire year whereas the eCQM measures are reported for a self-selected quarter in 2017. DHHA chose to report 2Q 2017. Hospitals that fail to participate will lose their accreditation.

- **Future Impact**
  - ◊ CY 2018: DHHA elected to submit the same measures as CY 2017.

Recognition by The Joint Commission for eCQM Participation

In October 2017, Denver Health and 470 other organizations were recognized as a 2017 Pioneers in Quality™ Data Contributor for the voluntary submission of 2016 eCQM data to The Joint Commission.

2.7. CMS/The Joint Commission Clinical Quality Measures

Hospital Inpatient

Venous Thromboembolism (VTE)
VTE-6 was a mandatory chart-abstracted measure in 2017 for CMS IQR and TJC ORYX programs.
eVTE-1 and eVTE-2 were selected as electronic clinical quality measures for CMS IQR and TJC ORYX programs.

- **2017 Overall Results**
  - ◊ 0% of patients who did not receive VTE prophylaxis developed a VTE during hospitalization (VTE-6).
  - ◊ 96.2% of patients received venous thromboembolism prophylaxis during Q1 2017 and 96.9% during Q2 2017 (eVTE-1).
  - ◊ 98.8% of ICU patients received venous thromboembolism prophylaxis during Q1 2017 and 98.4% during Q2 2017 (eVTE-2).

Figure 2.7-1: Incidence of Potentially Preventable VTE (VTE-6)
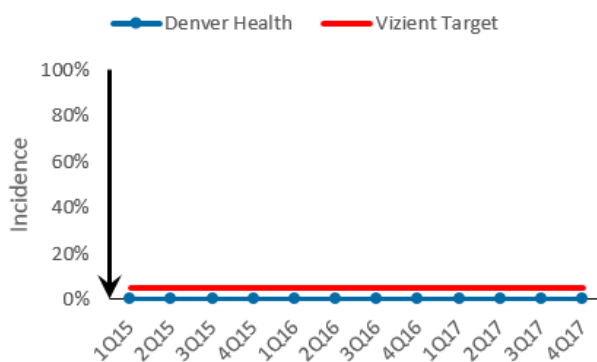
- **PI Activity**
  - ◊ DPSQ, Epic teams, and VTE physician champions collaborated to include the Padua formal risk assessment in the inpatient prophylaxis order set.

- **Future Impact**
  - ◊ CY 2018: same three measures reported to CMS and TJC.
  - ◊ CY 2019: CMS has proposed to retire VTE-6, thereby eliminating all VTE chart-abstracted measures.

Stroke (STK)
eSTK-6 was selected as an electronic clinical quality measure for the TJC ORYX program.

- **2017 Overall Results**
  - ◊ 100% of stroke patients were discharged on a statin medication (eSTK-6).

- **Future Impact**
  - ◊ CY 2018: DH selected eSTK-6 for TJC ORYX program.

## 2.7. CMS/The Joint Commission Clinical Quality Measures

Hospital Inpatient

Influenza Immunization (IMM)
IMM-2 was a mandatory chart-abstracted measure in 2017 for CMS IQR and TJC ORYX programs.

- **2017 Overall Results**
  ◊ During the 2016-2017 flu season, 98% of patients had documentation of influenza vaccine status (contraindication, receipt or refusal of vaccine during the current admission, or receipt prior to current admission).
  ◊ During the first half of the 2017-2018 flu season, 99.6% of patients had documentation of influenza vaccine status.

Figure 2.7-2: Influenza Immunization (IMM-2)
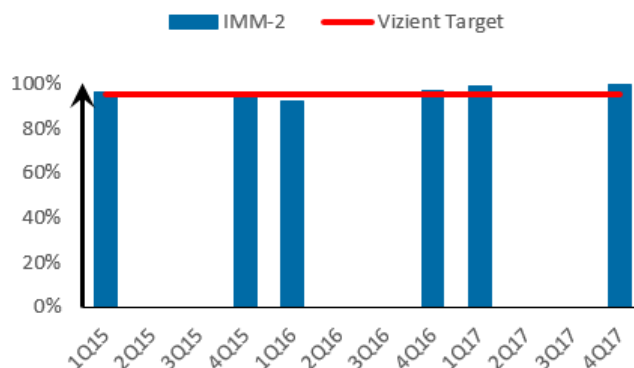
- **PI Activity**
  ◊ Epic Inpatient Clinical Documentation Team created real-time, unit-specific worklists which showed patient-level status of vaccination screening, administration, and discharge order. This worklist facilitated DPSQ staff to provide immediate feedback to specific units with potential failed cases.
  ◊ DPSQ staff reviewed all discharges within the previous 24 hours for missed documentation on vaccine status. The discharging unit nurse manager and clinical nurse educator were apprised of the missed opportunity. Feedback was provided for unit staff education. If appropriate, retrospective documentation was facilitated.
  ◊ DPSQ reported weekly on previous 7-day performance at Daily Patient Safety Briefing.
  ◊ Unit-specific weekly performance was posted on DHHA's Intranet Home Page from October 1, 2017 to November 15, 2017.

- **Future Impact**
  ◊ CY 2018: IMM-2 remains a required chart-abstracted measure for CMS IQR and TJC ORYX programs.
  ◊ CY 2019: CMS has proposed to retire IMM-2, thereby eliminating the hospital-wide immunization measures.

2.7. CMS/The Joint Commission Clinical Quality Measures

Hospital Inpatient

Severe Sepsis and Septic Shock (SEP)
SEP-1 was a mandatory chart-abstracted measure in 2017 for the CMS IQR program.

- **2017 Overall Results**
  - ◊ 40% of patients passed all applicable measure components in the Sepsis Composite (compared to 24% in 2016).
  - ◊ 80% of these cases occurred when the patient was in the Emergency Department (ED).

Figure 2.7-3: Early Management Bundle: Severe Sepsis / Septic Shock (SEP-1)
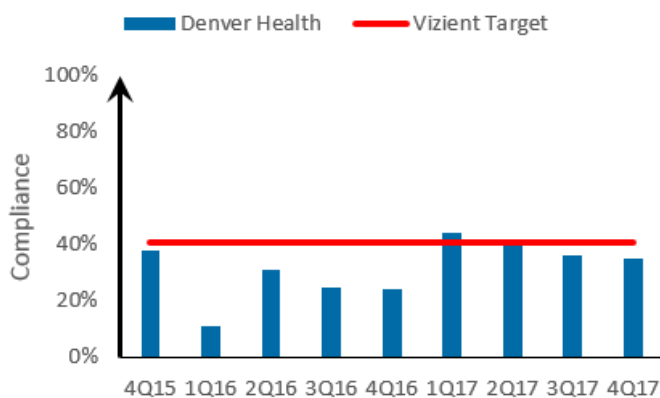
- **PI Activity**
  - ◊ Due to the ED being the primary location of sampled cases (80%), a real time screen is done within the ED for patients who meet the CMS criteria for septic shock.
  - ◊ Real time feedback sent to ED leadership to discuss compliance with bundle requirements with bedside clinicians.
  - ◊ Weekly data reports were sent to ED Quality leadership.
  - ◊ Failed case follow-up with clinicians.
  - ◊ Monthly Septic Shock Data is sent to the ED, MICU, and DPSQ leadership teams.
  - ◊ Yearly Physician level data reported to ED leadership for Ongoing Professional Performance Evaluation (OPPE) process.
  - ◊ Collaboration with lab on possible system process issues with timing of labs.
  - ◊ Monthly and continuous education of MICU residents and interns on documenting the physical reassessment piece into a "dot sepsis" phrase as well as the Sepsis Alert process.
  - ◊ New targets set for compliance based off other institutions nationwide and current performance.

- **Future Impact**
  - ◊ CY 2018 : SEP-1 remains a required chart-abstracted measure for CMS IQR program.
  - ◊ Cases failing due to documentation rather than actual care will be escalated to clinical documentation team, attending physicians, or Chief Quality Officer to determine if an addendum can be added to the medical record.
  - ◊ Attending physicians in the ED are held accountable for their performance via the OPPE process.
  - ◊ Update of order sets and process improvement for low performing components are priority for 2018. (Re-measure lactate if initial is greater than 2.0).

2.7. CMS/The Joint Commission Clinical Quality Measures

Hospital Inpatient

Perinatal Care Conditions (PC)
PC-01 was a mandatory chart-abstracted measure in 2017 for the CMS IQR program.
ePC-05 was selected as an electronic clinical quality measure for CMS IQR program.
Perinatal Care measure set must be chart-abstracted for the 2017 TJC ORYX program, i.e. PC-01, PC-02, PC-03, PC-04, and PC-05.
eEHDI-1a was selected as an electronic clinical quality measure for the 2017 TJC ORYX program.

- **2017 Overall Results**
  - ◊ 0% of pregnant women had an elective delivery between 37 and 39 weeks gestation (PC-01).
  - ◊ 24% of nulliparous women with a term baby in a vertex position were delivered by cesarean section (PC-02).
  - ◊ 100% of pregnant women at risk of preterm delivery at 24-32 weeks gestation received antenatal steroids prior to delivering the preterm newborn (PC-03).
  - ◊ 0% of high risk newborns diagnosed with septicemia or bacteremia acquired their infection in the hospital (PC-04).
  - ◊ 54% of newborns were exclusively fed breast milk during the inpatient stay following birth (PC-05).
  - ◊ 99% of newborns received a hearing screening prior to hospital discharge during Q2 2017 (eHDI-1a).
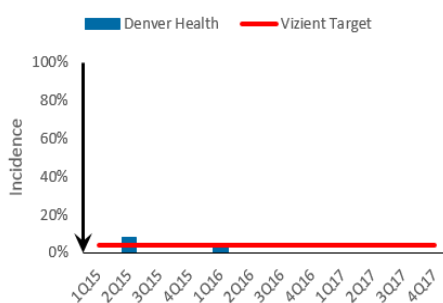
Figure 2.7-4: Elective Delivery (PC-01)

Figure 2.7-5: Cesarean Section (PC-02)
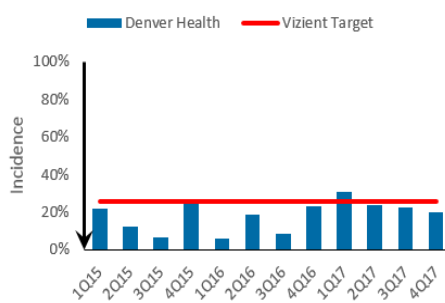
Figure 2.7-6: Antenatal Steroids (PC-03)
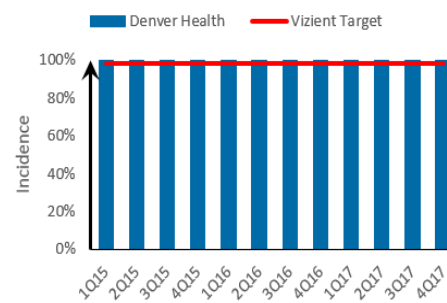
Figure 2.7-7: Healthcare Associated Blood Stream Infections in Newborns (PC-04)
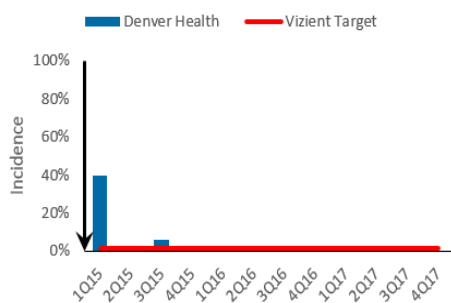
Figure 2.7-8: Exclusive Breast Milk Feeding Overall (PC-05)
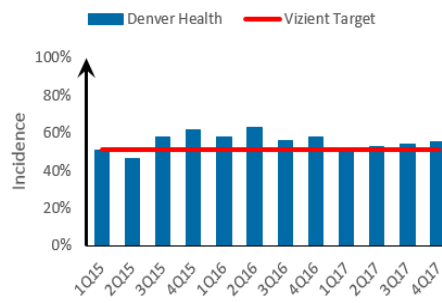
- **PI Activity**
  - ◊ Exclusive breast milk feeding results are provided to the Breast Feeding Council bimonthly.
  - ◊ OB/GYN Department reviews cesarean section rates and indications for the procedure monthly to monitor appropriate usage. Provider-level reports are distributed annually.

- **Future Impact**
  - ◊ CY 2018: no changes.
  - ◊ CY 2020: CMS has proposed removal of ePC-01.

2.7. CMS/The Joint Commission Clinical Quality Measures

Emergency Department

CMS does not have a separate payment system or quality reporting program for Emergency Department (ED) encounters. Instead, these visits are incorporated into either the Inpatient Quality Reporting or Outpatient Quality Reporting (OQR) programs depending on a patient's final discharge disposition. Patients who are discharged home from the ED are considered outpatients whereas patients who are admitted are considered inpatients. The Joint Commission only monitors the inpatient ED measures.

ED-1 and ED-2 were mandatory chart-abstracted measures in 2017 for the CMS IQR and TJC ORYX programs.
eED-1 and eED-2 were selected as electronic clinical quality measures for the TJC ORYX program.
ED-OP-18, ED-OP-20, ED-OP-21, and OP-23 were mandatory chart abstracted measures for the CMS OQR program.

- **2017 Overall Results**

Figure 2.7-9 Emergency Department

ID	Measure	Cases	Median Time (minutes)
ED-1b	ED arrival to ED departure for patients admitted to the hospital	643	287
ED-2b	Admit decision to ED departure for patients admitted to the hospital	643	103
ED-OP-18b	ED arrival to ED departure for patients discharged from the ED	305	260
ED-OP-20	ED arrival to diagnostic evaluation by a qualified medical professional	381	18
ED-OP-21	ED arrival to pain management for ED patients with long bone fracture	225	22

ID	Measure	Performance Rate
OP-23	Head CT or MRI scan interpretation for ED stroke patients within 45 minutes of arrival	56%

Figure 2.7-10: Time from ED arrival to departure for admitted patients (ED-1b)
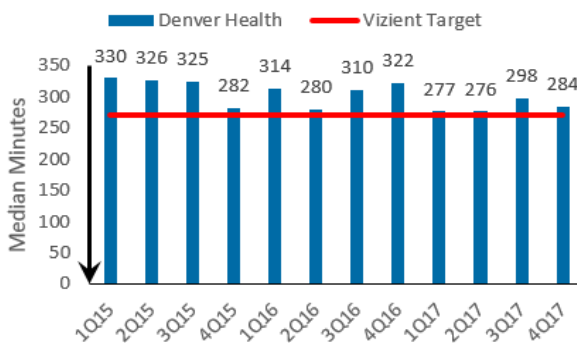
Figure 2.7-11: Time from admit decision time to ED departure for admitted patients (ED-2b)
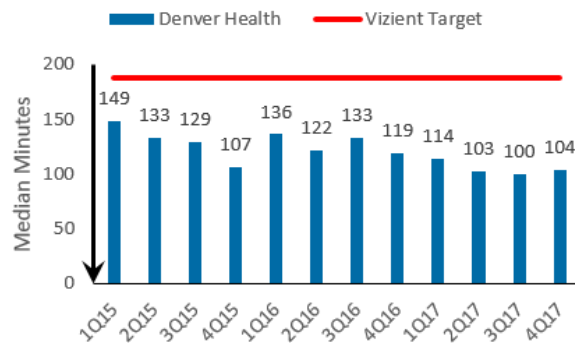
Figure 2.7-12: Time from ED arrival to departure for discharged patients (ED-OP-18b)
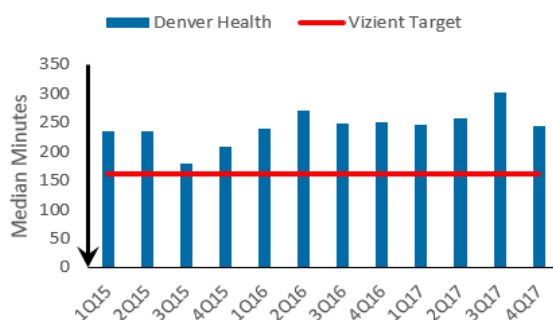
Figure 2.7-13: Time from ED arrival to provider contact (ED-OP-20)
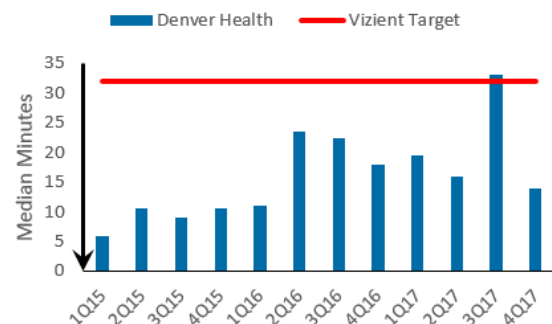
Figure 2.7-14: Time from ED arrival to pain medication for long bone fractures (ED-OP-21)
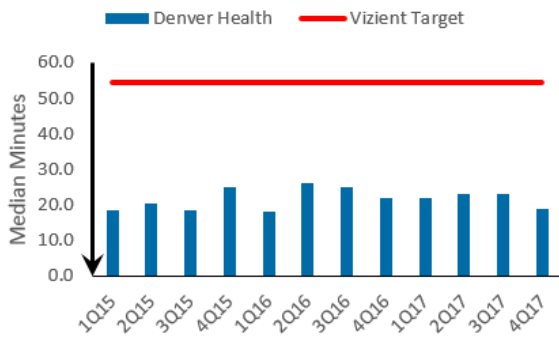
Figure 2.7-15: Stroke MRI/CT interpretation within 45 minutes of ED arrival (ED-OP-23)
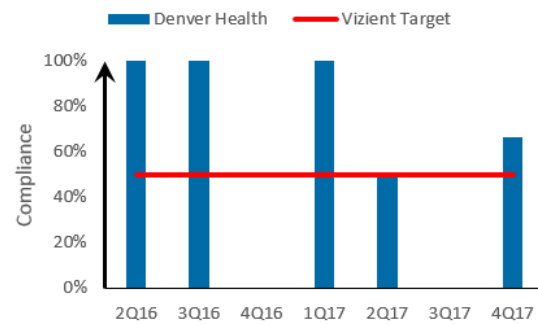
- **PI Activity**
  - ◊ Quarterly reports provided to emergency room leadership and presented at Gemba walks.
  - ◊ In 2016, the executive leadership of DHHA launched a multi-pronged coordinated improvement effort focused on hospital flow. A primary target of the improvement work that began in 2017 targeted ED wait times.

- **Future Impact**
  - ◊ CY 2018 CMS OQR program: CMS has retired OP-20 and OP-21 after Q1 2018 encounters.
  - ◊ CY 2018 TJC ORYX: DHHA will submit both the chart-abstracted and electronic versions of ED-1 and ED-2.
  - ◊ CY 2019: CMS has proposed to retire chart-abstracted measure ED-1.
  - ◊ CY 2020: CMS has proposed to remove chart-abstracted measures ED-2 and OP-21, as well as electronic measures eED-1 and eED-3.

2.7. CMS/The Joint Commission Clinical Quality Measures

CMS Inpatient Psychiatric Quality Reporting (IPFQR) Program

The Inpatient Psychiatric Facility Quality Reporting (IPFQR) program's goals are to help consumers make more informed decisions about healthcare options and to encourage hospitals to improve the quality of care. IPFs collect aggregate data by quarter and submit to CMS annually. IPFs that do not participate or meet reporting requirements receive a 2.0 percentage point reduction of their annual payment update. The reduction is non-cumulative across payment years. There are 18 measures and 4 sub-measures for the FFY 2019 payment determination. Newly adopted measures include Alcohol and Other Drug Use Disorder Treatment Offered at Discharge (IPF-SUB-3) and its sub-measure Treatment Provided at Discharge (IPF-SUB-3a), Transition Record with Specified Elements Received by Discharged Patients (IPF-TTR-1), Timely Transmission of Transition Record (IPF-TTR-2), Screening for Metabolic Disorders (IPF-SMD-1), as well as 30-Day All-Cause Unplanned Readmission Following Psychiatric Hospitalization.

- **Future Impact**
  - ◊ CY 2018: No changes.

Alcohol Use (IPF-SUB)
- **2017 Overall Results**
  - ◊ 99% of psychiatric inpatients were screened for alcohol use using a validated screening questionnaire within the first three days of admission (IPF-SUB-1).
  - ◊ 93% of psychiatric inpatients who screened positive for unhealthy alcohol use, alcohol abuse, or alcohol dependence were offered a brief intervention during the hospital stay (IPF-SUB-2).
  - ◊ 85% of psychiatric inpatients who screened positive for unhealthy alcohol use, alcohol abuse, or alcohol dependence received a brief intervention during the hospital stay (IPF-SUB-2a).
  - ◊ 30% of psychiatric inpatients who screened positive for unhealthy alcohol use or other drug use disorder were offered treatment at discharge (IPF-SUB-3).
  - ◊ 24% of psychiatric inpatients who screened positive for unhealthy alcohol use or other drug use disorder received treatment at discharge (IPF-SUB-3a).

Figure 2.7-16: Alcohol Use Screening (IPF-SUB-1)
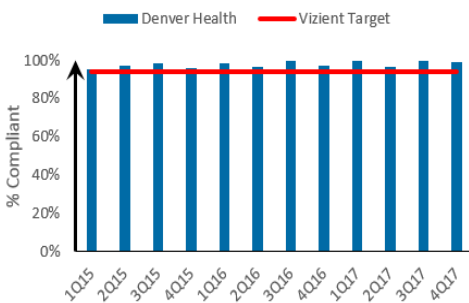
Figure 2.7-17: Brief Intervention Offered in Hospital Stay (IPF-SUB-2)
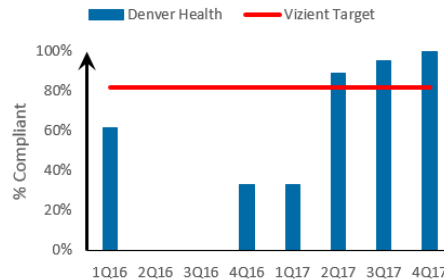
Figure 2.7.18: Brief Intervention Received in Hospital Stay (IPF-SUB-2a)
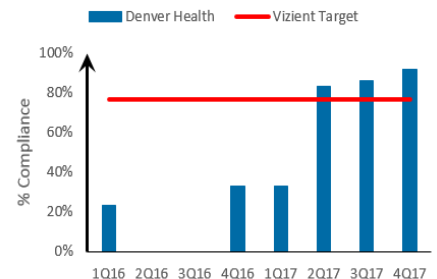
- **PI Activity**
  - ◊ DPSQ met with Behavioral Health staff certified in alcohol intervention to review previously established process for identifying patients who should receive treatment; reviewed documentation of required elements of intervention.

2.7. CMS/The Joint Commission Clinical Quality Measures

CMS Inpatient Psychiatric Quality Reporting (IPFQR) Program

Tobacco Use (IPF-TOB)
- **2017 Overall Results**
  - ◇ 100% of psychiatric inpatients were screened for tobacco use during the first day of admission (IPF-TOB-1).
  - ◇ 96% of psychiatric inpatients who used tobacco within the past 30 days were offered cessation counseling and tobacco cessation medication during the hospital stay (IPF-TOB-2).
  - ◇ 31% of psychiatric inpatients who used tobacco within the past 30 days received cessation counseling and tobacco cessation medication during the hospital stay (IPF-TOB-2a).
  - ◇ 32% of psychiatric inpatients who used tobacco within the past 30 days were offered an outpatient counseling referral and tobacco cessation medication at discharge (IPF-TOB-3).
  - ◇ 32% of psychiatric inpatients who used tobacco within the past 30 days received an outpatient counseling referral and tobacco cessation medication at discharge (IPF-TOB-3a).

Figure 2.7-19: Tobacco Use Screening on Admission Day (IPF-TOB-1)
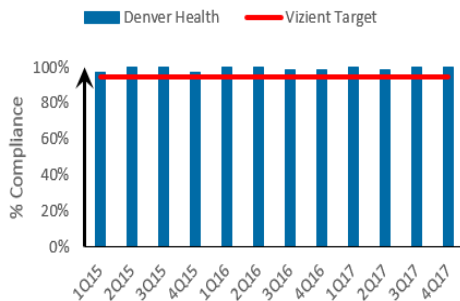
Figure 2.7-20: Tobacco Use Treatment Offered in Hospital Stay (IPF-TOB-2)
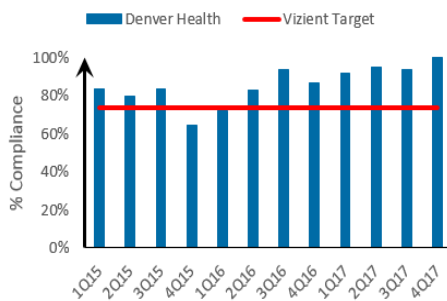
Figure 2.7-21: Tobacco Use Treatment Received in Hospital Stay (IPF-TOB-2a)
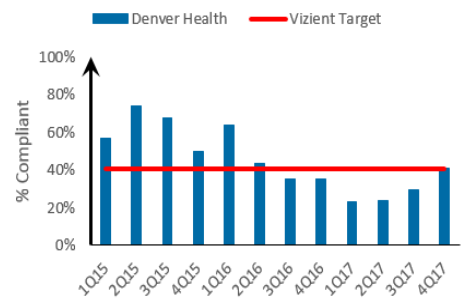
Figure 2.7-22: Tobacco Use Treatment Offered at Discharge (IPF-TOB-3)
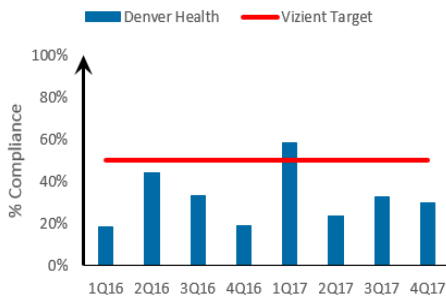
Figure 2.7-23: Tobacco Use Treatment Provided at Discharge (IPF-TOB-3a)
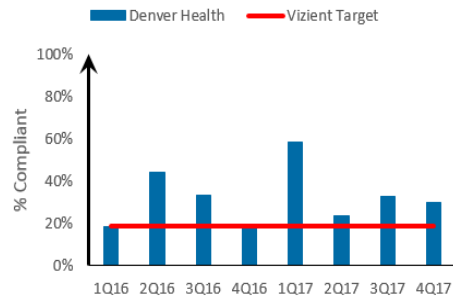
- **PI Activity**
  - ◇ DPSQ met with Behavioral Health providers to discuss pros/cons of prescribing tobacco cessation medication at discharge.

2.7. CMS/The Joint Commission Clinical Quality Measures

CMS Inpatient Psychiatric Quality Reporting (IPFQR) Program

Hospital-Based Inpatient Psychiatric Services (HBIPS)
- **2017 Overall Results**
    - ◊ 0.47 hours of physical restraint usage per 1,000 patient hours (HBIPS-2).
    - ◊ 0.42 hours of seclusion used per 1,000 patient hours (HBIPS-3).
    - ◊ 100% of patients discharged on multiple antipsychotic medications had appropriate justification (HBIPS-5).

Figure 2.7-24: Physical restraint rate (HBIPS-2)
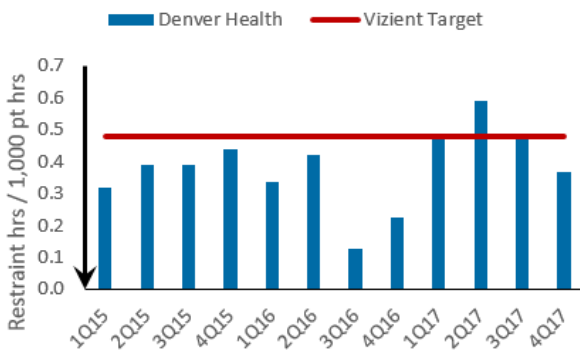
Figure 2.7-25: Seclusion rate (HBIPS-3)
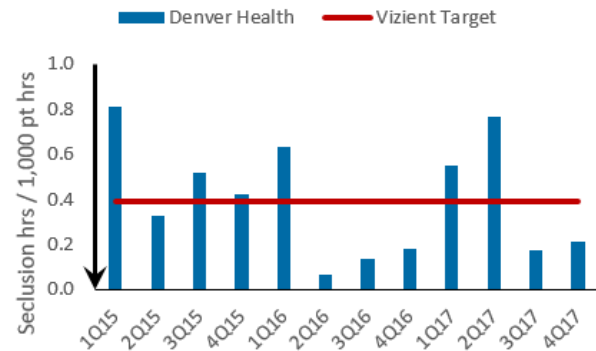
Figure 2.7-26: Multiple discharge antipsychotic medications justified (HBIPS-5)
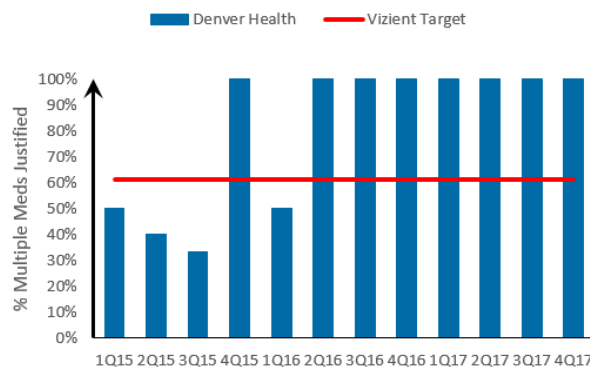
- **PI Activity**
    - ◊ DPSQ reviewed Epic documentation of restraint and seclusion events with Behavioral Health nursing staff, resulting in more accurate documentation of start/stop times to allow more accurate case count (cases missing start or stop time are excluded).
    - ◊ Quarterly data provided to NORE/BH project "Study on the Seclusion and Restraint Rate and the Implementation of Trauma Informed Care and Sensory Modality Use."
    - ◊ DPSQ and Epic Inpatient Clinical Documentation teams collaborated to create a drop-down list with allowable justifications for multiple antipsychotic medications in the provider discharge summary.

2.7. CMS/The Joint Commission Clinical Quality Measures

## CMS Inpatient Psychiatric Quality Reporting (IPFQR) Program

Influenza Immunization
- **2017 Overall Results**
  - ◊ During the 2016-2017 flu season, 98.1% of psychiatric inpatients received their influenza immunization (IPF-IMM-2).
  - ◊ During the first half of the 2017-2018 flu season, 99.6% of patients received their influenza immunization (IPF-IMM-2).

Figure 2.7-27: Influenza Immunization (IPF-IMM-2)
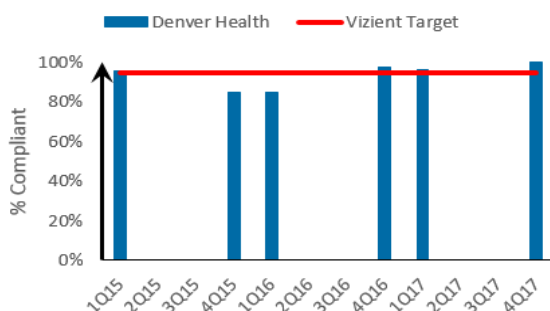
- **PI Activity**
  - ◊ See activities under Hospital Inpatient Influenza Immunization (IMM) Clinical Quality Measure.

Transitions of Care and Screening for Metabolic Disorders
- **2017 Overall Results**
  - ◊ 87% of psychiatric inpatients received a transition record with 11 mandatory elements (IPF-TTR-1).
  - ◊ 84% of psychiatric inpatients received their transition record within 24 hours of discharge (IPF-TTR-2).
  - ◊ 47% of patients discharged with at least one routinely scheduled antipsychotic medication received a metabolic screening in the 12 months prior to the discharge or during the inpatient psychiatric stay (IPF-SMD-1).

Web-Based and Claims-Based Measures
The FFY 2018 IPFQR claims-based measure includes Medicare FFS paid claims for encounters from July 1, 2015 to June 30, 2016. The two structural web-based measures for FFY 2018 are based on the hospital's status as of December 31, 2016. The influenza measure reported to NHSN for FFY 2018 is for the 2016-2017 Influenza season.

Figure 2.7-28: DHHA Performance on IPFQR Web-Based and Claim Based Measures

Submission	Measure	FFY 2017	FFY 2018	FFY 2019
Claims Based	Follow-Up After Hospitalization for Mental Illness 30-Days (FUH-30)	64%	n/a	TBD
Claims Based	Follow-Up After Hospitalization for Mental Illness 7-Days (FUH-7)	32%	n/a	TBD
Structural Web-Based	Assessment of Patient Experience of Care	Yes	Yes	Yes
Structural Web-Based	Use of an Electronic Health Record System	No	Yes	Yes
Structural Web-Based	Exchange of Interoperable Health Information with a Health Information Service Provider for Transitions of Care	No	Yes	Yes
NHSN	Influenza Vaccination Coverage Among Healthcare Personnel	96%	90%	97%

2.7. CMS/The Joint Commission Clinical Quality Measures

CMS Hospital Outpatient Quality Reporting (OQR) Program

The Outpatient Prospective Payment System (OPPS) pays for services furnished to Medicare beneficiaries in hospital outpatient departments and ambulatory surgery centers. Hospitals that fail to meet the outpatient quality reporting (OQR) requirements receive a 2 percentage point reduction in payments. For the CY 2019 payment determination (i.e. program year 2017), there were 26 measures (9 chart-abstracted, 10 web-based, 7 claims-based).

DHHA was randomly selected by CMS for Outpatient Data Validation for the FFY 2018 annual payment update determination. Hospitals that fail validation (<75% agreement) will lose the annual market basket update. During 2017, a CMS contractor validated 12 medical charts per quarter for Q1 2016, Q2 2016, Q3 2016 and Q4 2016 on three chart-abstracted measures (OP-18, OP-20, and OP-21). DHHA passed the validation with an overall score of 90%.

- **Future Impact**
  - ◊ CY 2018:
    - CMS removed four chart-abstracted measures and two web-based measures:
      - Median Time to Fibrinolysis (OP-1)
      - Aspirin at Arrival (OP-4)
      - Door to Diagnostic Evaluation by a Qualified Medical Professional (OP-20)
      - Median Time to Pain Management for Long Bone Fracture (OP-21)
      - Safe Surgery Checklist Use (OP-25)
      - Hospital Outpatient Volume on Selected Outpatient Surgical Procedures (OP-26)
    - CMS added two new measures:
      - Admissions and Emergency Department Visits for Patients Receiving Outpatient Chemotherapy (OP-35)
      - Hospital Visits After Hospital Outpatient Surgery (OP-36)

2.7. CMS/The Joint Commission Clinical Quality Measures

Hospital Outpatient

Chart Abstracted Measures

In 2017, DHHA had zero cases for the AMI and chest pain measures (OP-1, OP-2, OP-3, OP-4, OP-5). The Emergency Department (ED) measures (OP-18, OP-20, OP-21, OP-23) are shown in the ED section.

Web-Based Measures

These measures are submitted annually. DH had zero cases for Colonoscopy Interval for Patients with History of Adenomatous Polyps (OP-30) and External Beam Radiotherapy for Bone Metastases (OP-33). CMS does not provide benchmarks for these measures.

Figure 2.7-29: Web-Based Measures

ID	Measure	DHHA 2015	DHHA 2016	DHHA 2017
OP-12	Electronically Receive Laboratory Data Directly into EHR System as Discrete Searchable Data	Yes	Yes	Yes
OP-17	Ability to Track Clinical Results Between Visits	Yes	Yes	Yes
OP-22	Emergency Department Patient Left Without Being Seen	2.6%	3.8%	4.0%
OP-25	Safe Surgery Checklist Use	Yes	Yes	Yes
OP-26	Hospital Outpatient Volume Data on Selected Outpatient Surgical Procedures			
	Cardiovascular	556	88	281
	Eye	1543	732	905
	Gastrointestinal	4347	3392	4144
	Genitourinary	876	420	764
	Musculoskeletal	2828	1003	644
	Nervous System	708	208	36
	Other	88	1541	77
	Respiratory	728	163	95
	Skin	2721	80	719
OP-27	Influenza Vaccination Coverage Among Healthcare Personnel	98%	98%	98%
OP-29	Appropriate Follow-up Interval for Normal Colonoscopy in Average Risk Patients	98.5%	96.8%	100%

Claims-Based Measures

These measures are based on paid Medicare FFS claims. Results are released by CMS approximately six months after a quarter ends. The most recent reporting period for these outpatient imaging efficiency measures are for encounters from Q3 2016 through Q2 2017 and hospital visit rate is for CY 2016 colonoscopies.

Figure 2.7-30: Claims-Based Measures

ID	Measure	DHHA	National
OP-8	MRI Lumbar Spine for Low Back Pain	51.1%	39.3%
OP-9	Mammography Follow-up Rates	13.1%	8.9%
OP-10	Abdomen CT—Use of Contrast Material	2.8%	7.8%
OP-11	Thorax CT—Use of Contrast Material	4.0%	1.5%
OP-13	Cardiac Imaging for preoperative risk assessment for non-cardiac low-risk surgery	4.6%	4.6%
OP-14	Simultaneous Use of Brain Computed Tomography (CT) and Sinus CT	1.0%	1.1%
OP-32	Facility 7-Day Risk-Standardized Hospital Visit Rate after Outpatient Colonoscopy per 1,000 colonoscopies	15.6	16.4

2.8 CMS Overall Hospital Quality Star Rating

CMS developed the Star Ratings in response to consumer and patient feedback that information displayed on *Hospital Compare* was difficult to understand. The existing quality measurements were simplified into a 5-star rating system.

Despite excellent performance in the domains of readmissions and efficient use of medical imaging, DHHA dropped from a 3-Star to a 2-Star rating in December 2017 (Figure 2.8-1). The decline reflects lower than expected performance in the safety and patient experience domains (Figure 2.8-2).

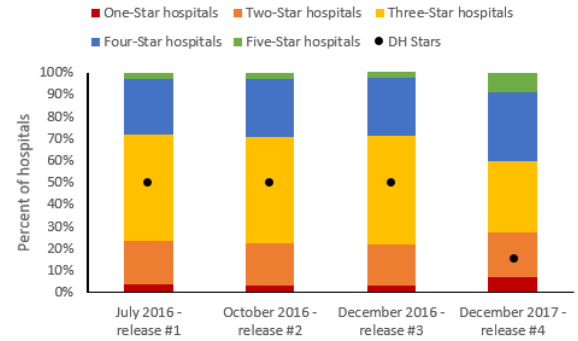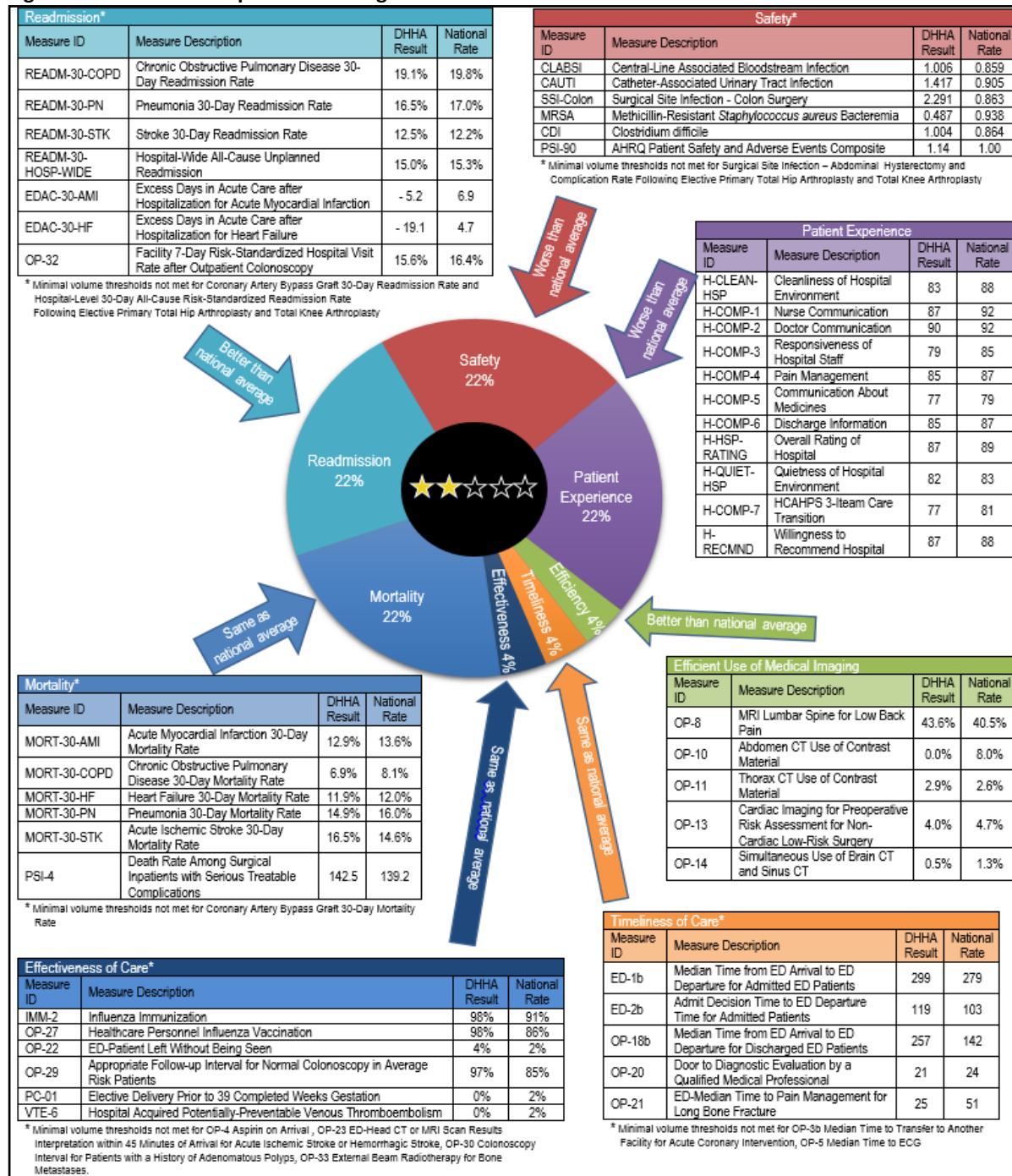**Figure 2.8-1: CMS Overall Hospital Star Rating**

Legend: One-Star hospitals ■ Two-Star hospitals ■ Three-Star hospitals ■ Four-Star hospitals ■ Five-Star hospitals ● DH Stars

X-axis: July 2016 - release #1, October 2016 - release #2, December 2016 - release #3, December 2017 - release #4

Figure 2.8-2: Overall Hospital Star Rating for Denver Health—December 2017

Readmission*

Measure ID	Measure Description	DHHA Result	National Rate
READM-30-COPD	Chronic Obstructive Pulmonary Disease 30-Day Readmission Rate	19.1%	19.8%
READM-30-PN	Pneumonia 30-Day Readmission Rate	16.5%	17.0%
READM-30-STK	Stroke 30-Day Readmission Rate	12.5%	12.2%
READM-30-HOSP-WIDE	Hospital-Wide All-Cause Unplanned Readmission	15.0%	15.3%
EDAC-30-AMI	Excess Days in Acute Care after Hospitalization for Acute Myocardial Infarction	- 5.2	6.9
EDAC-30-HF	Excess Days in Acute Care after Hospitalization for Heart Failure	- 19.1	4.7
OP-32	Facility 7-Day Risk-Standardized Hospital Visit Rate after Outpatient Colonoscopy	15.6%	16.4%

* Minimal volume thresholds not met for Coronary Artery Bypass Graft 30-Day Readmission Rate and Hospital-Level 30-Day All-Cause Risk-Standardized Readmission Rate Following Elective Primary Total Hip Arthroplasty and Total Knee Arthroplasty

Safety*

Measure ID	Measure Description	DHHA Result	National Rate
CLABSI	Central-Line Associated Bloodstream Infection	1.006	0.859
CAUTI	Catheter-Associated Urinary Tract Infection	1.417	0.905
SSI-Colon	Surgical Site Infection - Colon Surgery	2.291	0.863
MRSA	Methicillin-Resistant *Staphylococcus aureus* Bacteremia	0.487	0.938
CDI	Clostridium difficile	1.004	0.864
PSI-90	AHRQ Patient Safety and Adverse Events Composite	1.14	1.00

* Minimal volume thresholds not met for Surgical Site Infection – Abdominal Hysterectomy and Complication Rate Following Elective Primary Total Hip Arthroplasty and Total Knee Arthroplasty

Patient Experience

Measure ID	Measure Description	DHHA Result	National Rate
H-CLEAN-HSP	Cleanliness of Hospital Environment	83	88
H-COMP-1	Nurse Communication	87	92
H-COMP-2	Doctor Communication	90	92
H-COMP-3	Responsiveness of Hospital Staff	79	85
H-COMP-4	Pain Management	85	87
H-COMP-5	Communication About Medicines	77	79
H-COMP-6	Discharge Information	85	87
H-HSP-RATING	Overall Rating of Hospital	87	89
H-QUIET-HSP	Quietness of Hospital Environment	82	83
H-COMP-7	HCAHPS 3-Iteam Care Transition	77	81
H-RECMND	Willingness to Recommend Hospital	87	88

Center wheel: Safety 22%, Patient Experience 22%, Efficiency 4%, Timeliness 4%, Effectiveness 4%, Mortality 22%, Readmission 22% — ★★☆☆☆. Arrows: Better than national average, Worse than national average, Worse than national average, Same as national average, Same as national average, Same as national average, Better than national average

Mortality*

Measure ID	Measure Description	DHHA Result	National Rate
MORT-30-AMI	Acute Myocardial Infarction 30-Day Mortality Rate	12.9%	13.6%
MORT-30-COPD	Chronic Obstructive Pulmonary Disease 30-Day Mortality Rate	6.9%	8.1%
MORT-30-HF	Heart Failure 30-Day Mortality Rate	11.9%	12.0%
MORT-30-PN	Pneumonia 30-Day Mortality Rate	14.9%	16.0%
MORT-30-STK	Acute Ischemic Stroke 30-Day Mortality Rate	16.5%	14.6%
PSI-4	Death Rate Among Surgical Inpatients with Serious Treatable Complications	142.5	139.2

* Minimal volume thresholds not met for Coronary Artery Bypass Graft 30-Day Mortality Rate

Efficient Use of Medical Imaging

Measure ID	Measure Description	DHHA Result	National Rate
OP-8	MRI Lumbar Spine for Low Back Pain	43.6%	40.5%
OP-10	Abdomen CT Use of Contrast Material	0.0%	8.0%
OP-11	Thorax CT Use of Contrast Material	2.9%	2.6%
OP-13	Cardiac Imaging for Preoperative Risk Assessment for Non-Cardiac Low-Risk Surgery	4.0%	4.7%
OP-14	Simultaneous Use of Brain CT and Sinus CT	0.5%	1.3%

Effectiveness of Care*

Measure ID	Measure Description	DHHA Result	National Rate
IMM-2	Influenza Immunization	98%	91%
OP-27	Healthcare Personnel Influenza Vaccination	98%	86%
OP-22	ED-Patient Left Without Being Seen	4%	2%
OP-29	Appropriate Follow-up Interval for Normal Colonoscopy in Average Risk Patients	97%	85%
PC-01	Elective Delivery Prior to 39 Completed Weeks Gestation	0%	2%
VTE-6	Hospital Acquired Potentially-Preventable Venous Thromboembolism	0%	2%

* Minimal volume thresholds not met for OP-4 Aspirin on Arrival , OP-23 ED-Head CT or MRI Scan Results Interpretation within 45 Minutes of Arrival for Acute Ischemic Stroke or Hemorrhagic Stroke, OP-30 Colonoscopy Interval for Patients with a History of Adenomatous Polyps, OP-33 External Beam Radiotherapy for Bone Metastases.

Timeliness of Care*

Measure ID	Measure Description	DHHA Result	National Rate
ED-1b	Median Time from ED Arrival to ED Departure for Admitted ED Patients	299	279
ED-2b	Admit Decision Time to ED Departure Time for Admitted Patients	119	103
OP-18b	Median Time from ED Arrival to ED Departure for Discharged ED Patients	257	142
OP-20	Door to Diagnostic Evaluation by a Qualified Medical Professional	21	24
OP-21	ED-Median Time to Pain Management for Long Bone Fracture	25	51

* Minimal volume thresholds not met for OP-3b Median Time to Transfer to Another Facility for Acute Coronary Intervention, OP-5 Median Time to ECG

2.9. Hospital Quality Incentive Program (HQIP)

The Colorado Department of Health Care Policy and Financing (HCPF) started HQIP in 2011 to incentivize hospitals to improve health care and patient outcomes. The state's Medicaid agency retains a percentage of each hospital's payment and distributes incentive payments based on each hospital's performance on selected nationally recognized measures. In 2016 and 2017, HCPF added measures related to culture of safety. In 2017, HCPF removed the distinction between base measures and optional measures. Although hospitals are required to submit data on all eight measures, they will only receive scores for the first five measures for which they are eligible. The order of measures also changed: 1) Culture of Safety, 2) Active Participation in RCCOs, 3) Cesarean Section, 4) HCAHPS, 5) 30-Day All-Cause Readmissions, 6) Emergency Department Process, 7) Advanced Care Planning, and 8) Tobacco Screening Follow-up.

DHHA received full points on the Culture of Safety and Regional Care Collaborative domains and has a cesarean section rate in the best quartile in Colorado. DHHA performed in the worst quartile for patient satisfaction. The state was unable to produce readmission rates for the hospitals, so the totals were normalized to 50 points. DHHA received a final point total of 38/50 which translated into an estimated payment of $7.9 million.

- ■ **Next Steps:**
  - ◊ Educate the Obstetrics Department on the importance of documenting medical reasons for cesarean sections.
  - ◊ Continue work to improve the rapid availability of comprehensive outpatient services designed for patients who might otherwise be admitted.

- ■ **Future Impact of 2018 Program**
  - ◊ A Behavioral Health Organization (BHO) Engagement element will be added to the RCCO Engagement measure.
  - ◊ A Patient Safety element will be added to the Culture of Safety measure.
  - ◊ A Discharge Planning measure will be added, which encompasses Advance Care Planning and Care Transitions.
  - ◊ A Breastfeeding Practices measure will be added.
  - ◊ The Tobacco Screening and Follow-up measure was expanded to include Substance Use Screening and Follow-up.
  - ◊ Providers will be required to submit more supporting documentation/narrative summaries.

Figure 2.9: HQIP Program Scoring

Measure Name	Model Year 2015-2016			Model Year 2016-2017			Model Year 2017-2018		
	Result	Time	Points	Result	Time	Points	Rate/Result	Time	Points
Culture of Safety 1. Patient and Family Advisory Council 2. Hospital Safety Leadership 3. Patient Safety Survey 4. Unit Safety Huddles/Briefings 5. Adverse Events Reporting (new 2017)	n/a	n/a	n/a	#1: Yes #2: Yes #3: Yes #4: n/a	CY 2016	10 of 10	#1: Yes #2: Yes #3: Yes #4: No #5: Yes	CY 2017	10 of 10
Regional Care Collaborative Organizations 1. Hospital engaged with RCCO—Population health 2. Hospital engaged with RCCO—Care coordination 3. Hospital engaged with RCCO—Care management 4. Hospital engaged with RCCO—High utilizers 5. Advisory committee meetings participation	n/a	n/a	n/a	n/a	n/a	n/a	#1: Yes #2: Yes #3: Yes #4: Yes #5: Yes	CY 2017	10 of 10
Cesarean Section Rate (PC-02)	18.00%	CY 2014	10 of 10	16.77%	CY 2015	7 of 10	13.76%	CY 2016	10 of 10
Patient Satisfaction—HCAHPS Hospital rating of 9 of 10	69.00%	July 2015	0 of 10	68%	July 2016	0 of 10	67%	July 2017	0 of 10
30-Day All Cause Readmission Rate (Medicaid only)	16.00%	CY 2014	0 of 10	14.42%	CY 2015	0 of 10	n/a[†]	n/a[†]	n/a[†]
Emergency Department Processes: 1. Info provided about local primary care clinics if no PCP 2. Info provided about nurse advice lines 3. Policy to not replace lost/destroyed/stolen opiate prescriptions 4. Policy that long-acting opiates are not prescribed	#1: Yes #2: Yes #3: Yes #4: Yes	CY 2015	10 of 10	#1: Yes #2: Yes #3: Yes #4: Yes	CY 2016	10 of 10	#1: Yes #2: Yes #3: Yes #4: Yes	CY 2017	n/a
INCENTIVE PAYMENT	**$5,857,931**		**30 of 50**	**$4,612,904**		**27 of 50**	**$7,933,197***		**30 of 40[‡]**

[†] Due to a system conversion at HCPF, the data necessary for 30-Day All-Cause Readmissions could not be generated in time to be included in the 2017 program.
*Preliminary
[‡] By rule, the HQIP payment calculation must be based on a 50-point scale so each hospital's score was normalized to 50 points.

2.10. The Leapfrog Group Hospital Safety Grade

The Leapfrog Hospital Safety Grade is a single letter grade which represents a hospital's overall performance in keeping patients safe from preventable harm and medical errors. The score uses 30 performance measures from CMS, the Leapfrog Hospital Survey, AHRQ, CDC, and the American Hospital Association's Annual Survey and Health Information Technology Supplement. The Safety Grade is assigned to over 2,600 hospitals nationwide twice annually. Safety scores are accessible to the public via http://www.hospitalsafetygrade.org.

Denver Health's letter grade of C reflects higher than expected rates of some selected hospital acquired infections that have been active areas of improvement work, including CLABSI, CAUTI, Injury Falls, and hospital acquired *C. difficile*. Since the measurement period for these recent scores, we have seen improved performance in all areas which should be reflected in future letter grades (Figure 2.10). Patient experience measures, particularly those related to doctor and nurse communication, also contribute to the lower grade and have been areas of active improvement work. For the measures listed as "Declined to report", Denver Health chose not to participate in the voluntary Leapfrog survey in 2017.

Figure 2.10: Denver Health Hospital Safety Grades

Spring 2014	Fall 2014	Spring 2015	Fall 2015	Spring 2016	Fall 2016	Spring 2017	Fall 2017	Spring 2018
B	B	B	C	C	C	C	C	C

Outcome Measures	DHHA Score	Average Perform-ing Hospital	Time Period
Dangerous object left in patient's body	0	0.022	7/1/14—9/30/15
Air or gas bubble in blood	0	0.002	7/1/14—9/30/15
Patient falls	0.482	0.371	7/1/14—9/30/15
Infection in the blood during ICU stay	1.006	0.822	1/1/15—6/30/16
Infection in the urinary tract during ICU stay	1.417	0.895	1/1/15—6/30/16
Surgical site infection after colon surgery	2.291	0.855	10/1/15—9/30/16
MRSA infection	0.487	0.922	10/1/15—9/30/16
C. difficile infection	1.004	0.848	10/1/15—9/30/16
Dangerous bed sores	0.15	0.24	7/1/13—6/30/15
Death from treatable serious complications	142.50	138.90	7/1/13—6/30/15
Collapsed lung	0.48	0.40	7/1/13—6/30/15
Serious breathing problems	14.36	12.34	7/1/13—6/30/15
Dangerous blood clot	4.88	4.35	7/1/13—6/30/15
Surgical wound splits open	2.16	2.25	7/1/13—6/30/15
Accidental cuts and tears	1.28	0.88	7/1/13—6/30/15

Process Measures	DHHA Score	Average Perform-ing Hospital	Time Period
Doctors order medications through a computer	65	80.80	2016
Specially trained doctors care for ICU patients	75	50.32	2015
Effective leadership to prevent errors	Declined to report	116.77	2017
Staff work together to prevent errors	Declined to report	114.92	2017
Track and reduce risks to patients	Declined to report	97.01	2017
Enough qualified nurses	Declined to report	97.64	2017
Handwashing	Declined to report	57.84	2017
Communication with nurses	87	90.96	10/1/15—9/30/16
Communication with doctors	90	91.27	10/1/15—9/30/16
Responsiveness of hospital staff	79	83.84	10/1/15—9/30/16
Communication about medicines	77	77.69	10/1/15—9/30/16
Communication about discharge	85	86.88	10/1/15—9/30/16

2.11. Colorado Department of Public Health and Environment (CDPHE)

Colorado Department of Public Health and Environment (CDPHE) publishes Healthcare-Associated Infection (HAI) rates annually per legislation for state licensure. These HAIs include infections associated with surgeries, central lines, and hospital acquired *Clostridium difficile* infections. Data are reported by each institution to the CDC's National Healthcare Safety Network (NHSN). Improvement efforts are described in the Infection Control section. CPDHE's report was released in January each year but they changed to a summer release this year in order to report data by calendar year. Thus, the data shown in Figure 2.11 are based on NHSN reports.

For those with a calculated SIR, Denver Health's performance was no different statistically than national benchmark data. These include colon surgery, medical and trauma ICU CLABSI, and hospital-acquired *C. difficile*. While surgical volume is similar to the previous reporting period, the methodology NHSN uses to determine inclusion in the SIR calculation has changed. The greatest effect has been observed with the elimination of outpatient procedures from inclusion. Utilization of central lines has been on a decreasing trend for several years, but the transition from manually collected to electronic device denominator data has also had an impact. The standardized infection ratio for *C. difficile* infections decreased from the previous reporting period, but is no different than the national benchmark.

Figure 2.11: Denver Health Healthcare-Associated Infections

		August 2015—July 2016*				January 2017—December 2017**			
		# Procedures	# Infections	SIR	National Comparison	# Procedures	# Infections	SIR	National Comparison
Breast Surgery		217	4	0.9	Same	42	2	—	—
Colon Surgery		83	2	0.3	Same	137	6	1.30	Same
Hip Replacement		129	5	2.1	Same	92	2	—	—
Knee Replacement		174	2	1.1	Same	103	1	—	—
Abdominal Hysterectomy		83	2	0.9	Same	76	1	—	—
	Unit Type	# CL Days	# Infections	SIR	National Comparison	# CL Days	# Infections	SIR	National Comparison
Central Line-Associated Bloodstream Infections	MICU	2,883	3	0.9	Same	1870	2	0.95	Same
	Trauma ICU	1,863	8	3.1	Worse	1465	4	1.79	Same
	NICU	1,251	3	3.1	Same	714	0	—	—
	Inpt Rehab	65	0	0	Same	217	0	—	—
		# Patient Days	# Infections	SIR	National Comparison	# Patient Days	# Infections	SIR	National Comparison
C. difficile Infections		95,488	82	0.9	Same	98,519	64	0.81	Same

*Source: CDPHE
**Estimated from NHSN

2.12. U.S. News & World Report

The U.S. News and World Report publishes yearly rankings and ratings for hospitals in an effort to help consumers decide at which hospital they should receive their care. Adult specialties are evaluated based on data from multiple sources like the American Hospital Association (AHA), Centers for Medicare and Medicaid Services (CMS), and reputation among surveyed physicians. The Survival measure reflects the chances of survival in the specialty 30 days after being admitted, adjusted for patient severity and other risk factors. Patient Safety demonstrates the ability to prevent six types of accidents and medical errors across the hospital. Patient Services includes services which have been shown to improve patient care within the specialty, such as infection isolation rooms, palliative care, translators, and wound management services. Nurse Staffing indicates the nurse to patient ratio for the hospital.

Figure 2.12-1: Denver Health Adult Specialties Rankings and Ratings

	Overall Score	Survival	Patient Safety	Patient Services	Nurse Staffing
Neurology & Neurosurgery	47.7/100	Above Average	Average	Above Average	Above Average
Orthopedics	40.2/100	Above Average	Average	Above Average	Above Average

Figure 2.12-2: Denver Health Adult Procedures and Conditions Ratings

	Rating	Survival	Preventing Readmissions	Nurse Staffing
Abdominal Aortic Aneurism Repair	Not Rated	Average	Average	Very High
Chronic Obstructive Pulmonary Disease	Average	Average	N/A	N/A
Colon Cancer Surgery	Average	Average	N/A	Very High
Heart Failure	Average	Average	N/A	N/A
Hip Replacement	Average	Average	Average	N/A
Knee Replacement	Average	Average	N/A	N/A
Lung Cancer Surgery	Average	Average	N/A	Very High

Source: U.S. News and World Report

2.13. Healthgrades

Based on quality and safety performance from 2013-2015, DHHA received the 2017 Distinguished Hospital Award for Clinical Excellence[TM] by performing in the top 5% nationally for overall quality of care. Unlike other hospital quality comparisons, Healthgrades evaluates quality based solely on clinical outcomes after risk-adjusting at the patient level. DHHA was also awarded Healthgrades' Specialty Excellence Awards in Critical Care, Gastrointestinal Care, and Pulmonary Care. The treatment of common in-hospital procedures and conditions was recognized through 5-Star Ratings (Figure 2.13).

Figure 2.13: Healthgrades Recognition and Awards

Hospital Wide
Distinguished Hospital Award for Clinical Excellence™ in 2017
Specialty Excellence Awards
Critical Care Excellence Award™ in 2015, 2016, 2017
Gastrointestinal Care Excellence Award™ in 2017
Pulmonary Care Excellence Award™ in 2015, 2016, 2017
Five-Star Recipient
Treatment of Heart Failure for 5 Years in a Row (2013-2017)
Treatment of Chronic Obstructive Pulmonary Disease for 8 Years in a Row (2010-2017)
Treatment of Pneumonia for 9 Years in a Row (2009-2017)
Colorectal Surgeries (2017)
Treatment of GI Bleed for 2 Years in a Row (2016-2017)
Treatment of Sepsis for 5 Years in a Row (2013-2017)
Treatment of Pulmonary Embolism for 2 Years in a Row (2016-2017)
Treatment of Respiratory Failure for 4 Years in a Row (2014-2017)

3. NATIONAL COLLABORATIVES

3.1. Vizient Academic Medical Center (AMC) Inpatient Quality and Accountability (Q&A) Scorecard

Vizient created the Quality and Accountability (Q&A) Study in 2005 to help organizations assess their performance across a broad spectrum of high-priority dimensions of patient care. The Q&A Scorecard allows institutions to benchmark their results against other Academic Medical Centers (AMCs). In 2017, DHHA received three of five stars overall (Figure 3.1-1). Figure 3.1-2 shows DHHA's performance on each domain while Figure 3.1-3 displays performance on each metric.

Figure 3.1-1: Vizient Q&A Scorecard Star Ratings for Denver Health
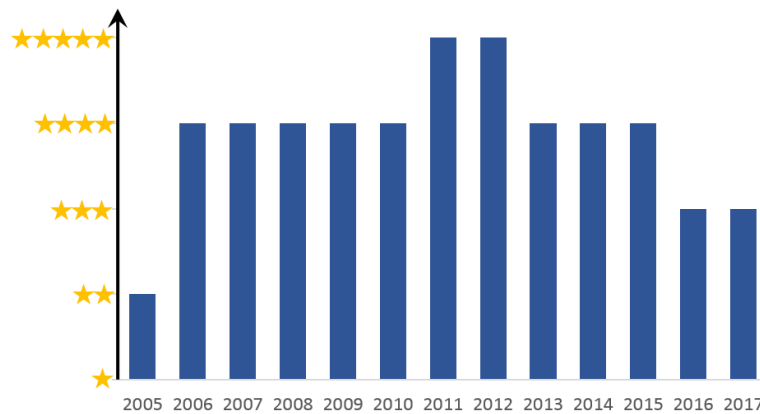
Figure 3.1-2: Vizient 2017 Q&A Scorecard Summary for Denver Health
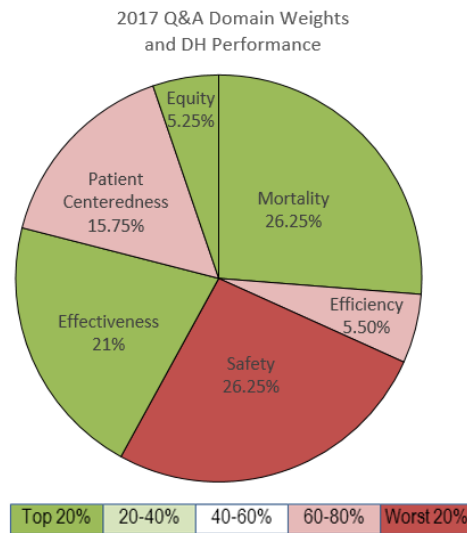
- **Future Impact of 2018 Q&A**
  - ◊ Comparison groups: Historically hospitals were in the Academic Medical Center (AMC) or Community Hospital cohorts. The new cohorts are Comprehensive AMC, Complex Teaching Medical Center, and Community Hospital. DHHA is in the Complex Teaching Medical Center cohort because we perform less than 25 solid organ transplant cases per year and care for at least 75 neurosurgery or cardiothoracic surgery cases per year.
  - ◊ Domain weights: Return to the 2015-2016 weights, i.e. efficiency domain at 10% with the introduction of the revised direct cost methodology.
  - ◊ Service Lines: Historically the mortality, length of stay, cost, and excess days metrics utilized sub-metrics with 10 core service lines representing 70% of the score and the aggregation of other service lines representing 30% of the score. The 2018 Q&A will focus on high volume, strategic services. There will be 14 Service Lines for length of stay and cost, while only 13 Service Lines for mortality and excess days (OB/GYN is excluded).
  - ◊ Risk Methodology: Vizient's risk models will be solely based on ICD-10 codes for the first time.

3.1. Vizient Academic Medical Center (AMC) Inpatient Quality and Accountability (Q&A) Scorecard

Figure 3.1-3: Vizient 2017 Quality and Accountability Scorecard for Denver Health

Mortality* (26.25%)

Vizient Service Line	O/E	Percentile Rank	Compared to Q&A 2016
Cardiology	0.87	40th	▲
Cardiothoracic Surgery	0.62	20th	▲
Gastroenterology	1.27	90th	▼
Medicine General	0.52	10th	▼
Neurology	0.63	10th	▲
Neurosurgery	1.59	100th	▼
Oncology	0.52	10th	▲
Ortho/Spine	0.32	10th	▲
Surgery General	0.61	10th	▲
Vascular Surgery	0.44	10th	▲
Non-Core Service Lines	0.79	30th	▲

*Timeframe: July 2016 – May 2017

Patient Centeredness* (15.75%)

HCAHPS Survey Dimension	% Top Box	Percentile Rank	Compared to Q&A 2016
Nurse communication	76.0	90th	▼
Doctor communication	80.7	60th	▲
Pain management	70.2	50th	▲
Communication about medications	69.1	10th	▼
Cleanliness and quietness	67.8	20th	▲
Responsiveness of staff	60.5	80th	▲
Discharge information	86.9	80th	▼
Overall rating of hospital	71.3	90th	▲
Transition of care composite	45.8	100th	▼

*Timeframe: Q2'16-Q4'16

Efficiency* (5.50%)

Vizient Service Line	Length of Stay O/E	Percentile Rank	Compared to Q&A 2016
Cardiology	1.06	90th	▼
Cardiothoracic Surgery	1.06	80th	▲
Gastroenterology	0.92	30th	▲
Medicine General	0.84	10th	▼
Neurology	0.98	60th	▼
Neurosurgery	1.18	100th	▼
Oncology	0.91	50th	▼
Ortho/Spine	0.96	50th	▼
Surgery General	1.04	90th	▼
Vascular Surgery	0.90	40th	▲
Non-Core Service Lines	1.03	80th	▼

*Timeframe: July 2016 – May 2017

Equity* (5.25%)

Core Measure		p-value (≤0.01 significant difference)		
Metric		Gender	Race	Socio economic status
ED-1	Median time from ED arrival to departure for admitted patients	0.20	0.04	0.07
ED-2	Median time from admit decision to departure time for admitted patients	0.02	0.09	0.04
ED-OP-18	Median time from ED arrival to departure for discharged patients	0.62	0.29	0.42
ED-OP-20	Median time from door to diagnosis	0.13	0.22	0.24
PM-OP-21	Median time for pain management in long bone fracture	0.80	0.08	0.88
VTE-5	Venous thromboembolism warfarin therapy discharge instructions	-	-	-

*Timeframe: Q1'16-Q4'16

Safety* (26.25%)

AHRQ PATIENT SAFETY INDICATORS

Metric ID	Description	O/E	Percentile Rank	Compared to Q&A 2016
PSI-3	Pressure ulcer	1.03	30th	▲
PSI-6	Postoperative iatrogenic pneumothorax	0.65	60th	▼
PSI-9	Postoperative hemorrhage or hematoma	1.66	100th	▼
PSI-11	Postoperative respiratory failure	0.68	90th	▼
PSI-13	Postoperative sepsis	1.58	100th	▲

NHSN HEALTHCARE ASSOCIATED INFECTIONS

Metric ID	Description	SIR	Percentile Rank	Compared to Q&A 2016
CLABSI	Central line-associated blood stream infection	1.26	80th	▲
CAUTI	Catheter-associated urinary tract infection	1.50	100th	▼
C-Diff	Clostridium difficile infection	1.18	70th	▲
SSI	Colon surgical site infection	2.44	100th	▼

CMS CORE MEASURES

Metric ID	Description	Rate	Percentile Rank	Compared to Q&A 2016
VTE-6	Hospital acquired venous thromboembolism	0.00	10th	–
THK	Total hip / total knee arthroplasty complication	1.46	20th	▲

Timeframe: AHRQ July 2016-May 2017, NHSN Q2'16-Q4'16, CMS Q1'16-Q4'16

Effectiveness* (21%)

30-DAY ALL CAUSE UNPLANNED READMISSIONS

Vizient Service Line	Rate (%)	Percentile Rank	Compared to Q&A 2016
Cardiology	10.25	50th	▲
Cardiothoracic Surgery	3.70	10th	▲
Gastroenterology	15.18	40th	▼
Medicine General	20.38	100th	▲
Neurology	7.39	40th	▲
Neurosurgery	10.94	90th	▲
Oncology	17.75	60th	▼
Ortho/Spine	6.35	70th	▲
Surgery General	15.57	100th	▼
Vascular Surgery	23.61	100th	▼
Non-Core Service Lines	4.20	10th	▼

EXCESS DAYS

Vizient Service Line	Rate	Percentile Rank	Compared to Q&A 2016
Cardiology	0.26	100th	▼
Cardiothoracic Surgery	0.05	70th	▲
Gastroenterology	0.31	100th	▼
Medicine General	- 0.01	30th	▼
Neurology	0.25	100th	▼
Neurosurgery	- 0.06	20th	▲
Oncology	- 0.02	50th	▲
Ortho/Spine	0.10	100th	▼
Surgery General	0.09	60th	▼
Vascular Surgery	- 0.25	10th	▲
Non-Core Service Lines	0.05	50th	▼

CMS CORE MEASURES

Metric ID	Description	Minutes	Percentile Rank	Compared to Q&A 2016
ED-1	Median time from ED arrival to departure for admitted patients	316	10th	▲
ED-2	Median time from admit decision to departure time for admitted patients	127.5	30th	▲
ED-OP-18	Median time from ED arrival to departure for discharged patients	260	70th	▼
ED-OP-20	Median time from door to diagnosis	20	20th	▼
PM-OP-21	Median time for pain management in long bone fracture	27.5	10th	▼
VTE-5	Venous thromboembolism warfarin therapy discharge instructions	100%**	10th	▲

*Timeframe: Readmissions/Excess Days July 2016-April 2017, CMS Q1'16-Q4'16
** Rate

3.2. Vizient Ambulatory Quality and Accountability (AQA) Scorecard

The Vizient Ambulatory Quality and Accountability (AQA) Scorecard provides a holistic view of ambulatory performance to enable institutions to deliver high quality, accessible, and cost efficient care. Fifty academic medical centers and their affiliate physician organizations participated in 2017. Organizations were ranked on five domains composed of 23 metrics and 119 sub-metrics. DHHA received four stars with its ranking of #10 (Figure 3.2-1). DHHA performed best in the domain of Quality and Efficiency with a Top 20% ranking (Figure 3.2-2). In 2018, DHHA will focus on Continuum of Care, the only domain with a score below the Vizient median.

Figure 3.2-1: 2017 AQA Scorecard for Denver Health

2017 AQA Domain Weight and DH Performance
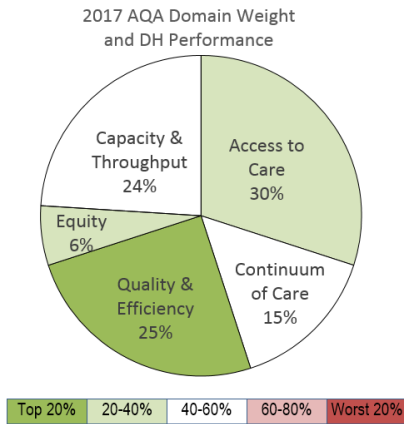
Figure 3.2-2: Denver Health AQA Overall Rank

Figure 3.2-3: Vizient 2017 AQA Metrics for Denver Health

Domain	Metric	Cardiology	Dermatology	Endocrinology	ENT	GI & Hepatology	Hematology & Oncology	Infectious Disease	Nephrology	Neurology	OB/GYN	Ophthalmology	Orthopedics	Primary Care	Pulmonology	Rheumatology	Surgery	Urology
Access to Care	% new patient visits over total visits	22.4	51.1	23.2	42.3	35.8	12.3	15.6	20.9	27.6	6.2	27.1	27.8	13.7	31.4	12.1	29.2	33.0
	% new patients seen within 10 days of scheduling an appointment	41.1	46.0	34.4	30.1	29.9	29.2	80.8	*	27.1	23.6	24.8	45.2	41.5	42.7	53.5	30.7	28.8
	Median days from scheduling appointment to visit for new patients visits	14	13	20	26	16	16	0.0	*	30	27	28	13	14	13	10	19	22
	% appointments cancelled by provider or clinic within 30 days of appointment date	1.8	0.2	1.3	1.8	4.2	3.4	3.1	*	2.3	0.3	1.7	3.9	1.4	1.6	1.9	2.7	0.8
Capacity & Throughput	Median encounters per provider per hour	1.0	2.5	1.5	2.0	1.3	1.7	1.0	*	1.0	1.5	1.8	1.6	1.7	1.0	1.3	1.0	1.5
	Consistency in encounters per provider per hour	0.0	1.0	0.5	0.6	0.5	0.7	0.3	*	0.5	0.8	1.5	0.8	0.7	0.3	0.5	0.5	0.8
	ED median time for admitted patients (ED-1b)	316 minutes																
	ED median time for discharged patients (OP-18b)	260 minutes																
Equity	Disparity in new patients seen within 10 days of scheduling an appointment by commercial and Medicaid payer	-	-	-	-	-	-	-	-	-	-	D	D	D	-	-	-	-
	Disparity in ED median time for admitted patients by white and nonwhite race	-																
	Disparity in ED median time for admitted patients by female and male gender	-																

Domain	Metric	Performance
Continuum of Care	% of ED visits that are low acuity	62.7
	% of patients with 4 or more ED visits per year	5.0
	% of patients with return to ED within 7 days	8.6
Quality & Efficiency	Hospitalization rate for acute ambulatory care-sensitive condition: Bacterial pneumonia	6.5
	Hospitalization rate for acute ambulatory care-sensitive condition: Urinary tract infection	0.0
	Hospitalization rate for acute ambulatory care-sensitive condition: Dehydration	0.0
	Hospitalization rate for chronic ambulatory care-sensitive condition: Diabetes mellitus	*
	Hospitalization rate for chronic ambulatory care-sensitive condition: COPD or asthma	*
	Hospitalization rate for chronic ambulatory care-sensitive condition: Heart failure	*
	Total per-capita costs for all conditions ($)	8,323
	Total per-capita costs for specific chronic conditions ($)	*
	Medicare spending per beneficiary ($)	19,846

LEGEND	
Top 20%	Low data
20-40%	
40-60%	Significant Difference at P<0.001
60-80%	
Worst 20%	- is no difference

3.3. Vizient Hospital Improvement Innovation Network (HIIN)

CMS funded two rounds of Hospital Engagement Networks (HEN and HEN 2.0) where significant progress was made nationally in keeping patients safe: 2.1 million fewer patients harmed, 87,000 lives saved, and $20 billion in cost-savings. To continue these efforts, CMS awarded $347 million to 16 hospital associations, Quality Improvement Organizations, and health system organizations for Hospital Improvement Innovation Networks (HIINs). The HIINs work to achieve a 20% decrease in overall patient harm and a 12% reduction in 30-day hospital readmissions over three years. Denver Health joined the Vizient HIIN in October 2016.

Benefits of HIIN Participation:
- Improve patient safety and avoid hospital-acquired conditions, penalties, and other costs.
- Head start on program requirements that may become mandatory later.
- Access to accurate, timely benchmarking and comparative reports that will leverage nationally endorsed, standardized measures.
- Opportunity to showcase accomplishments on both a local and national stage as well as receive considerable resources at no direct cost.

Vizient's HIIN Harm Areas:
- Central Line-Associated Blood Stream Infections (CLABSI)*
- Catheter-Associated Urinary Tract Infections (CAUTI)*
- *Clostridium difficile* Infection*
- Injury from Falls and Immobility*
- Surgical Site Infections (SSI)*
- Sepsis and Septic Shock
- Pressure Ulcers
- Venous Thromboembolism
- Ventilator-Associated Events
- Readmissions
- Adverse Drug Events (opioids, anticoagulants, and hypoglycemic agents)
- Iatrogenic Delirium
- Malnutrition
- Methicillin-Resistant *Staphylococcus aureus* infection

*DHHA chose to focus on these harm areas because they aligned with the enterprise Target Zero initiative.

DHHA's Target Zero aligns with many of the chosen initiatives in the HIIN Collaborative. Our Target Zero interventions are designed to improve our HIIN measures. In 2018, it was decided to add Venous Thromboembolism (VTE) to the Target Zero initiatives. In addition, based on data from the HIIN collaborative, DPSQ convened an Inpatient Pain and Opioid Stewardship and is working closely with the diabetes educators to improve those measures.

Figure 3.3-1: HIIN DHHA Improvement rates 10/2016—12/2017
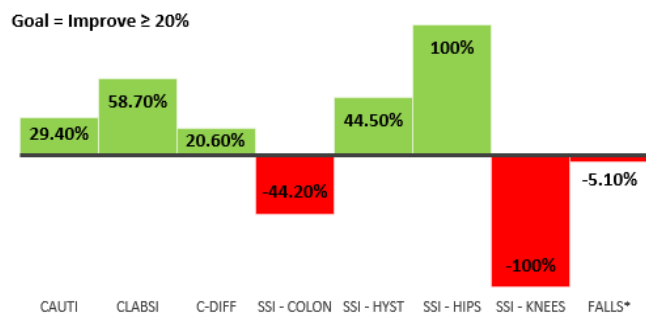
*Falls with minor or greater harm.

Figure 3.3-2: Additional Opportunities

Harm	Performance	Associated Costs	Quartile
Stage 2+ PRU	-36%	-$84 K	Above Median
Stage 3 PRU	+82%	+$61 K	Below Median
Iatrogenic Delirium	-10%	-$54 K	Above Median
ADE Anticoagulants	-7.2%	-$8 K	Below Median
Sepsis Mortality	-3.2%	-$49 K	Best
Peri-Op PE or DVT	+30.6%	+$63 K	Worst
ADE-Insulin	+24%	+$311 K	Near Worst
ADE-Opioids	+12.2%	+$69 K	Above Median

3.4. Vizient Mortality Collaborative

Denver Health participated in Vizient's Mortality Review Process Collaborative in an effort to implement best practices for in-hospital death reviews. The first phase of the collaborative focused on understanding DHHA's existing mortality review processes and completing a gap analysis. The second phase of the project involved implementing changes to the mortality review processes to incorporate best practices.

Five best practices were identified and implemented at DHHA during 2017:
- Development of a standardized tool for preliminary quality review (Figure 3.4)
- Creation of a standardized process for referring cases requiring further review
- Integration of mortality review efforts across the enterprise
- Implementation of process which empowers staff to follow recommendations for improvement and ensure accountability for completion
- Conduct preliminary review on all mortality cases using the standardized tool

By utilizing best practices and reviewing every death, DHHA can identify areas of improvement in care and decrease duplicative efforts across the organization. Referrals for secondary review are directed to the appropriate party to ensure a deeper, focused review. When opportunities of improvement or prevention are identified, education is provided to staff. Through a safe culture with accountability and transparency of actions, deaths can be prevented.

During 2018, DPSQ will continue conduct 100% mortality reviews. The mortality review tool will be migrated to an electronic format to improve staff efficiency and data aggregation.

Figure 3.4: DHHA Mortality Review Form

3.5. Vermont Oxford Network (VON)

The Vermont Oxford Network (VON) is a voluntary collaborative focused on improving the quality and safety of medical care for newborn infants and their families through a coordinated program of research, education, and quality improvement projects. Data are used to analyze the care and outcomes of high-risk newborn infants for quality management, process improvement, internal audit, peer review, outcomes research, randomized clinical trials, and epidemiological studies. VON provides reports which benchmark center specific data to neonatal centers from around the world. Findings are important for the development of educational materials and programs for health care professionals, policy makers, families of high-risk infants, and the public.

VON offers two comparative databases and DHHA participates in both options. The very low birthweight (VLBW) database is for infants born between 401 and 1500 grams. The expanded database includes infants weighing over 401 grams at birth and who were admitted to a Neonatal Intensive Care Unit (NICU).

DHHA had lower morbidity rates for VLBW infants compared to the VON Network average rates with respect to necrotizing enterocolitis, intraventricular hemorrhage, and any late infection (Figure 3.5). DHHA's mortality rate for VLBW infants was slightly higher than the VON Network (DH 17.9%, IQR 8.0%-17.6%). However after excluding early deaths, DHHA's mortality rate was lower than the national average (DH 3.0%, IQR 4.9%-13.3%). The mortality rate and most morbidity rates for infants in the expanded cohort was similar for Denver Health and the VON Network.

Figure 3.5: Vermont Oxford Network Key Performance Measures
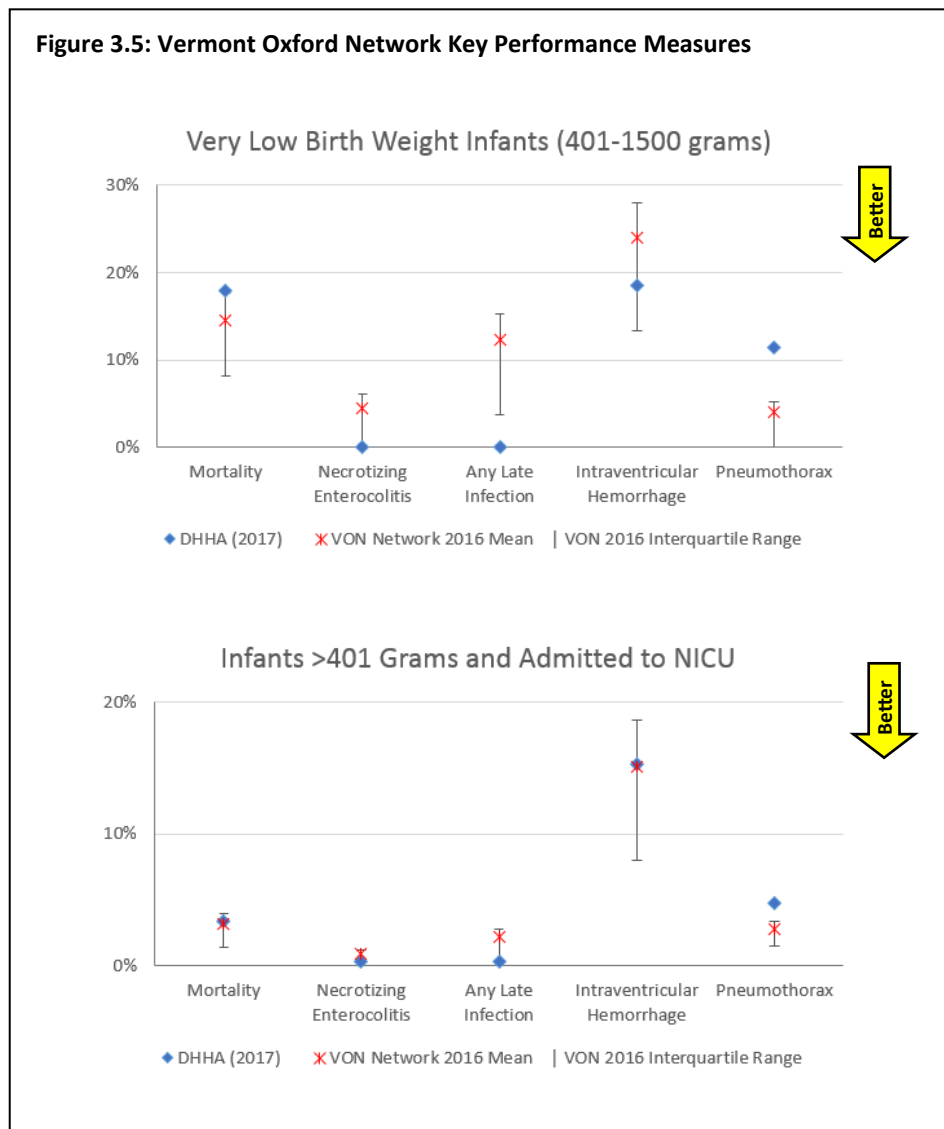
3.6. American College of Surgeons Trauma Quality Improvement Program (TQIP)

The Trauma Quality Improvement Program (TQIP) is offered through the American College of Surgeons to promote the quality of care for trauma patients at trauma centers. Currently more than 755 verified trauma centers participate in TQIP, including Level I, Level II, and Level III centers. Each center collects data through its trauma registry and submits information to the National Trauma Data Bank (NTDB) on a quarterly basis. NTDB works with TQIP to aggregate data sets and provide feedback to participating facilities. By identifying institutional specific trends, performance improvement activities are identified at the local level. Additionally, TQIP uses risk-adjusted benchmarking to provide each facility with national comparisons.

Trauma patients are less likely to die at DHHA compared to other trauma centers (Odds Ratio 0.87). Patient's with penetrating trauma at DHHA have a 43% higher survival rate but 70% higher chance of major complications. Trauma Brain Injury patients are 34% more likely to survive and 22% less likely to have major complications when cared for at DHHA's Level I trauma center (Figures 3.6-1 and 3.6-2).

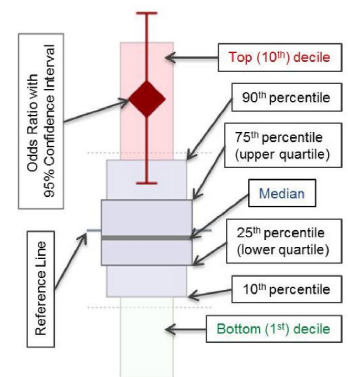### Figure 3.6-1: Risk Adjusted Mortality by Cohort
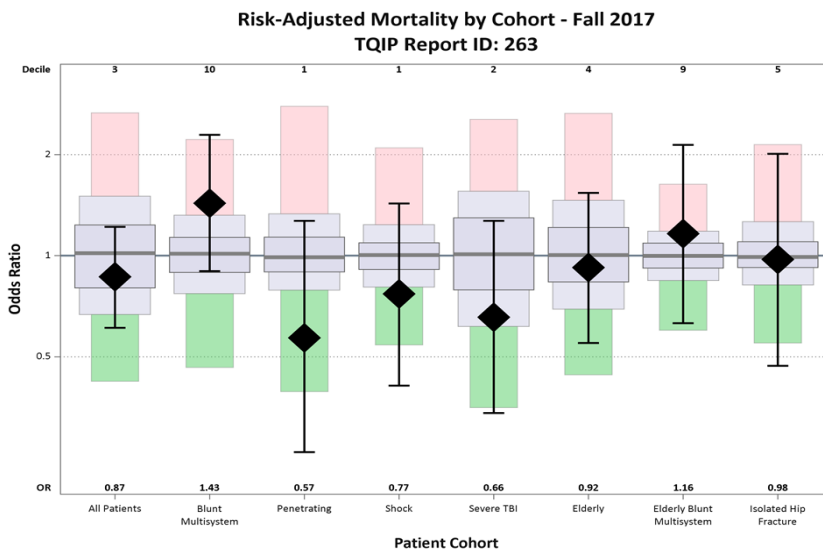
Source: TQIP Benchmark Report, Fall 2017

Figure 3.6-2: Risk Adjusted Major Complications by Cohort
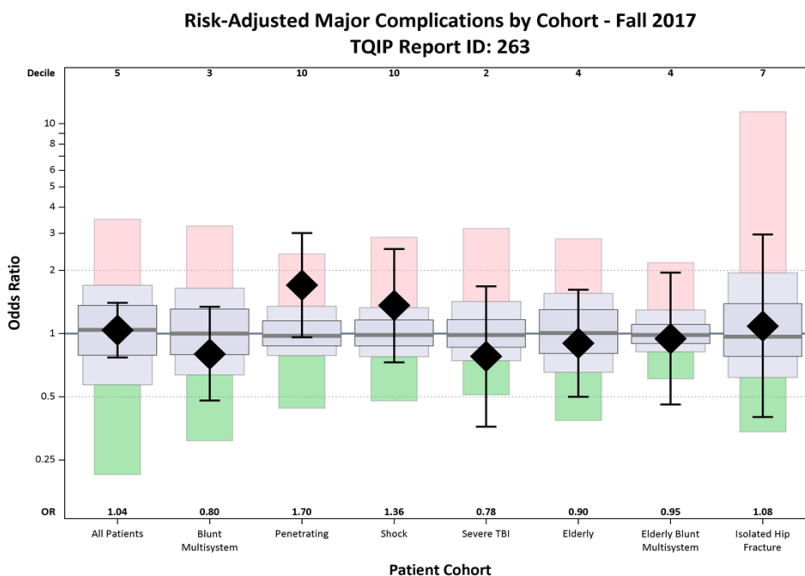
Source: TQIP Benchmark Report, Fall 2017

Figure 3.6-3: Legend

4. INPATIENT SAFETY & QUALITY INITIATIVES

4.1. Target Zero

Target Zero is an enterprise-wide initiative to protect our patients from preventable harm due to infections, falls, and medication events Figure 4.1). For the third year in a row, DHHA achieved its target of reducing the Target Zero events by more than 10% annually. The Target Zero Metric is a bundled measure of patient harm, based on a raw count of the following events.

Falls with Injury
Falls voluntarily reported in Safety Intelligence (SI) which led to moderate or major injury or death. The Nursing Department reviews the fall events and determines whether they meet the National Database of Nursing Quality Indicators (NDNQI) criteria.

Medication Safety Events
Ambulatory or Inpatient events voluntarily reported in SI with a high harm score which indicates temporary or permanent harm or death. Pharmacy and DPSQ review each event to determine if it qualifies for Target Zero.

Surgical Site Infections (SSI)
Infection Preventionists (IP) identify SSI after colon, breast, hip arthroplasty, knee arthroplasty, and abdominal hysterectomy procedures using National Healthcare Safety Network (NHSN) criteria from the Centers for Disease Control and Prevention (CDC). Because it takes up to 90 days to identify an SSI, this metric is reported with a 3 month delay, e.g. SSI for procedures performed in January are reported in April.

***Clostridium difficile* Infections (*C. difficile*)**
Hospital-acquired *C. difficile* infections are identified by IPs using the CDC's NHSN criteria, i.e. diagnosed in inpatients after at least two hospital days.

Catheter Associated Urinary Tract Infections (CAUTI)
Hospital-acquired CAUTIs are identified by IPs using the CDC's NHSN criteria, i.e. inpatients with a urinary catheter who have a fever and positive urine culture.

Central Line-Associated Blood Stream Infections (CLABSI)
Hospital-acquired CLABSIs are identified by IPs using the NHSN definition.

Figure 4.1: Target Zero Events
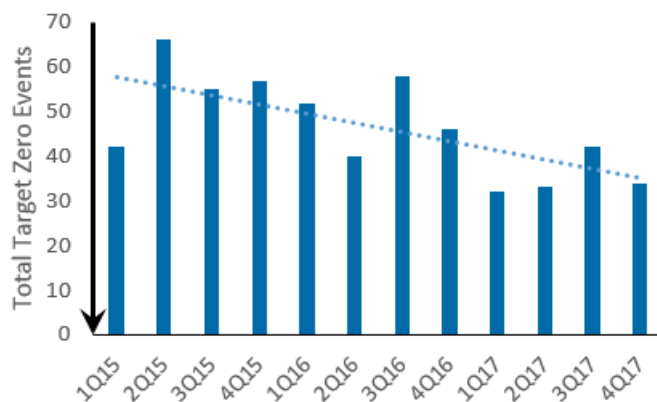
Goals of Target Zero:
- Every hospital employee can identify Target Zero as a major hospital safety initiative.
- Every inpatient unit staff member can name at least one component of the Target Zero Metric.
- Every inpatient unit manager regularly accesses unit-specific performance to share with teams.
- Visual management boards reflect local performance on Target Zero components.
- Safety measures designed to prevent harm are followed 100% of the time.
- DHHA experiences sustained year-over-year decline in preventable adverse events.

4.2. Inpatient Medication Reconciliation

Medication Reconciliation is a National Patient Safety Goal and improves continuity of care and safety for patients. Every hospitalized patient who is going home on medications is provided with a list of reconciled medications at discharge. The inpatient metric excludes patients who die, leave against medical advice, or are discharged from the neonatal intensive care unit or newborn nursery. DHHA exceeded our goal of 90% consistently throughout 2017 for both admission and discharge medication reconciliation.

Figure 4.2-1: Monthly Admission Medication Reconciliation 2016-2017
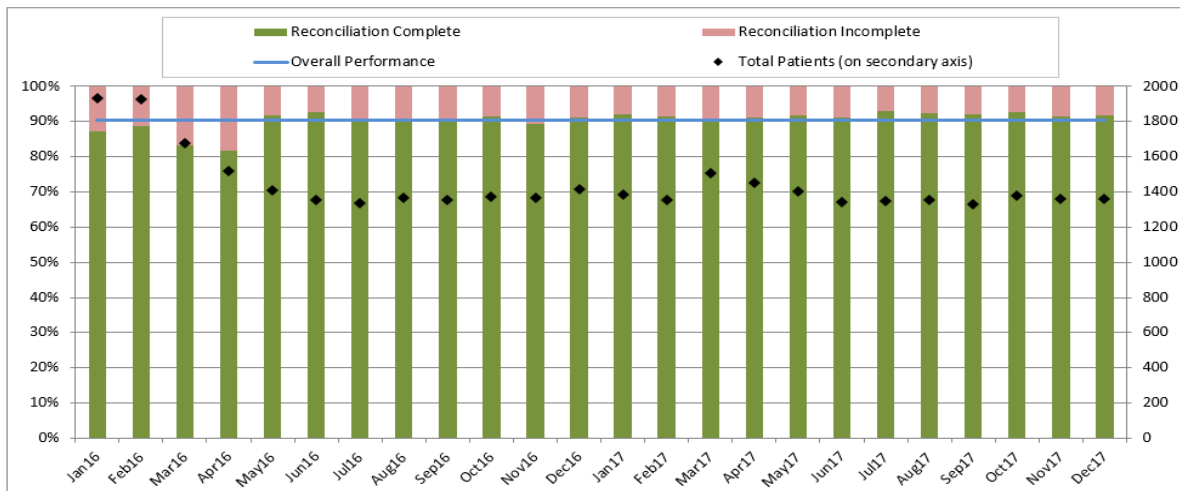
Current Methodology:
Admission medication reconciliation is expected within 24 hours of admission for all patients who occupy a hospital bed either in observation status or inpatient status. Collection is considered as complete if it was performed in SOARIAN LLC or Epic. Patients were included in the report if they were admitted during the reporting month. Patients were excluded if they were admitted to either the nursery or neonatal service.

Figure 4.2-2: Monthly Discharge Medication Reconciliation 2016-2017

Current Methodology:
Discharge medication reconciliation is expected on all patients who occupy a hospital bed either in observation status or inpatient status except for patients discharged on no medications or who leave against medical advice. Medication Reconciliation is considered as complete if it was performed in SOARIAN LLC or Epic. Action must have taken place at some time during the patient's stay; before discharge took place. Patients were included in the report if they were discharged during the reporting month. Patients were excluded if they A) expired during their stay, B) were discharged AMA, or C) were discharged from either the nursery or neonatal service.

4.3. Inpatient Pain and Opioid Stewardship

As part of a national effort to address the opioid crisis and increase the quality and safety of patient care, The Joint Commission began a project to revise its pain assessment and management standards in 2016. On June 30, 2017, The Joint Commission announced revisions to pain management standards that resulted in approximately 20 new or revised elements of performance effective January 1, 2018. The new pain management standards required changes within multiple areas of Denver Health clinical practice and information technology.

New Requirements:
- Identify pain assessment and pain management, including safe opioid prescribing, as an organizational priority (LD.04.03.13).
- Actively involve the organized medical staff in leadership roles in organization performance improvement activities to improve quality of care, treatment, and services and patient safety (MS.05.01.01).
- Assess and manage the patient's pain and minimize the risks associated with treatment (PC.01.02.07).
- Collect data to monitor its performance (PI.01.01.01).
- Compile and analyze data (PI.02.01.01).

In an effort to address the changes and continue to strive for patient safety and quality, an Inpatient Pain and Opioid Management Stewardship Taskforce was formed to establish a leadership team responsible for inpatient pain management and safe opioid prescribing and performance improvement activities. This taskforce analyzed our current status and data with the immediate focus on meeting the standards and communicating the vision to the organization. This project is ongoing and the Taskforce members are committed to being part of the DHHA solution to the opioid crisis.

- Next Steps in 2018 will include continued patient and staff education about pain management, leveraging our information technology to reflect appropriate documentation of pain management, compiling and reviewing data to monitor performance, and identifying future opportunities including prescribing, alternative pain management modalities, and increased safety.

4.4. COR Zero, ICU Transfers and Bounce Backs

Denver Health is committed to providing care at the right time and in the right setting. In an effort to ensure high quality of care is provided, DPSQ has standard work in place to review patients who require a rapid assessment for the following reasons: change in clinical status; transfer out of an intensive care unit and then return to the intensive care unit within 48 hours; and unanticipated coronary/respiratory arrest while being cared for as an inpatient.

Rapid Response / Escalation of Care
Denver Health has a Rapid Response methodology currently in place whereby a nurse will identify a patient who is decompensating and will immediately escalate care to the on call resident or attending provider. An immediate assessment by the clinical care team will precipitate additional orders and frequently necessitate a transfer to a higher level of care. All transfers from Acute Care to the ICU are formally reviewed by the DPSQ team for any opportunities and to evaluate the effectiveness of the escalation process.

The Adult Rapid Response process is currently being reassessed due to the implementation and capability of Epic to provide an early warning score (EWS) triggered automatically from documented vital signs, lab values, patient age, etc. This EWS will notify nurses with colors (green, yellow, and red). This quick color visual helps the nurses to react appropriately and quickly.

Our goal is to continue to work with Epic and stakeholders to review the accuracy of an early warning score and implement a process for rapid escalation of care.

**Intensive Care Unit (ICU) Transfers & Bounce Backs**
Patients who are transferred from the ICU to a lower level of care and then return to the ICU within 48 hours are considered ICU Bounce Backs and are reviewed for appropriateness of care. The number of Bounce Backs decreased from 50 in 2015 to 41 in 2016 and was stable with 41 in 2017. An analysis of the 41 cases did not demonstrate any particular trend.

Transfers increased from 408 in 2015 to 479 in 2016 and then decreased to 446 in 2017. After a careful analysis of the information, the contributing factors for these transfers in 2017 were: respiratory condition, cardiac condition, and sepsis co-morbidity. The sepsis co-morbidity occurs when a patient has more than one complex condition leading to a transfer to the ICU. DHHA is currently evaluating the automated sepsis notification (currently notification is for ED admitted patients) for patients on the floor that meet the sepsis criteria.

COR Zero

A review of all medical emergencies and surrounding processes is conducted by the Code Blue Committee. In 2017 there were 14 "Code Blue" events (Figure 4.4-1). No significant opportunities have been identified by the committee. However, the OB Screening Room and the Cath lab are two areas with a low incidence of Code Blue thereby necessitating ongoing education and competency training. In 2018, "mock code" drills will be simulated in these specific areas.

**Figure 4.4-1: Acute Care COR Zero / Code Blue Events**
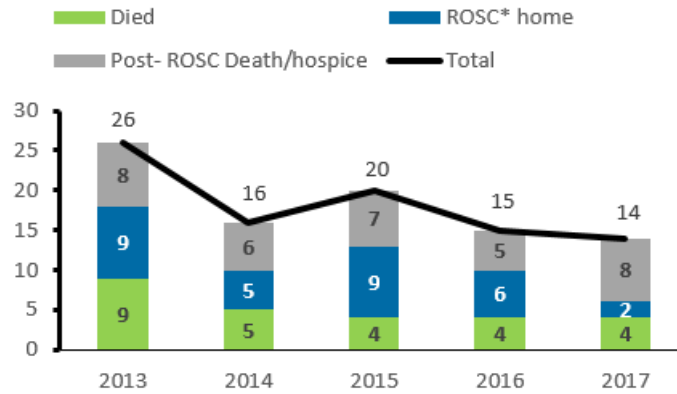
* Return of Spontaneous Circulation (ROSC)

4.5. Procedural Sedation

Procedural Sedation is a high-risk intervention that requires well written guidelines for physician, nurse and respiratory therapy training, practice, and ongoing competency. These procedures are performed by non-anesthesiologists for planned sedation cases on non-intubated patients. Documentation is analyzed to facilitate and support practice as well as to follow-up for performance improvement.

The Procedural Sedation Committee reviews data and makes recommendations to ensure ongoing performance improvement. The graphs display the bundle pass rate for outpatient and inpatient documentation (Figures 4.5-1 and 4.5-2).

Figure 4.5-1: Outpatient Procedural Sedation Documentation
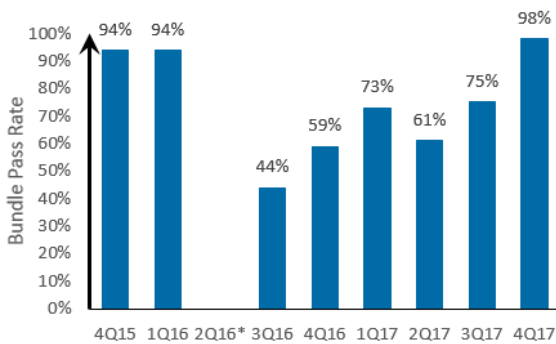
*Epic implemented in April - no 2Q16 data.

Figure 4.5-2: Inpatient Procedural Sedation Documentation
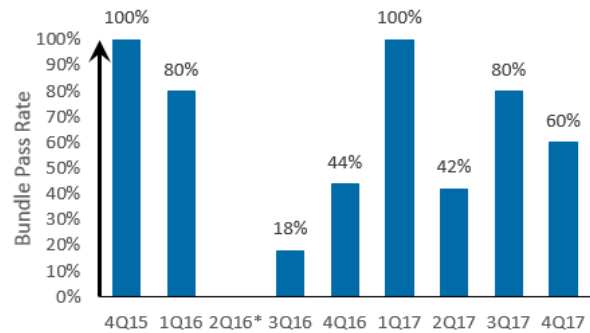
*Epic implemented in April - no 2Q16 data.

Documentation:

In April 2016, documentation of procedural sedation was converted from a paper format to an electronic format with the implementation of Epic. A dramatic drop in comprehensive documentation occurred with Epic requiring reeducation of providers. These efforts to optimize the electronic documentation are showing major improvements in the outpatient areas. Inpatient areas had inconsistent compliance in 2017. This was attributed to the low volume of applicable procedures and the challenges of documenting in Epic outside a provider's usual areas (e.g. GI procedures & Bronchoscopy). Feedback has been given to these providers and nurses with active efforts to improve underway.

Procedural Sedation Occurrence/Safety Events:

Procedural sedation related safety events are self-reported. The data demonstrate a low percentage of safety events related to procedural sedation (Figure 4.5-3).

Figure 4.5-3: Procedural Sedation Events
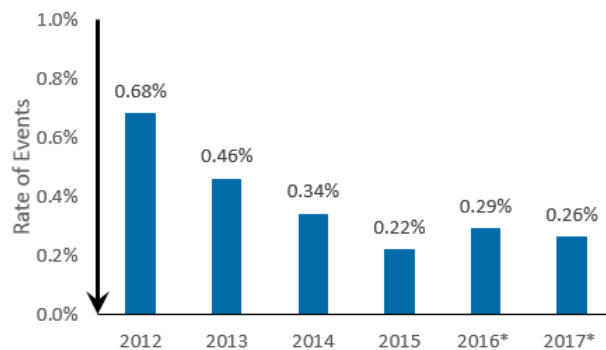
*Epic implemented in April - no 2Q16 data. Denominator estimated in 2016 and 2017.

4.6. Standing Orders

The Standing Order Lean Event (October 4-7, 2016) work continued through 2017. The problem statement was: The process for use of orders by protocols and standing orders is unclear throughout the organization. This impacts billing and presents a risk to our compliance with governing federal and state regulations. Most importantly, there is potential harm to patients when order by protocol and standing orders are ordered outside of scope of practice, or are not current. Throughout 2017, DPSQ worked diligently with departments and service line champions in identifying standing orders and orders by protocol, creating standard templates, educating and ensuring the appropriate process flow and approvals within the Policy Stat system. The Epic team was instrumental in working to create a process whereby the standing orders and orders by protocol implemented are entered directly into the patient medical record as required by CMS.

4.7. Diabetes Program

Diabetes is a chronic and burdensome condition that currently affects over 13,000 patients in the Denver Health system. On a national scale, the total estimated cost of diagnosed diabetes is a staggering 327 billion dollars, which represents an increase of 26% over the last five years.[1]

Patients typically spend < 1% of their lifetime in direct contact with healthcare professionals, so any inpatient or outpatient encounter provides a critical opportunity to evaluate and intervene if patient's lack the necessary skills, knowledge, and/or confidence necessary for effective self-care.[2] All frontline staff (RNs, providers, pharmacists, RDs, etc.) should be prepared to provide accurate and up-to-date information, and also assist with implementing and sustaining behaviors needed to help patients continue managing their diabetes. However, when asked, frontline staff often report a lack of confidence and knowledge when it comes to providing diabetes education. As a result, "Diabetes Education for Healthcare Professionals" was created to provide frontline staff with the information needed to provide ongoing self-management education and support to patients in their care.

This diabetes education conference has been presented on a semi-annual basis over the last few years. Most recently, it was offered in November 2017 over 2 days, with up to 14.5 contact hours provided. The conference content addressed areas that are considered essential self-care behaviors (medications, monitoring, nutrition, being active, healthy coping, reducing risks, etc.), and also included a general overview, diabetes in specific populations, and discussed emerging technologies. Presenters represented a wide range of disciplines (nursing, medicine, dietary, exercise physiology, and pharmacy).

Evaluations were completed by most participants, and they were asked to rate on a scale of 0-5 their knowledge and confidence before and after each presentation (Figure 4.7).

Figure 4.7: Diabetes Education Evaluation Results

	Participants	% Responses	Δ in Knowledge	Δ in Confidence	Intent to Δ Practice	Applicability to Practice
Day 1	37	95%	1.3 (1.1-1.6)	1.5 (1-1.5)	4.7	4.9
Day 2	29	93%	1.23 (1-1.5)	1.28 (1.1-1.4)	4.9	4.9

Sample Question and Response:

Before the presentation I had sufficient knowledge of the topic discussed. 3

After the presentation I had sufficient knowledge of the topic discussed. 5

Δ in Knowledge = 2

For all 16 presentations, the majority of participants indicated that both their knowledge and confidence increased after hearing the content. Overall, feedback from this event was also very positive:

"This is a great review; I think a lot of the info given during the emotional/psychosocial talk was extremely helpful. It is applicable to many patients, even those without diabetes and was a great reminder of how to approach patients in multiple circumstances with multiple complications"

"Great materials and presenters-engaging and relevant. Learned tons, thank you!"

The conference organizers and presenters are currently revamping the conference content and format, and plan on offering this education again in 2019.

References
1.   American Diabetes Association (2018). Economic Costs of Diabetes in the U.S. in 2017. *Diabetes Care* Mar 2018, dci180007; DOI: 10.2337/dci18-0007
2.   Beck, J et al. (2017). 2017 National Standards for Diabetes Self-Management Education and Support. *The Diabetes Educator*. Vol 43, Issue 5, pp. 449 – 464.
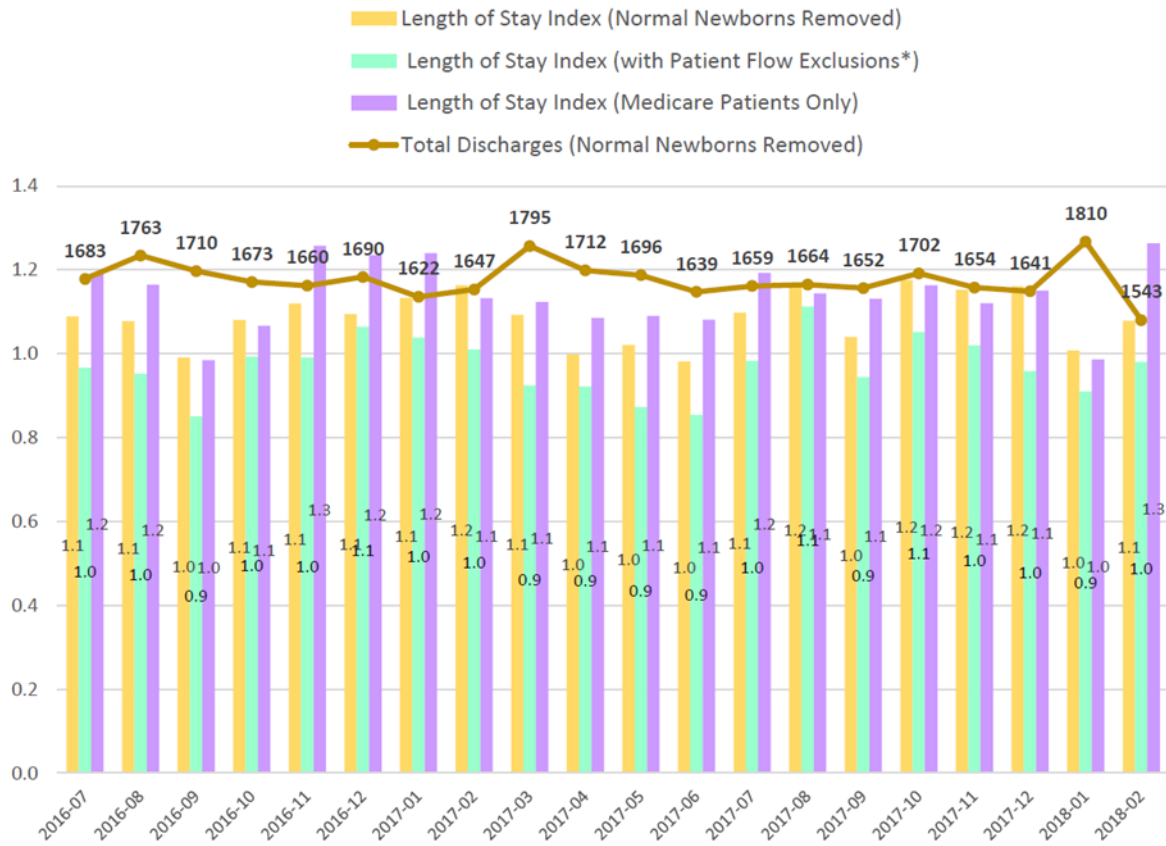
4.8. Patient Flow Workgroups / Length of Stay

In late 2016, DHHA launched a multidisciplinary effort to improve hospital flow. Each component of the effort had an Executive lead and a principle target for all the efforts was to reduce the observed/expected length of stay (LOS) among adult patients. The table below, Figure 4.8-1, lists major initiatives that were in flight by the end of 2017. Below the table is a graph, Figure 4.8-2, showing the LOS index with various exclusions. While we did not see significant changes to the LOS index, all of the initiatives hold promise for improvement in 2018.

Figure 4.8-1: Major Patient Flow Initiatives

Project	Short Description
Expand IDDR to other floors	The goal of this project is to improve our existing interdisciplinary discharge rounds on 8A and 9A and then use those learnings to expand parts of these rounds to other floors (6A, 7A, 3B, 4B) to make their rounds more efficient and increase discharges that happen earlier in the day.
Cardiology Stewardship	A three month pilot using the heart score to improve our guidelines for chest pain admissions for giving a common language for how we think about chest pain and evidence-based way to triage these patients. In addition, we'll finalize syncope guidelines in 2018 for use as a guidelines for clinicians.
PCP appointments for discharging unestablished patients who are appropriate to establish	This project will focus on getting earlier follow-up appointments for unestablished patients who are discharging from the hospital who are interested and eligible to establish with a primary care physician at DHHA.
Outpatient appointments for discharging patients who are not appropriate to establish	This project is to establish a new discharge/care-transition clinic that will provide appointments for unestablished patients discharging from the hospital who do not want (or are not eligible) to be seen regularly in primary care at Denver Health. This could include follow-up appointments for patients who have a primary care physician outside of the Denver Health system if the concern is getting the patient stabilized for a specific issue before the patient is able to get into his/her own medical home. The clinic will be housed in the IOC facility and will use primary care residents in an elective rotation to provide care under the supervision of an attending physician. In addition, this project will work on processes and relationships with our partners such as Colorado Coalition for the Homeless (CCH) and Mental Health Center of Denver (MHCD) to ensure that patients who have relationships with them are connected back to their medical homes for follow-up post-discharge.
Specialty Care Appointments	This project will be focused on getting patients who need to be seen in a specialty clinic into an appointment in a timely manner. This includes: ■ Partnering with the Lean event on 1st floor consults to ensure that when consults from specialty services are performed and recommend clinic follow-up, that these referrals are approved and clinic appointments are scheduled. ■ Working with specialty care one service at a time to get clinic appointment availability earlier for patients to be seen.
Guardianship	The goal of this project is to create standard work for communication, collaboration and documentation when making the decision to pursue guardianship. New Epic tools will create a method to track all of the information that will go into a formal guardianship letter to Adult Protective Services and monitor the process through either approval or denial of that guardianship, enabling us to get metrics on the time taken for each step of the process.
External Partnerships	This project is to work with our external partners (mainly Mental Health Center of Denver and Colorado Coalition for the Homeless) to improve our processes in working with each other, improve communication and establish new processes for patient transitions of care.

Figure 4.8-2: Length of Stay Index

*Excluded departments: Acute Eating Disorders, Pavillion C, Psych, CCMF, and Rehab

5. INPATIENT NURSING SENSITIVE INDICATORS

5.1. Healthcare Acquired Pressure Injuries (HAPI)

Pressure injuries related to moisture issues continued to be an issue in 2017. Wound care nurses identified this as a key point of education for Wound Champions on their units and addressed it in hospital-wide education and training.

Nurses from the Nursing Outcomes, Research, and Evidence-Based Practice Team and Wound Care Nurses led a joint effort to create a National Database for Nursing Quality Indicators (NDNQI) pressure injury data collection team lead training which included didactic and hands-on components.

The focus of Team Lead Training is primarily for nurses but any staff may attend. This training prepares nurses to be able to lead a group of staff for the quarterly NDNQI Pressure Injury study day. During this training, participants become comfortable in identifying, assessing, and staging pressure injuries as well as receive a brief overview of other types of wounds that they may encounter. RNs are eligible to earn ProCAP points and 2.5 CEUs for being an NDNQI team lead and active member of the Unit Wound Champion Committee.

- On January 24, 2017, 14 attendees received Team Lead Training.
- On October 5, 2017, 6 attendees received Team Lead Training.

Data collection days were held on March 9, June 14, August 31, and November 30. Teams were trained on NDNQI data collection methods and the identification and staging of pressure injuries.

The origin of pressure injuries must be determined (hospital, hospital/unit or community acquired) for patients with pressure injuries. Calculation of the Healthcare Acquired Pressure Injuries (HAPI) rate requires the record of any patient with a pressure injury at the time of the survey be examined for evidence of a pressure injury on admission. If a review of the patient record finds no evidence of the pressure injury on admission (present on admission), then the pressure injury is hospital acquired. See Figure 5.1-1 for the number of patients who acquired a new pressure injury after admission to the hospital.

Figure 5.1-1: Point of Prevalence Pressure Injury Outcomes, Stage II and Above
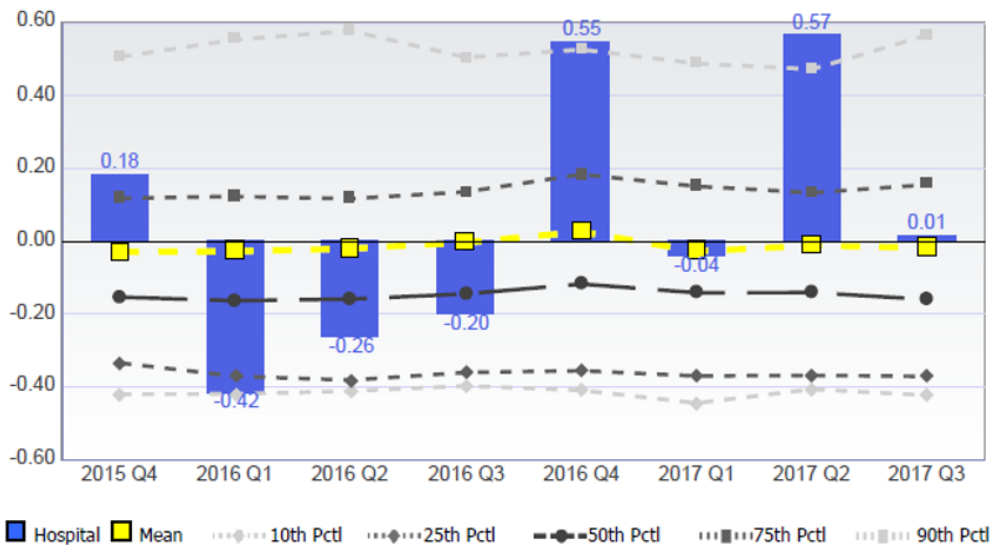
Source: NDNQI

5.2. Patient Falls

Denver Health has a robust dedication to fall prevention for inpatients. Fall prevention is one of the components of Target Zero and a requirement of Magnet. We also provide data to NDNQI and Denver Health divisions to support quality initiatives. We continue our efforts in analyzing the data for further understanding falls and in utilizing the data for meaningful change in the organization.

A patient fall is a sudden, unintentional descent, with or without injury to the patient, that results in the patient coming to rest on the floor, on or against some other surface (e.g., a counter), on another person, or on an object (e.g., a trash can). NDNQI counts only falls that occur on an eligible inpatient or ambulatory unit that reports falls. When a patient rolls off a low bed onto a mat or is found on a surface where you would not expect to find a patient, this is considered a fall. If a patient who is attempting to stand or sit falls back onto a bed, chair, or commode, this is only counted as a fall if the patient is injured.

Performance Measures: Falls per 1,000 Patient days and Injury Falls per 1,000 Patient Days

Approximate Denver Health fall costs for 2017: $1,446,335.04**
Non-Injury: 235 x 1,586.00 = $372,710.00
Minor/Moderate Injury: 88 x 9,995.83 = $879,633.04
Major Injury: 8 x 24,249.00 = $193,992.00

**Cost estimates based on work by Spetz et al. (2015)
Reference: Spetz, J. Brown, D.S., Aydin, C. 2015. The economics of preventing hospital falls: Demonstrating roi through a simple model. The Journal of Nursing Administration, 45(1): 50-57.
Data Source: NDNQI, Nursing Education and Research Database

Figure 5.2-1: Hospital Wide Falls
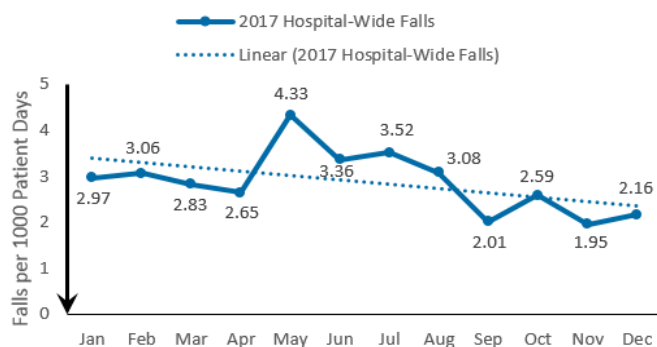
Source: DHHA NORE

Figure 5.2-2: Hospital Wide Falls with Injury

Source: DHHA NORE

Analysis:
Although Denver Health still experiences multiple falls the NDNQI Benchmark for Quarter 3 in 2017 was 0.04 and DHHA was 0.01. The following initiatives were completed in 2017 and will continue into 2018.

Under the leadership of Nursing Education and Research, Fall Champions continue to meet monthly with multidisciplinary attendees consisting of frontline staff and educators. This past year, Fall Champions have developed a standardized checklist for post-fall documentation called the ACT which stands for Assess for fall risk, Communicate between team members, and Tailor interventions to patients. They also began fall awareness audits on their respective units.

Working closely with the Acute Care Director, as well as the educators and managers within the Acute Care division, Nursing Education and Research provided input towards the development of their fall initiatives. Some highlights included rolling-out with the Big Three (bed alarm on all patients until fall risk assessed, keeping patients at arm's length for all moderate and high risk patients, and assist to bathroom, stay, assist back), rolling-out a patient safety video on inpatient channel 18, and providing monthly fall rate data to assist in tracking the effectiveness of the interventions.

Nursing Education and Research is working closely with Behavioral Health in developing their falls prevention program. A journal club was started for the purpose of sharing evidence and research surrounding inpatient psychiatric falls, and for gathering

recommendations and ideas for implementation in the behavioral units. A pilot looking at the feasibility and usability of a psychiatric-based falls assessment tool was conducted on the behavioral units. Continued efforts in developing an effective falls prevention program are in place.

Unit 9A and Behavioral Health units piloted the ACT post-fall checklist. This pilot sought to assess the effectiveness of this checklist in standardizing post-fall tasks and improve falls documentation in EPIC. The baseline rate of new fall documentation in EPIC prior to the pilot for 9A was 75% and for Behavioral Health was 65%. At the conclusion of the pilot, the rate of new fall documentation in EPIC was 100% for 9A and 95% for Behavioral Health.

Nursing Education and Research assisted in formally evaluating the effectiveness of the EXTREME Falls Program utilized in the Critical Care Division. Utilizing an interrupted time series design and segmented regression analysis on data from 2005 to 2017, the EXTREME falls program saw a 19% decrease in their fall rate at the implementation of the program and a sustainable change of their fall rate over time.

The Pharmacy Division and the Nursing Education and Research Team have collaborated to develop a medication-only fall risk assessment tool. Research is being conducted and a formal IRB proposal is in development.

6. OUTPATIENT SAFETY & QUALITY INITIATIVES

6.1. Ambulatory Care Services (ACS) Quality Improvement (QI) Committees

Workgroup	Focus

CHS Director: Simon Hambidge MD, PhD
CHS Quality Improvement: Ray Estacio MD, Data Support, Operations Coordinator

Workgroup	Focus
Cancer Screening	Colorectal Cancer Screening, Cervical Cancer Screening, Breast CancerScreening
Immunizations	Pediatric and Adult Immunizations throughout Enterprise: Pediatric, Influenza, Pneumovax, Adolescent
Pediatric QI Workgroup	Pediatric preventive services in primary care
Mental Health	School based health clinics, Integrated Behavioral Health
Diabetes	Adult diabetes care
Cardiovascular Diagnoses	Cardiovascular Prevention / treatment
Perinatal Care	Prenatal and Perinatal services
Anticoagulation	Outpatient anticoagulation services
Asthma	Asthma management in CHS clinics
Tobacco	Tobacco assessment and cessation in primary care
Weight management	Assessment of weight (BMI) and counseling in primary care
HIV Primary Care	Care for HIV patients in the Primary Care Clinics
Practice Transformation	Focus on developing and implementing Integrated Care Management Model
Medical Neighborhood Committee	Referral management and best practice between primary and specialty care

6.2. Ambulatory QI and Design Committee (AQIDC)

The AQIDC is a multidisciplinary committee which helps monitor QI performance efforts through updates from QI Workgroups and vet potential new processes that would involve ACS clinics (from interventions developed in clinics to research projects to national initiatives). Interventions which will involve our clinics must be vetted by AQIDC to obtain approval. This allows the Committee to evaluate the intervention and determine the potential impact on the clinics. AQIDC has also served to facilitate interventions/ research within clinics.

6.3. ACS Strategic Clinical Performance Metrics

Figure 6.3-1: Ambulatory Quality Scorecard Summary December 2017

	Hypertension BP Controlled 70%	Primary Care 30-Day Utilization - Adult 65%	Well Child Check Rate 3-9 Year Olds 74%	Post-Partum Visit 21-56 Days 63%	ACS Tobacco Interventions 55%
CHS	64.5% 20053	55.8% 622	74.8% 23985	53.8% 251	48.9% 4143
Family Medicine Division	63.4% 9372	56.8% 206	72.3% 8918	57.3% 110	
General Internal Medicine Division	65.0% 10241	55.7% 395	68.6% 331	100.0% 3	
General Pediatric Division		16.7% 6	78.1% 13714		
School Health Division		50.0% 2	54.5% 1022		
Womens Care Division		61.5% 13		50.0% 138	

Hypertension Control

Percent of patients in hypertension registry (adults with hypertension on their problem list or at least 2 diagnoses of hypertension in the past 5 years) with most recent blood pressure in ACS in last 18 months < 140/90 mmHg (age < 80) or < 150/90 mmHg (age ≥ 80)

- Clinic performance seems to be driven by the percentage of African Americans (lowest control rates) in the clinics while Hispanic patients had the best performance.
- In reviewing potential barriers, the CVD workgroup found that patients often do not take their medications the day of the clinic visit thus impacting the effect of their antihypertensive medications. The CVD workgroup is in process of designing/testing an intervention to have clerks call patients to remind them of their appointment and to take their medications the morning/day of their appointment.

Transitions of Care

Percent of DHHA discharges for patient ≤ 18 years with a primary care appointment scheduled within 30 days post-discharge.

- Patient Navigator Intervention: outreach to patient recently discharged based on discharged lists, the overall number of patients are relatively low.
- 30-day readmission rates are relatively low at 16.5% (8/31/17) which is low compared to other institutions but does take into account admissions to outside hospitals. We are working to eventually use claims data.

Well Child Check

Percent of empaneled 3-9 year old patients who have had one well child check in the past year.

- Interventions include conversion of visits to well child check visits and text messaging reminders to families with data suggesting a positive effect.

Postpartum Care

Percent of women with a delivery in the calendar month two months prior to the reporting month, who had a post-partum visit 21-56 days after delivery. Clinic is the OB site of greatest prenatal care.

- There is great variability month-to-month due to the relatively small number of babies born.
- Dyading continues to be the most effective intervention with focus on seeing the mother during the baby's visit.
- Collaborative efforts in the "Postpartum Right Time Right Place" initiative led. The team has recently finished their A3 and are working with Epic to generate the tools to facilitate the process.

Tobacco Cessation Intervention

Percent of patients ≥ 11 year olds who smoke, were seen in the reporting month and received a cessation intervention in 6 months prior to their visit (Figure 6.3-2).

Figure 6.3-2: Tobacco Cessation Intervention
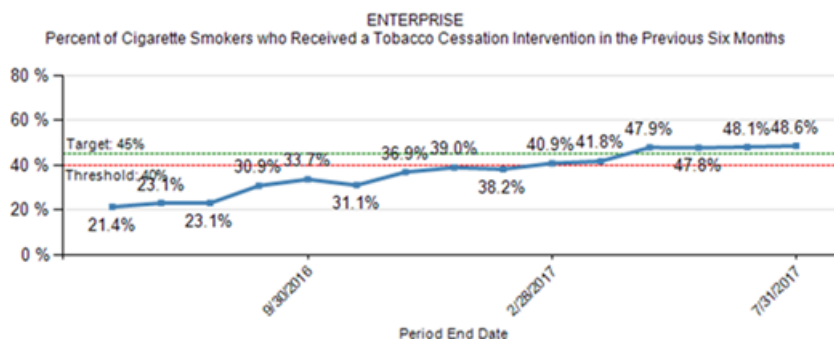
Breast Cancer Screening

We have noticed that the BPA is firing annually rather than every 2 years, we are correcting this and setting the default to 2 years. We will be working with radiology to make sure we are in alignment regarding the communications to patients regarding follow up recommendations.

Cervical Cancer Screening:

Not all patients with a hysterectomy have been excluded from the cervical cancer screening BPA. Here is an overview of potential solutions:

- If the BPA recommends Pap testing, the medical assistant can ask if a hysterectomy was done before applying the BPA and alert the provider that the patient has had a hysterectomy.

6.4. Other ACS QI Metrics

Performance has decreased since the Epic implementation and a number of issues have been found related to the data. We are in the process of correcting this issue.

- If hysterectomy performed due to reasons other than cancer or abnormal Pap smears, patient may be excluded and BPA will not fire in the future.
- If a hysterectomy is performed at Denver Health, the BPA will be changed during that admission to reflect follow, e.g. turn off the BPS if performed due to non-cancer or abnormal PAP smear.

Colon Cancer Screening

ACS identified an opportunity to improve our Star rating which is associated with a positive financial outcome. Need 91 patients in order to improve our cancer screening rates by December 2017.
- The proposed intervention was to use Patient Navigators (PN) to outreach to patients who were given a FOBT card or missed a colonoscopy appointment. The PN's addressed why they did not return the card or missed their colonoscopy. Then they would try to address the barrier to facilitate either return of the cards or reschedule their colonoscopy.

6.5. Medical Neighborhood

We are continuing to focus on creating the Medical Neighborhood. Most of the efforts have focused on the referral process from both sides of the fence! We greatly appreciate the participation and input our specialty and primary care providers have provided thus far to help improve the process. The bottom line is there is still room for improvement which undoubtedly will lead to better patient experience. Issues identified:
- It is important that we utilize the referral guidelines to make the process more efficient.
- Effort is needed to determine what the recommendations are from specialty to primary.

7. ACCREDITATION

7.1. The Joint Commission

The Joint Commission (TJC) survey occurred from May 2, 2017 through May 5, 2017. In preparation for the Joint Commission triannual survey scheduled to occur in May, Denver Health contracted with Vizient to perform a Mock Survey from January 3 through January 5, 2017. The comprehensive on site visit identified areas of opportunity for improvement and provided DHHA with recommendations to strengthen specific standards.   In 2017 TJC's introduced the SAFER matrix. This new tool changed the way that TJC scores and we quickly discovered that the number of findings increased. The SAFER matrix identifies findings into 3 categories; high, moderate and low based on the likelihood to harm a patient, visitor or staff member. In addition the surveyor will determine whether the finding is limited (only evidence in one place), pattern (have witnessed the finding in several different places) or widespread (throughout the organization).   The majority of findings were in the low and limited then moderate with a pattern with two significant issues resulting in a Condition of Participation finding from CMS.

CMS and TJC have been in discussions regarding the deficiencies related to ligature risk and self-harm, which was one of our conditions of participation findings. Denver Health was able to collaborate closely with Mark Pelletier, Chief Operating Officer of The Joint Commission. Denver Health spent the next 30 days working diligently on resolving the findings and implementing sustainable solutions working directly with TJC and participating in policy making meetings with CMS and TJC.   DHHA was able to resolve the concerns identified and received full accreditation.   This accreditation cycle is effective beginning May 6, 2017 and is customarily valid for up to 36 months.

This year was also the first time that Denver Health Public Health was surveyed and had no findings!

7.2. Methadone Clinic

The Joint Commission also surveyed our Methadone Clinic during our triannual visit. Several opportunities arose to address building concerns related to space and age, but the highlight was the surveyor's support of our mission and those who work in our substance abuse clinic. The Methadone Clinic received full Behavioral Health Care Accreditation and this accreditation cycle is effective beginning May 4, 2017 and is customarily valid for up to 36 months.

7.3. Hospital Laboratory

The Joint Commission lab surveyors arrived on May 16, 2017 with two surveyors for four days. There were opportunities for improvement but overall the surveyors are impressed with Denver Health. There were no findings in Molecular and Immunology and the surveyors were impressed with the design of the new lab space. The laboratory received full accreditation and this accreditation cycle is effective beginning May 20, 2017 and is customarily valid for up to 24 months.

7.4. Denver Public Health

Denver Public Health and the Department of Environmental Health recently achieved national accreditation through the Public Health Accreditation Board. The designation is a result of a rigorous peer-review process that confirmed Denver met or exceeded a national set of quality standards and measures guaranteeing residents are receiving high-quality public health services. Denver is the first local public health department in the metro area to become accredited, in addition to four other local public health departments in Colorado and the Colorado Department of Public Health and Environment. Only five percent of health departments across the country have achieved public health accreditation.

7.5. Recognitions

Pharmacy
The State Board of Pharmacy completed an inspection for the Main pharmacy, Chempak room and Infusion Center on May 19, 2017 and was found to be in compliance with board regulations.

Mom/Baby Lactation
The International Board of Lactation Consultant Examiners and the International Lactation Consultant Association met the requirements for a global recognition and award.

East Grand Community Clinic and Emergency Center

On November 14th, 2017, an on-site level V trauma center review was conducted. The reviewers noted no deficiencies and no items met with reservations at the review. The following strengths were mentioned by the reviewers and included leadership from the Trauma Medical Director (TMD) and the Trauma Nurse Coordinator (TNC) for trauma program; system and administrative support responsive to clinic needs; thorough and timely process improvement (PI) and Morbidity and Mortality (M&M); Blunt Chest Trauma (BCT) exemplary model for evidence-based practice; integration with ski patrol, mountain patrol, EMS, and police department; upgraded equipment and technology with Picture Archiving System (PACS) being well-utilized and integrated. The following opportunities were identified through the review process involving the continuation to utilize data and assess the effectiveness of PI interventions and examination of the peer review process to ensure protection of identified PI issues. The Designation Review Committee (DRC) has indicated that it gives an automatic recommendation to any facility with no deficiencies or items met with reservation. Since our facility had fully met all criteria, Denver Health East Grand CCEC received an automatic recommendation from the DRC. The designation is for three years from the date of our previous expiration, May 10, 2018.

7.6. Failure Modes and Effects Analysis (FMEA)

ED Alaris Pump House-wide Roll Out

The BD Alaris pump upgrade project initially was to begin with the NICU unit and then roll out to PAV C. Due to strong negotiations and fiscal rewards it was determined by executive leaders to purchase the pumps for the entire hospital. The Kick Off for this house wide endeavor occurred on December 5, 2017. The roll out is anticipated on April 10, 2018 with a robust plan for nursing education. The project runs from December 2017 through May 1, 2018.

The Department of Patient Safety and Quality in collaboration with the following departments, Pharmacy, Purchasing, Central Supply and Nursing, conducted a Failure Modes and Effects Analysis (FMEA).

Reasons for Action:

Denver Health currently has IV syringe pumps which are outdated in terms of functionality and adaptability. The current pumps require a manual software update in order to create new drug administration libraries as well as adding or changing individual medication parameters. A tremendous amount of resources are needed to update the current pumps. New medical data which requires changes in dosing, infusion rates and new drug additions to the DHHA medication formulary happen on a regular basis. Delays in loading data into the pumps create safety concerns. When a medication is not loaded into the pump library a nurse needs to manually build a medication into the pump in order to administer. This is known to cause infusion errors which may result in preventable patient harm.

FMEA Purpose:

Proactively identify failure points in the process Allow for proactive mitigation.
Safety and Satisfaction for our Patients, Families and Employees.

Failure Modes Identified:
- Patient Safety
- Education (Nurse, Pharmacy, Providers)
- Productivity is negatively impacted

Possible Effects of Failure:
- Preventable Patient Harm
- Delay in patient care and services
- Patient and Family Dissatisfaction and Frustration
- Employee Dissatisfaction and Frustration

Project Goals:
- Reduce potential for patient harm
- Mitigate delay in care by appropriate education/training
- Patient, Family and Employee Satisfaction

Next Steps:
- Complete the project by May, 2018.

7.7. 27-65 Behavioral Health Designation

In January of 2017, The Colorado Office of Behavioral Health performed their annual onsite visit to the Behavioral Health units. Two surveyors arrived for a full day of interviews, medical chart reviews and touring of the units. This was the first survey after implementation of Epic in April 2016 and there were some recommendations for Treatment plan documentation. Denver Health created an action plan for those recommended standards and was re-designated as a 27-65 facility.

7.8. Continual Readiness

The Continual Readiness (CR) Steering Committee consists of interdisciplinary leaders representing the Joint Commission Chapters. In the beginning of 2017 the team focused on the anticipated May 2017 Joint Commission triannual survey. Vizient Consultants came to Denver Health in January to perform a "mock survey," assessing the organization's readiness. Based on their report, the CR Steering Committee concentrated on the areas identified for improvement and monitored all other standards for ongoing compliance. As of March 1, 2017 the committee addressed a new Joint Commission notification which indicated that The Joint Commission's focus on ligature risks for patients at risk for self-harm and suicide in behavioral health areas and other non-behavioral health units would be a priority during the survey. An interdisciplinary team was formed to review the new information, conduct a risk assessment identifying gaps and then implement a process to address the risks identified. The determination of this team led DHHA to a successful survey obtaining full accreditation in June. In the month of August, in response to 21 new Pain Management elements of performance introduced by The Joint Commission, an Inpatient Pain Management Taskforce was convened. The team continues to stay involved in ensuring that we consistently review new, revised, or deleted elements of performance, monitor the sustainability of new processes implemented, and brainstorm new and innovative means to guarantee that DHHA patients receive evidence based practice and high quality of care.

7.9. Environment of Care (EOC)

The goal of the Environment of Care (EOC) chapter is to promote a safe, functional, and supportive environment so that patient safety and quality are preserved. The chapter stresses the importance of identifying and managing the risks in the EOC. The EOC is composed of seven sections:
1. Safety: Addresses risks in the physical environment, staff safety, construction safety, product recalls, and smoking.
2. Security: Addresses overall security, access to sensitive areas, response to events, and other issues where staff, visitors, or patients may be at risk.
3. Hazardous Materials and Waste: Addresses the risks associated with hazardous chemicals, radioactive materials, hazardous energy sources, hazardous medications, and hazardous gases and vapors.
4. Fire and Life Safety: Addresses risks from fire, smoke, and other products of combustion; fire response plants; fire drills; management of fire detection, alarm, and suppression equipment and systems; and measures to implement during construction or when the Life Safety Code cannot be met.
5. Medical Equipment: Addresses selection, testing and maintenance of medical equipment and contingencies when equipment fails.
6. Utilities: Addresses inspection and testing of operating components, control of airborne contaminants, and management of disruptions.
7. Emergency Preparedness: Addresses how the hospital will respond and sustain during large disasters.

Below are some accomplishments within the EOC program within the calendar year 2017:

- Following the Joint Commission Survey process in the first half of 2017, a large portion of the second half of the year was spent pulling together multiple assessments of our behavioral health spaces and working with Planning & Construction on design of the upcoming adult space on 5A as well as the existing 4A spaces. The 5A build out will be complete in first quarter of 2018, and the 4A spaces will begin at that time. The next step in that process will involve design of the changes in PES and the adolescent unit on 4M.
- Pressure relationships that were a challenge during TJC survey are now being monitored with local ball-in-the-wall systems in addition to the remote monitoring via the building automation system. This helps staff identify pressure issues early and report them so Engineering can research and resolve them in a more timely fashion.
- A new Biomed Manager was recruited and started in November 2017. He is working diligently on challenges we have battled related to completion of preventative maintenance tasks. As of the end of the year, they were completely current.

- The waste RFP was completed and new vendors were on board beginning in September. Along with this came a lot of change, including:
  ◊ Discontinuing use of the onsite autoclave for our biohazard waste and shipping the waste offsite utilizing a local vendor.
  ◊ Changing vendors for confidential shredding, resulting in cost reductions of 50% as well as more sustainable use of the product post destruction.
  ◊ Pulling cardboard out of the waste stream and sending it out in bales, thereby turning it into a source of revenue instead of expense. In the last quarter of 2017, we diverted 70,000 pounds of cardboard from the landfill and got paid for it.
  ◊ Increased recycling efforts have resulted in a 172% increase in recycling, with diversion of about 30% of our waste from the landfill to recycling facilities.
  ◊ Additional changes will be coming in the new year, including the addition of composting in the kitchen as well as moving to reusable sharps bins, which we predict will save money and save a lot of plastic from entering the landfill.
- The decontamination team was expanded to include staff outside of the Emergency Department.
- Established internal Emergency Response Team to assist in an emergency.
- Conducted 15 Roving Active Shooter Huddles, reaching 530 employees across the organization.
- DH actively participated in, conducted, or responded to 22 drills/events.
- With the assistance of Food Services, secured a cache of food to be used for emergencies.
- Training on Emergency Preparedness with Care Management (key resource in family reunification).
- Identified Nursing Leaders to serve as EOC Committee chair moving forward.
- Inventoried and organized disaster supplies to be more readily available in an emergency.
- Completed training three-deep for primary Incident Command Team members.
- Hiring of new Emergency Preparedness Coordinator with extensive background in Workplace Violence.
- Addition of wall oxygen and suction in Winter Park Clinic.

7.10. Emergency Preparedness

Objective:
The objective of the Emergency Management Program (EMP) is to prepare Denver Health to respond to an actual incident in an efficient and effective manner while supporting a continuum of patient services in a safe environment of care.

Scope:
The primary components included in the EMP are Denver Health Medical Center, Ambulatory Care Services, Behavioral Health Services, and all other leased or owned buildings that Denver Health employees occupy. Close coordination is maintained with the Denver Health Paramedic Division, Denver Public Health, and the Rocky Mountain Poison and Drug Center to ensure a comprehensive and coordinated response to an event of any size.

The Emergency Operations Plan (EOP) is the document that outlines response procedures for specific incidents with special attention to the Joint Commission's Six Critical Areas: Communication, Resources and Assets, Safety and Security, Staff Responsibilities, Utility Management, and Patient Care. The EOP is an "all-hazards" plan compliant with the National Incident Management System (NIMS).

Performance:
Several initiatives were undertaken and continued in Emergency Management in 2017.
- Emergency Operations Plan (EOP). Annual updates to the EOPs for the Hospital, ACS, Denver Health East Grand (DHEG), 530 and 550 Acoma.
- Required Emergency Response Exercises and Drills.
  ◊ Ambulatory Care Services conducted lock-down drills at each of the nine community health centers.
  ◊ Denver Health East Grand Community Clinic and Emergency Center (DHEG) did not need to conduct an exercise/drill in 2017 due to responding to a real-world event in which, they treated several patients from a multi-vehicle car crash.
  ◊ DHHA conducted two exercises for the required exercises in 2017.
    • On June 15th, Denver Health participated in a functional exercise with the Colorado Department of Public Health and Environment to test the process for dispensing prophylaxis antibiotics to staff following an exposure in the community. The Command Center was set up to manage the distribution of prophylactic medications to both staff and in-patients.
  ◊ On November 30th, Denver Health conducted a full-scale exercise activating the Bio-Containment Unit. Exercise participants included the Denver Paramedic Department, CDPHE, DPH, and other area hospitals. The Command Center

◊ was not activated for this exercise.
◊ DHHA also had several real-world events in 2017 that created opportunities for learning.
◊ On February 21st, the Hospital Command Center was activated for a partial campus utility failure involving Webb Clinic and areas in Pavilion B and Pavilion C.
  • On March 12th, the Hospital Command Center was activated for a technology outage that impacted the call center and Citrix users. The Command Center was activated for 1 hour and 50 minutes.
  • On June 5th, the Hospital Command Center was activated while the servers from 990 data center were transferred to new location.
  • On July 19th, Denver Health activated the Command Center to manage a bed shortage where 27 patients were being held in the ER due to not have rooms available on the inpatient unit, while simultaneously dealing with a utility failure that impacted the laundry department. The Command Center was activated for 9 hours and 30 minutes.

7.6: Emergency Management Met 3 Goals and Partially Met 1 Goal in 2017

Goals & Performance Indicators	Contact	Year End
Update the Mass Casualty Incident Plan to include new best practices.	Karri Knight Jeremy Cooke	**GOAL PARTIALLY MET** Planning meetings were held and gaps were identified, but plan was not fully updated in 2016. Goal is rolling over to 2017.
Expand the Decon team by 25% and the team's capabilities by revising training, expanding registration and purchasing new equipment	Karri Knight Jeremy Cooke	**Goal Met** Decon team membership increase by 25% by cross-training members of the HITeam on Decon. Purchased new Decon tent and Tyvex –Level 3 protective suits.
Conduct quarterly ReadyOp notifications and achieve a 90% confirmed received rate.	Karri Knight Jeremy Cooke	**PERFORMANCE INDICATOR MET** Year-end average 93%.
Conduct Ebola exercises in 4 of 4 quarters in 2017(100%).	Karri Knight Jeremy Cooke	**PERFORMANCE INDICATOR MET** The 4 quarterly drills were conducted.
Designate staff for HICS Command Staff position and develop and deliver one training session for each position.	Karri Knight	**GOAL MET** Staff identified for each HICS Command Level position and training was provided for each position.

Effectiveness

In addition to the above goals and performance measures, the following significant accomplishments were achieved:
■ An internal Emergency Response Team was established to quickly activate volunteers needed to assist with staffing shortages in an emergency.
■ Conducted 15 Roving Active Shooter Huddles, reaching 530 employees from different departments/locations.
■ Beyond the two required drills/events, Denver Health actively participated in, conducted, or responded to 22 drills/events. Included in this number are:
  ◊ 4 Hospital Command Center set-up drills
  ◊ 4 Ebola Quarterly exercises
  ◊ 1 Methadone Clinic Relocation Drill
  ◊ 1 Partial utility outage impacting Webb Clinic, Pavilions B, and Pavilion C.
  ◊ 1 Code Pink drill & 1 real Code Pink event.
  ◊ Lockdown drills at all 9 community health clinics
  ◊ 1 real world surge event
  ◊ 8 Network/Utility Outages

Emergency Management Goals for 2018
■ Update the Mass Casualty Incident Plan to include new best practices.
■ Develop a Hazardous Emergency Response Team to include both clinical and non-clinical staff.

Emergency Management Performance Measures for 2018
■ Achieve 100% completion/resolution rate of After Action Items.
■ Conduct four quarterly AOC trainings.

8. CLINICAL DOCUMENTATION INTEGRITY (CDI) QUALITY INITIATIVES

8.1. Patient Safety Indicators (PSIs) & Hospital Acquired Conditions (HACs)

The CDI team reviews the Agency for Healthcare Research and Quality (AHRQ) Patient Safety Indicators (PSIs) and select Centers for Medicare and Medicaid Services (CMS) Hospital Acquired Conditions (HACs) for coding and documentation accuracy. They review the patient record to determine if the documentation supports the code assignment that triggered the safety or quality indicator.

The PSI algorithms are updated periodically by AHRQ. The HACs are published annually by CMS. Patient Safety Indicator outcomes affect quality scores and are used to compare hospitals. Many of the outcomes are included in some pay-for-performance programs. The coded HACs impact payment as part of the Deficit Reduction Act Hospital Acquired Conditions Payment Provision. It is important to ensure that PSIs and HACs are accurately reported. Our team reviews PSIs that are included in the PSI 90 composite as well as select PSIs that are not included in the PSI 90 composite (Figures 8.1-1 and 8.1-2).
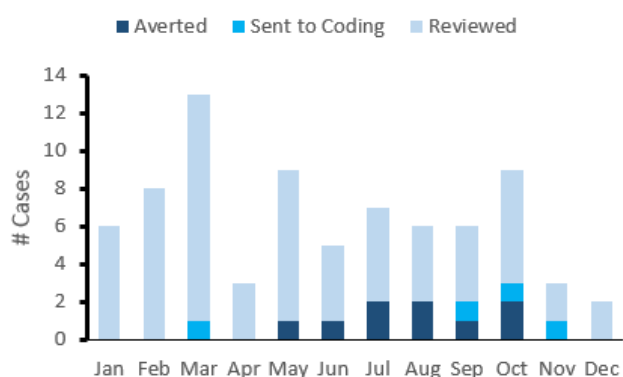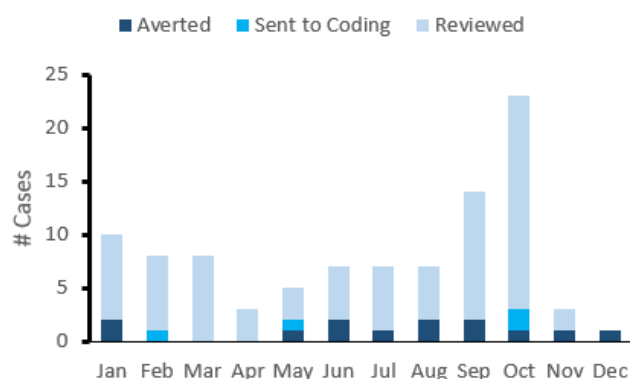
Figure 8.1-1: PSI 90 cases reviewed

Figure 8.1-2: Non-PSI 90 cases reviewed

Once the record is coded, it triggers a PSI or HAC if it meets either AHRQ's or CMS's protocol inclusion criteria and does not meet one of the exclusion criteria. The team is notified when a PSI and/or HAC is triggered after coded data is run through the AHRQ and CMS algorithms. The record populates to the work list that a Clinical Documentation Integrity (CDI) member checks weekly. Each record is reviewed to determine if the code(s) that triggered the PSI or HAC are accurately assigned given the existing documentation and clinical criteria in the record. Any potential exclusion criteria is determined and codes are reviewed for those conditions have been assigned correctly. If there is ambiguous or conflicting documentation, a recommendation is sent to coding to send a compliant query to the provider for clarification. If potential coding issues are identified, a coding review is requested. If a coding error or query opportunity is identified and documentation is correctly updated, it is possible to avert the PSI or HAC. Reviewed cases are entered into a SharePoint audit tool and electronic communication is sent to the Coding Educator if there is a request for a coding review or provider query.

In August 2017, the CDI team began collaborating with a surgical provider who does a secondary review of all PSIs to determine if the documentation by the providers supported the coding of the PSI. This surgeon also educates providers as needed regarding documentation accuracy. The CDI team is planning to implement a similar secondary provider review process with the HACs in 2018 with the Hospitalist provider team for cases where patients were primarily cared for by Medicine teams.

Cases are compared to reported cases in the Vizient Database at least quarterly to ensure that case reporting is accurate and averted cases have not been incorrectly reported.

In addition to the regular ongoing PSI and HAC audits, this year we did a focused audit on elective admissions due to the impact that elective admissions have on several of the PSIs.

Elective admissions are an inclusion criteria for some of the PSIs and it is therefore important for the admission type of elective to be selected appropriately.

The CDI team averted 8% of PSIs and 13% of HACs that we reviewed in 2017. The main reason for the aversion was multifactorial. Some cases had coding opportunities. Others required a query to the physician when the documentation conflicted with the clinical findings or when a condition could be clarified as possibly or definitely being present on admission (POA), thereby averting the PSI or HAC. The review process has been successful. The CDI team will continue to review the PSIs and HACs to ensure that the reporting of these conditions is accurate.

8.2. Mortality

Severity of Illness and Risk of Mortality Scores
The CDI team reviews all inpatient deaths with a severity of illness score (SOI) and/or a risk of mortality score (ROM) less than extreme. Opportunities are identified to improve documentation in order to increase SOI/ROM or to identify any coding errors which result in inaccurate SOI/ROM.

Mortality ratios (Figure 8.2-1) allow for a comparison of patients' actual mortality rates to expected mortality rates, based on risk adjusted mortality score. Risk adjusted expected mortality scores are impacted mainly by acute and chronic conditions that are present on admission and have been shown to have a statistically significant impact on mortality. This is one reason why it is important for providers to document all of the patients' medical problems.

8.2-1: Mortality Ratio Calculation

> **Risk Adjusted Mortality Ratio = (Σ observed mortality cases)/ (Σ expected mortality)**
>
> **Observed mortality**: The actual number of inpatient deaths that occur in the hospital during a specific period.
>
> **Expected mortality**: The predicted number of deaths in the hospital based on the patients' risk adjusted mortality calculation in the hospital. Patients who are very sick (higher severity of illness) have a higher expected mortality rate.

The CDI team uses the APR-DRG Grouper, developed by 3M Health Information Systems. It is one method that can be used to determine the SOI or ROM for each patient. High SOI and ROM scores are mostly determined by the interaction of multiple illnesses and chronic illnesses involving multiple organ systems. These patients are difficult to treat and are more likely to have poor outcomes. Prioritizing reviews based on the SOI/ROM is a reasonable and efficient way to determine which cases warrant a review. The discharge SOI/ROM is readily available after the record is coded which is more efficient than calculating the O/E manually.

The CDI team built an audit tool using Microsoft's SharePoint software. The office of decedent affairs sends death reports to the CDI team every month. The CDI team uses 3M to determine the SOI/ROM for each inpatient death. For each case that has an SOI/ROM that is less than 4/4 (extreme/extreme) the entire record is reviewed and entered into the audit tool. If there is an opportunity to increase the SOI/ROM because of missing documentation, incorrect coding, or an issue that was present on admission (POA) but not documented, it is marked this way in the audit tool and sent to the coding manager for further review. The coding manager determines if the case needs to be recoded or if a query needs to be sent to the provider. In 2017, the CDI team reviewed 62 inpatient deaths where the admit SOI/ROM was <4/4. Of those cases, we were able to increase the SOI/ROM on eight cases. Along with the current review process, the CDI team will continue to provide education to providers to remind them to use specific verbiage and document conditions that are POA to capture the highest SOI/ROM and appropriate risk adjusted mortality index.

Pulmonary Mortality Review
Denver Health's mortality performance was in the worst decile for Vizient's Pulmonary Critical Care service line for Q4 2016 – Q3 2017. Vizient Service Lines are determined based on Diagnosis Related Group (DRG) assignment, not by provider assignment or location of service in the hospital. Patients assigned to this Service Line may or may not have been cared for by the Pulmonary Critical Care providers at Denver Health.

In order to help improve our overall ranking, areas of opportunity in provider documentation and coding were identified. Cases where there were missing diagnoses can also affect other areas such as Severity of Illness Score (SOI), Risk of Mortality Score (ROM), complication or comorbidity (cc), and major complication or comorbidity (MCC) which can affect reimbursement.

The Clinical Documentation Integrity (CDI) department reviewed all inpatient mortality cases of Pulmonary Critical Care service line that were reported to Vizient in Q4 2016— Q3 2017. Auditing included reviewing coding and reviewing the risk adjustment model each patient fell into to ensure that all applicable diagnoses that were present on admission were captured.

Of the 33 cases that were reviewed it was determined that there were 11 cases with opportunities to query providers for more diagnoses that would affect the risk adjustment and SOI/ROM. There were several charts that had more than one query opportunity, thus 15 total missing diagnoses (figure 8.2-1).

Figure 8.2-1: Documentation of Risk Adjustment Opportunities

Documentation of Risk Adjustments	# Opportunities
CC Coagulopathy	5
Deep Coma	3
Hypotension	1
Other Pneumonia	2
Sepsis	1
Severe Brain / Spinal Conditions	1
Shock	2
Total	15

Of the 33 cases that were reviewed it was determined that there were 31 cases with opportunities for coding to capture more diagnoses that affect risk adjustment and SOI/ROM. There were several charts with more than one opportunity resulting in a total of 35 opportunities (Figure 8.2-2).

The CDI team recommends the following: Educate pulmonary providers on the Vizient ranking and risk adjustment methodologies, encourage complete and accurate documentation of every chronic and acute condition to ensure accurate SOI/ROM and capture all applicable CCs and MCCs, emphasize the importance of POA status, and provide examples of diagnoses that are frequently missed. The team also recommends changing the Critical Care H&P template to include the GCS (total and subscores) as each score can be coded from provider documentation and affects both risk adjustment and SOI/ROM.

Recommendations for the coding department are to review coding guidelines and have coding clinics with the coding educator to understand why some diagnoses are not typically coded. Vasopressor on admission day codes are not typically captured by coders as it is a nursing procedure, and there is not a straightforward and consistent documentation for coders to consistently pick it up.

Figure 8.2-2: Coding Risk Adjustment Opportunities

Coding Risk Adjustments	# Opportunities
Acute Kidney Failure	1
CC Coagulopathy	3
COPD	1
Deep Coma	4
GCS (Deep Coma not in this Risk Model)	1
Hypotension	1
Other Pneumonia	1
Severe Sepsis	1
Shock	2
Vasopressor Infusion on Admission Day	20
TOTAL	35

*Risk adjustment methodologies have diagnosis categories that include multiple diagnoses in one group. For example, Deep coma includes Glasgow coma scale score 3-8, persistent vegetative state, concussion, etc. Coagulopathy includes DIC, acquired coagulation deficiency, thrombocytopenia, etc. Therefore, the risk adjustment opportunities listed above do not reflect the specific diagnosis that was identified by the CDI team.

Neurosurgery Mortality Review

DHHA's Neurosurgery mortality index was in the worst 5% of Vizient hospitals in 2015. The CDI team performed an audit in 2016, to find areas of opportunity for improvement. The top missing diagnoses identified from 2016, were brain compression, cerebral edema and electrolyte abnormalities. These diagnoses not only have an impact on risk adjustment, they also potentially impact reimbursement and Severity of Illness and Risk of Mortality (SOI/ROM) scores. After the initial audit in 2016, it was determined that a change to the Neurosurgery H&P template in Epic was necessary in order to capture the top missing diagnoses and ensure that when the condition is present on admission (POA), it is appropriately captured by coding.

The CDI team performed a follow-up audit in 2017 after the Neurosurgery service line updated their H&P template in Epic. The team used the same audit tool in SharePoint that was used for the 2016 audit. All Neurosurgery patients who were admitted in November 2017 were audited. We assessed for appropriate documentation of POA status, ensured that all applicable conditions (brain compression, cerebral edema and electrolyte abnormalities) were documented. If a condition was not documented and there were clinical indicators to suggest its presence, we queried the provider. We also audited the records for overall documentation opportunities not related to brain compression, cerebral edema and electrolyte abnormalities. The focus was to capture all diagnoses that were present on admission in order to accurately reflect the severity of illness of the patient at the time of admission.

There was an improvement in overall documentation of brain compression and cerebral edema. However, electrolyte abnormalities were often not appropriately documented. Electrolyte abnormalities were either treated and not documented, or they were inappropriately documented such as "↓K" or "hypoK." Any diagnosis should be properly documented for a coder in order to ensure that it is accurately coded. Other Risk Variables are diagnoses that we identified as having an impact, but were not part of the initial audit. These were conditions such as Glasgow Coma Scale (GCS) (total and separate scores), encephalopathy, and coagulopathy.

There were several cases that required more than one query for several diagnoses, but overall the query rate decreased from the last month the audit was performed compared to the initial audit in March 2017 (Figures 8.2-3 and 8.2-4).

The new Neurosurgery H&P has helped to capture more diagnoses that are present on admission. The CDI team will continue to educate the providers on how to properly document diagnoses, specifically the electrolyte abnormalities. The CDI team is providing ongoing education to the Neurosurgery providers regarding other important diagnoses such as coagulopathy and total GCS score prior to death.

Figure 8.2-3: Queries and Missed Opportunities
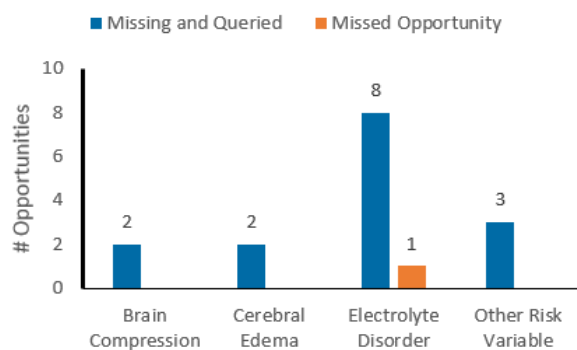
Figure 8.2-4: Queries and Missed Opportunities Per Case
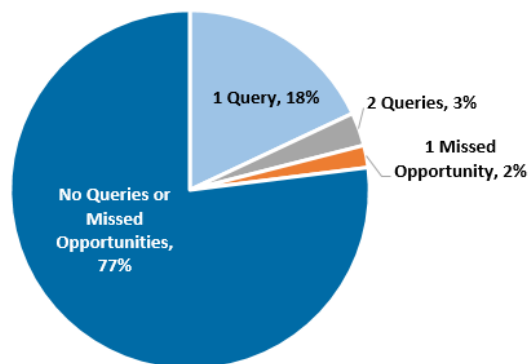
8.3. Malnutrition

Malnutrition has been identified as a significant clinical problem in the hospital setting. Malnutrition adversely affects physical well-being and complicates health treatments which directly impact hospital costs. Malnutrition has been defined by the American Society for Parenteral and Enteral Nutrition (ASPEN) criteria as "an acute, subacute or chronic state of nutrition, in which varying degrees of over nutrition or under nutrition with or without inflammatory activity have led to a change in body composition and diminished function."

The ASPEN severity of malnutrition scales is based on six characteristics, and the patient must meet two of the six:
- Insufficient energy intake
- Weight loss
- Loss of muscle mass
- Loss of subcutaneous fat
- Localized or generalized fluid accumulation that may sometimes mask weight loss
- Diminished functional status as measured by hand grip strength

The CDI team reviewed inpatient records that have a BMI < 19 for a possible malnutrition diagnosis based on physician documentation or registered dietician evaluation. Microsoft's SharePoint Software audit tool was used to record all malnutrition cases

reviewed by CDI. The registered dieticians use an Excel log built by Sodexo to track evaluated patients with a malnutrition diagnosis. The CDI team and Epic also built a workqueue that captures all inpatient admissions that have an identified BMI < 19 and are 18 years and older. The CDI team reviewed the Registered Dietician log to determine if the malnutrition diagnosis had been captured by the physician. If the diagnosis has not been captured, a query is issued to the physician. If there is a discrepancy in the malnutrition diagnosis between the Physician and the Registered Dietician, a query is issued to clarify the diagnosis. CDI reviews the malnutrition workqueue on a daily basis and reviews documentation to determine if a malnutrition query should be issued based on the current documentation. CDI follows all reviewed records through to coding. If it is noticed that there is a discrepancy between coding and documentation in the record, an email is directed to the coding educator to re-code the record.

Results:
The potential reimbursement Denver Health will received in 3rd and 4th quarter 2017 are noted below.
3Q 2017 - $186,313.40
4Q 2017 - $201,506.46
Total = $387,819.86

The CDI team issued 130 queries for malnutrition in 2017. Of the 130 queries, 90 were answered by a physician and documentation was updated to include a malnutrition diagnosis. The CDI team will continue to review inpatient records for malnutrition in conjunction with the registered dieticians and will continue to provide education and malnutrition data to physician groups and the malnutrition steering committee.

8.4. Workqueues (WQ) Created in Collaboration with Epic

WQ 193 - CDI Concurrent Reviews
Workqueue (WQ) 193 contains a list that includes all patients currently in the hospital. The purpose of the WQ is to track the concurrent reviews and possible queries completed by the CDI team. The purpose of the review is to optimize the physician documentation in each patient record before it goes to the coder so that the record is accurate, clear, and concise by the time the patient is discharged. CDI nurses use a number of different risk models to determine diagnoses that affect the overall severity of illness (SOI) and risk of mortality (ROM) of each patient reviewed. We use the 3M software to enter in our choice for principal diagnosis, appropriate secondary diagnoses, and procedures performed to get a final "working DRG" with associated SOI and ROM. Our reviews, queries and "working DRG" are visible to the coders, however, direct collaboration is not encouraged, nor is looking at our work part of their workflow.

In 2017, the CDI team reviewed 1,295 records and generated 346 queries to physicians. Out of the 346 queries sent, 84 queries were not responded to before the patient was discharged and Physicians did not agree with 30 query questions (Figure 8.4-1).

Figure 8.4-1: CDI Queries and Documentation
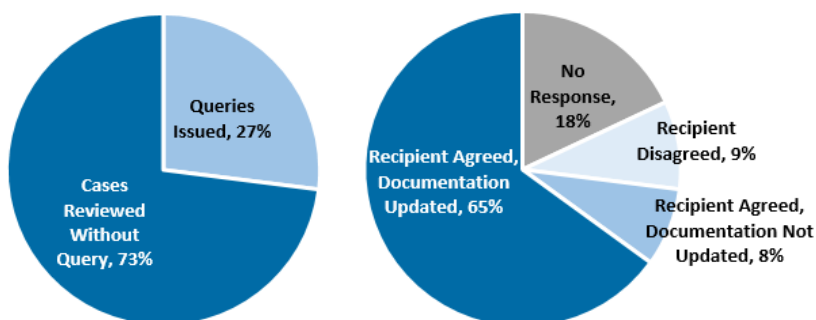
WQ 268 - CDI Patient Accounts No Longer Open with Active CDI Review
Once a patient is discharged from an inpatient stay and also had a CDI review done in WQ 193, they will populate to the WQ 268 list. Once in this list, the CDI nurse will follow up through discharge to compare the CDI DRG with the coder's DRG. If there are coding errors or issues, the CDI nurse can then follow up with the coding educator via our Coding/CDI audit SharePoint tool.

8.5. Outpatient CDI Pilot Project

The CDI team wanted to explore the possibility of focused documentation reviews in the outpatient setting to determine if there was a need to improve Hierarchical Condition Categories (HCC) captured in the documentation among primary care physicians.

The pilot program focused on Denver Health Medical Plan (DHMP) Medicare Advantage population in two clinics: Geriatric (2 providers) and Westwood (8 providers). All audit findings were entered into a SharePoint audit tool to track the data.

Part 1: Using data supplied by DHMP, specific HEDIS screenings (mammogram, colorectal screenings, DM eye exam) are identified as: current, overdue, encounter without a claim, or claim without an encounter. The CDI team reviewed charts to locate and report the screening findings to the DHMP interventionalist in charge of that HEDIS measure to adequately capture the data for CMS reporting. If there was a true gap in care (overdue), we emailed the provider that a screening is needed for a patient with an upcoming appointment.

Part 2: Using data supplied by Population Health, we focused on HCCs that were captured in the year prior (2016) that have not been captured in the current calendar year (2017). When we identified a chronic diagnosis that had not been captured for 2017 and the diagnosis will affect the risk adjustment of that patient, we queried the provider one day prior to the scheduled appointment. If the diagnosis is documented, the CDI team tracked the coding to verify capture. Once captured, the CDI team calculated the associated risk adjustment factor (RAF) that is added to the patients overall risk adjustment score.

Implementation timeline:

Geriatric Clinic Screenings	June 2017
Geriatric Clinic HCC's	Sept 2017
Geriatric Clinic Queries Issued	25% of total cases reviewed
Westwood screenings & HCCs	Oct 23, 2017
Westwood Clinic Queries Issued	49% of total cases reviewed

Results:
Total Current RAF: 22.865
RAF post CDI query: 27.855
Average increase in RAF per patient reviewed by CDI: 0.32

9. CULTURE OF PATIENT SAFETY

9.1. Patient Family Advisory Council (PFAC)

The Denver Health Patient Family Advisory Council (PFAC) was extremely active in 2017, participating in many important discussions. PFAC hosted seven meetings with fifteen members who participated in a majority of the events. Figure 9.1 displays the topics discussed by PFAC in 2017.

PFAC members are currently serving as consultants in the planning, aesthetics, and design elements of the Outpatient Medical Center. This is an ongoing project and the architects and designers visited with PFAC members multiple times in 2017 to discuss upcoming plans for the center and receive feedback. The meetings were centered on the design elements related to the waiting areas, registration, and public areas. There was much discussion about the location of clinics/offices as it relates to the café and other public areas as well.

The Open Notes presentation by Dr. Kortsch resulted in a very engaged discussion about the option to share provider notes with patients in MyChart. Based on the positive feedback provided by the council members, DHHA is piloting the use of Open Notes in MyChart in one community clinic in 2018.

The feedback provided by council members on Medical Aid in Dying contributed towards future discussions and the decision for Denver Health to *opt in* to Medical Aid in Dying.

Figure 9.1: 2017 PFAC Meetings

| |
|---|
| **Paramedic Division, Fleet Replacement Project**
 Garrett Chism, Paramedic EMT-P, MBA |
| **Food Services, New Patient Menus and Design**
 Dawn Kucera, Patient Services Manager
 Federico Felix, Executive Chef |
| **Strategic Planning for Denver Health**
 Amy Friedman, Chief Experience Officer
 Marisha Burden, Chief of Hospital Medicine |
| **Timely Discharge VSA**
 Sharif Abdelhamid, Senior LEAN Facilitator
 Agustin Leone, LEAN Coordinator |
| **Denver Health Brand Development**
 Marilyn Seely, Marketing & PR Strategist
 Beth Dunham, Marketing & PR Strategist II |
| **Medical Aid in Dying**
 Connie Price, MD, Chief Medical Officer |
| **Denver Health's Campus - The Outpatient Medical Center**
 Architecture firms on the ACC project: HKS Architects; Iron Horse Architects
 Alisa Rice, Vice President/Senior Medical Planner, HKS Architects
 Sara Parsons, Interior Design Principle, Gallun Snow
 Erin Folly, Senior Lean Facilitator |
| **Denver Public Health Open Discussion: The Outpatient Care Center**
 Bill Burman, MD, Director of Denver Public Health |
| **Open Notes**
 Daniel Kortsch, MD, Interim Chief Medical Information Officer |
| **Primary Care Provider and Hospitalist Collaboration**
 Patrick Ryan, MD |

9.2. Safety Intelligence (SI) Reporting

Safety Intelligence (SI) is DHHA's incident reporting system. All employees can access the system through the intranet and anonymously report on safety issues. Since 2010, there has been a 39.2% increase in incident reporting (Figure 9.2-1). Comparing 2016 to 2017, there was a 16% increase in incident reporting. The increase in incident reporting year over year has been attributed to ongoing education about Just Culture and the reinforcement of the positive impact that identification of opportunities of improvement can bring to the safety of our patients and the satisfaction of our employees.

Laboratory tests were the most reported event type in 2017 (Figure 9.2-2). These events occurred because of difficulties with labeling laboratory specimens and non-standardized processes. DHHA implemented enhancements to the Epic system to resolve label printing issues. Tip Sheets and Huddle Sheets were created to provide consistent education to staff about the process for labeling lab specimens. DHHA will continue to focus on system improvements in an effort to eliminate human error where possible.

Behavioral events were the second most common event reported in 2017. These events occurred throughout the organization, including inpatient, ambulatory, emergency, and behavioral health locations. A rise in violent patients is being witnessed throughout Colorado hospitals. In order to protect our employees and keep patients safe, DHHA began discussions and convened a team to implement a Behavioral Health Emergency Response Team (BERT) to act as a fast acting, preventative team which can come to the unit to speak with an individual before his or her behavior escalates. This team will be led by a behavioral health specialist and will be fully activated in 2018.

9.2-1: SI Reported Events by Year
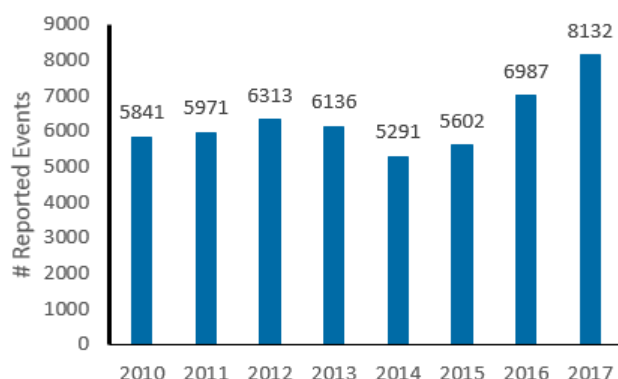
9.2-2: Top 10 Event Types Reported in SI
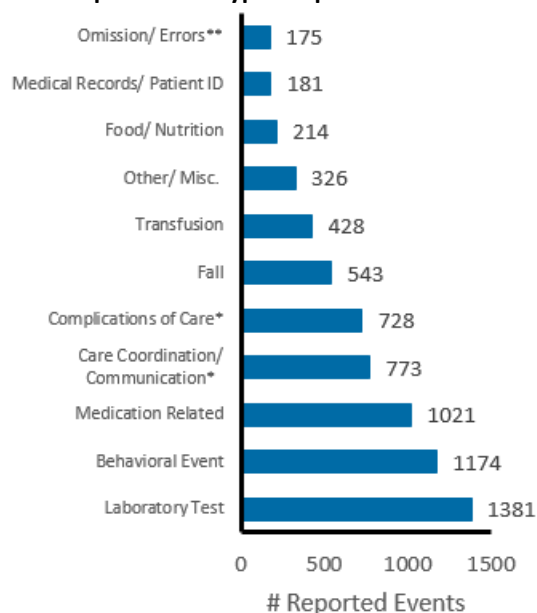
* Unanticipated, non surgical
** Assessment, Diagnosis, Monitoring

9.3. Press Ganey Culture of Safety Survey

In October 2015, DHHA rolled out a new employee engagement survey vendor and the patient safety culture survey was included to streamline the process and to reduce survey fatigue from our employees. In 2016, the survey was shortened, but still includes a number of culture of safety assessment questions. Three separate surveys were distributed: one for all employees, one for hospital providers, and one for clinic providers.

For Figures 9.5-1—9.3-3 below, "same" indicates scores on a 5-point scale that were within 0.1 points of the National Healthcare Average. "Lower" and "Higher" indicate scores that were more than 0.1 points different from the national benchmark. The "% Favorable Responses" indicates the percent of all respondents who agreed or strongly agreed with the statement.

Figure 9.3-1: 2017 Press Ganey Employee Survey

Item	% Favorable	Vs. Nat'l Healthcare Avg
Employees and management work together to ensure the safest possible working conditions.	80%	Same
Employees will freely speak up if they see something that may negatively affect patient care.	83%	Same
I feel free to raise workplace safety concerns.	87%	Same
In my work unit, we discuss ways to prevent errors from happening again.	85%	Same
The amount of job stress I feel is reasonable.	66%	Same
I would recommend this organization to family and friends who need care.	73%	Lower
Communication between providers, nurses, and other medical personnel is good in this organization.	66%	Lower
Different work units work well together in this organization.	66%	Same
I can report patient safety mistakes without fear of punishment.	85%	Same
Mistakes have led to positive changes here.	78%	Same
My work unit is adequately staffed.	55%	Same
There is effective teamwork between providers and nurses at this hospital.	73%	Same
This organization makes every effort to deliver safe, error-free care to patients.	86%	Lower
This organization provides high-quality care and service.	84%	Lower
We are actively doing things to improve patient safety.	87%	Same
When a mistake is reported, the focus is on solving the problem, not writing up the person.	72%	Same

Source: Press Ganey

Figure 9.3-2: 2017 Press Ganey Clinic Provider Survey

Item	% Favorable	Vs. Nat'l Clinic Physician Avg
I would recommend this hospital to family and friends who need care.	81%	Same
When a mistake is reported, the focus is on solving the problem, not writing up the person.	83%	-
Senior management (DOS) provides a climate that promotes patient safety.	87%	-
My work unit is adequately staffed.	56%	-
This clinic/group makes every effort to deliver safe, error-free care to patients.	92%	Higher
This clinic/group provides high-quality care and service.	93%	Higher
Different departments work well together at this clinic/group.	81%	Higher
The amount of job stress I feel is reasonable.	57%	-
My work unit is adequately staffed.	56%	-
I can report patient safety mistakes without fear of punishment.	92%	-
Mistakes have led to positive changes here.	85%	-
The members of this clinic/group work well together.	89%	Higher
Employees will freely speak up if they see something that may negatively affect patient care.	88%	-
In my department, we discuss ways to prevent errors from happening again.	88%	-
Employees and management work together to ensure the safest possible working conditions.	88%	-
I feel free to raise workplace safety concerns.	92%	-

Source: Press Ganey

**Figure 9.3-3: 2017 Press Ganey Hospital Provider Survey**

Item	% Favorable	Vs. Nat'l Physician Avg
I would recommend this clinic/group to family and friends who need care.	69%	Lower
Senior management (executive staff) provides a climate that promotes patient safety.	80%	Same
When a mistake is reported, the focus is on solving the problem, not writing up the person.	75%	Same
Different departments work well together at this hospital.	65%	Lower
Communication between departments is effective in this organization.	62%	Lower
I can report patient safety mistakes without fear of punishment.	88%	Same
My work unit is adequately staffed.	50%	Same
Mistakes have led to positive changes here.	86%	Higher
We are actively doing things to improve patient safety.	93%	Higher
The amount of job stress I feel is reasonable.	66%	Higher
Physicians and staff function well as a team to provide patient care.	86%	Same
I feel free to raise workplace safety concerns.	91%	Same

Source: Press Ganey

9.4. Monthly Culture of Safety Survey

DHHA recognized in 2014 that in order to continually improve our safety culture, assessments of our culture needed to be done more frequently than annually or biannually. Beginning in 2014 and continued through 2017, a three-item survey which highlights areas of opportunity, was used to gather monthly data on our culture of safety. The first survey is sent in February to all employees to determine the baseline rates. Ten percent (10%) of employees are randomly selected each month to receive a follow-up survey. All responses were anonymous, allowing the employees to be open and honest with their answers. The graph below (Figure 9.4) shows the three 2017 questions and overall results. The monthly results suggest random cause variation without change from the baseline performance.

Figure 9.4: Culture of Safety Survey
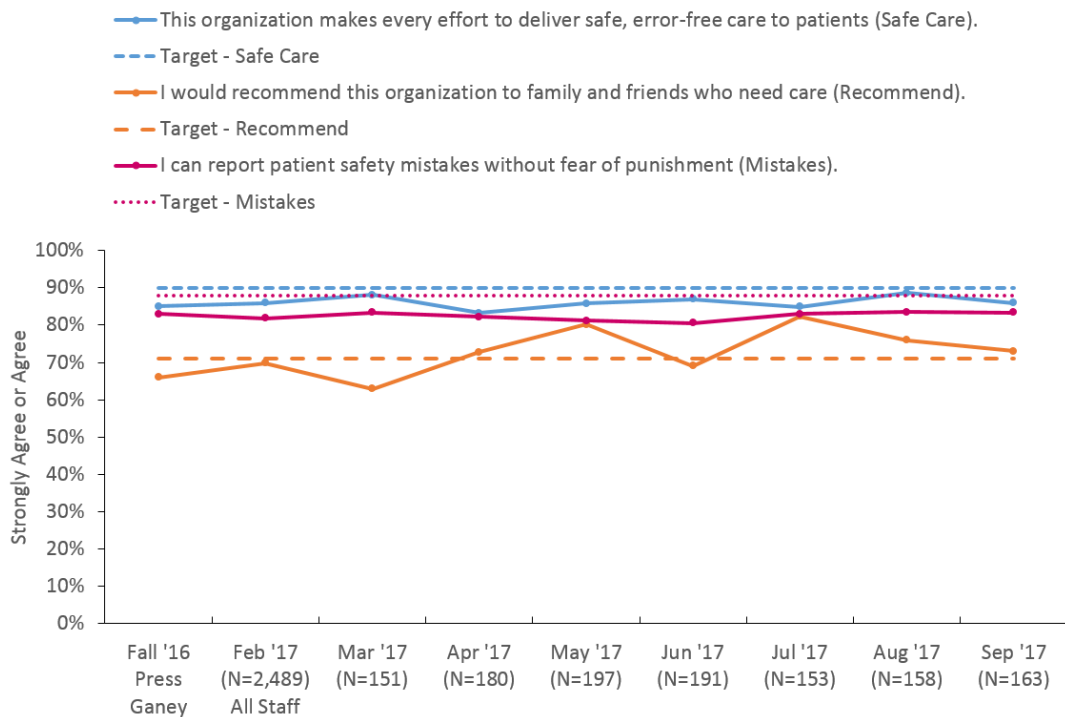
Source: DHHA DPSQ

9.5. Culture of Safety Decision Tree

In 2016, we presented the revised Culture of Safety Decision Tree tool to managers at DHHA and we included it when distributing the results of monthly culture of safety survey results by department (Figures 9.5-1 and 9.5-2).

Figure 9.5-1: DHHA Culture of Safety Decision Tree

Denver Health Culture of Safety Decision Tree
A Performance Management Tool for Adverse Events

DENVER HEALTH
Level One Care for ALL

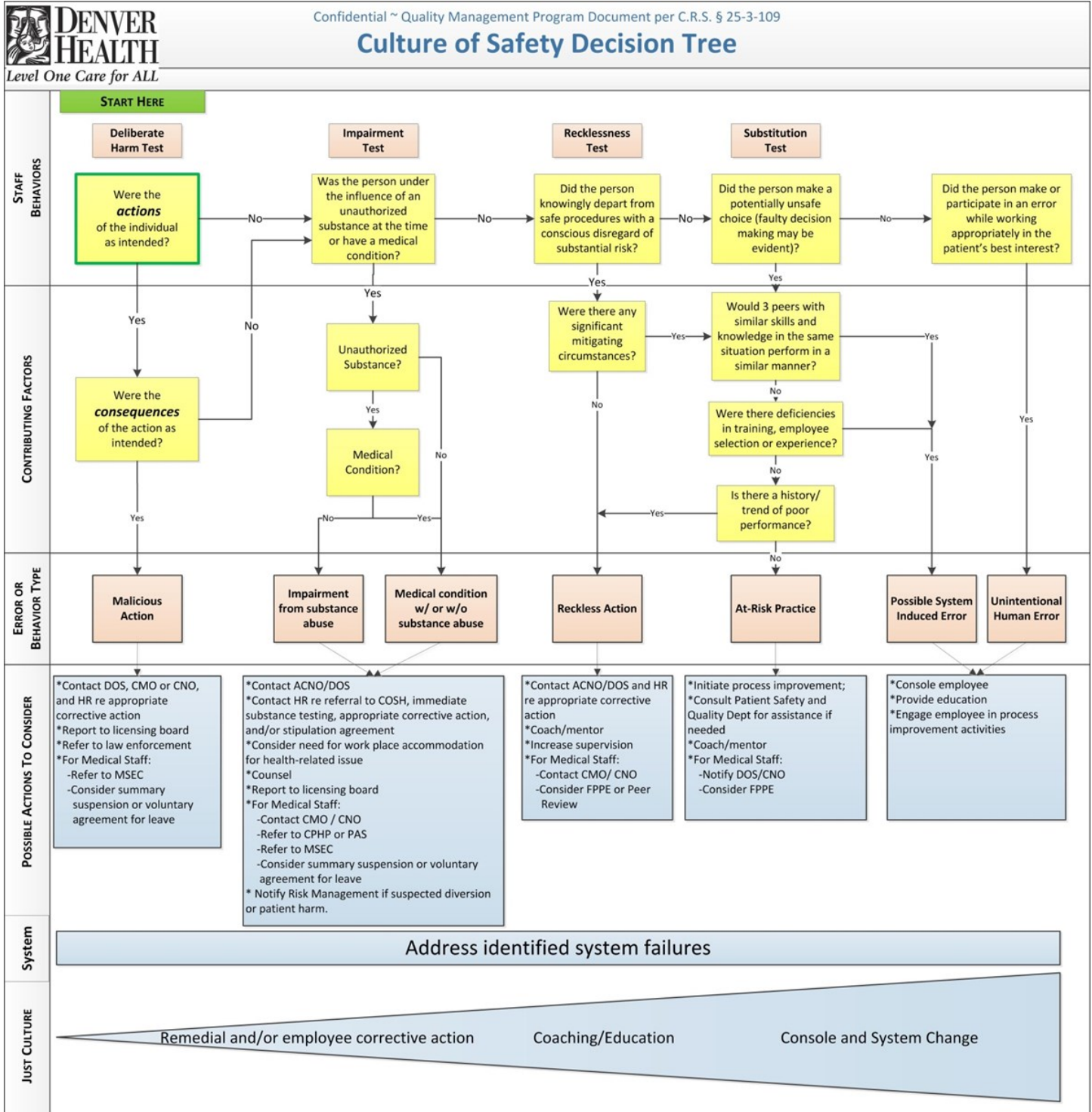|	
What is a Culture of Safety	▪ **Balances** the need for an open and honest reporting environment with appropriate individual *and* organizational accountability to our patients and to each other. ▪ **Improves** patient safety by empowering employees to actively monitor and participate in safety efforts.
When To Use This Decision Tree	▪ Utilize **prior to** issuing corrective action following an adverse event or near miss. ▪ Use **in addition to** and not in replace of the Safety Intelligence reporting system.
Purpose Of This Decision Tree	▪ A **tool** for leaders to evaluate employee conduct and determine appropriate follow-up action after an adverse event or near miss. ▪ **Encourages** leaders to decrease the focus on individual blame and instead view an adverse event-or near misses as an opportunity to console and re-educate staff, improve systems, and reduce risk.
How To Use This Decision Tree	▪ **First**: thoroughly investigate the adverse event or near miss. Ensure that a Safety Intelligence report has been filed. ▪ **Second**: start at the top left of the tool, answer each question 'yes' or 'no,' and follow the arrows through the Decision Tree. ▪ **Third**: ensure any corrective action is based upon the employee's behavior, not the outcome of the behavior (e.g., harm to a patient). ▪ **Fourth**: Enter corrective action plan into Safety Intelligence manager review

Tips for Leaders
1. We expect the vast majority of cases will result in an outcome requiring managers to console the employee and look for system improvements or re-education opportunities and will *not* result in employee corrective action.
2. A Culture of Safety encourages transparency. Share the steps you took to investigate and determine the action with the employee.
3. When necessary, seek a second opinion from a fellow leader and/or HR.
4. Contact HR when you are unsure of appropriate corrective action or are considering suspension, decision making leave, or termination.

Rev. 24May2016

Source: DHHA DPSQ

Figure 9.5-2: DHHA Culture of Safety Decision Tree

Confidential ~ Quality Management Program Document per C.R.S. § 25-3-109

Culture of Safety Decision Tree

DENVER HEALTH
Level One Care for ALL

START HERE

STAFF BEHAVIORS

| Deliberate Harm Test | Impairment Test | Recklessness Test | Substitution Test |

Were the *actions* of the individual as intended? —No→ Was the person under the influence of an unauthorized substance at the time or have a medical condition? —No→ Did the person knowingly depart from safe procedures with a conscious disregard of substantial risk? —No→ Did the person make a potentially unsafe choice (faulty decision making may be evident)? —No→ Did the person make or participate in an error while working appropriately in the patient's best interest?

CONTRIBUTING FACTORS

Yes / No

Were the *consequences* of the action as intended?

Unauthorized Substance? → Yes → Medical Condition?

Were there any significant mitigating circumstances? —Yes→ Would 3 peers with similar skills and knowledge in the same situation perform in a similar manner? —Yes→

No → Were there deficiencies in training, employee selection or experience? —Yes→

Is there a history/ trend of poor performance?

ERROR OR BEHAVIOR TYPE

| Malicious Action | Impairment from substance abuse | Medical condition w/ or w/o substance abuse | Reckless Action | At-Risk Practice | Possible System Induced Error | Unintentional Human Error |

POSSIBLE ACTIONS TO CONSIDER

*Contact DOS, CMO or CNO, and HR re appropriate corrective action
*Report to licensing board
*Refer to law enforcement
*For Medical Staff:
 -Refer to MSEC
 -Consider summary suspension or voluntary agreement for leave

*Contact ACNO/DOS
*Contact HR re referral to COSH, immediate substance testing, appropriate corrective action, and/or stipulation agreement
*Consider need for work place accommodation for health-related issue
*Counsel
*Report to licensing board
*For Medical Staff:
 -Contact CMO / CNO
 -Refer to CPHP or PAS
 -Refer to MSEC
 -Consider summary suspension or voluntary agreement for leave
* Notify Risk Management if suspected diversion or patient harm.

*Contact ACNO/DOS and HR re appropriate corrective action
*Coach/mentor
*Increase supervision
*For Medical Staff:
 -Contact CMO/ CNO
 -Consider FPPE or Peer Review

*Initiate process improvement;
*Consult Patient Safety and Quality Dept for assistance if needed
*Coach/mentor
*For Medical Staff:
 -Notify DOS/CNO
 -Consider FPPE

*Console employee
*Provide education
*Engage employee in process improvement activities

System

Address identified system failures

JUST CULTURE

Remedial and/or employee corrective action   Coaching/Education   Console and System Change

Source: DHHA DPSQ

10. PATIENT EXPERIENCE

10.1. The Patient Voice

The Patient Experience department uses a variety of methods to listen to and integrate the Voice of the Customer (VOC) to retrieve immediate and actionable feedback in an ongoing effort to drive our patient experience improvement efforts based on patient and customer input. Information gathered from various listening methods, is used to hone in on feedback about the care and services that we offer. This information is used to make process improvements and identify opportunities for innovative change. The various listening approaches used for our patient and community customers are indicated in Figure 10.1.

Denver Health uses a variety of integrated and learning processes to respond to the VOC throughout the various stages of a patient's relationship with DHHA. Through highly successful patient-centered engagement methods, such as the Patient Family Advisory Council (PFAC), DHHA has expanded the approach to include new councils that segment patient populations representative of specific units and clinics. This allows DHHA to gain valuable VOC insight and actionable information from council members, enabling DHHA to make improvements based on ongoing feedback provided by patients representing a specific area. In addition to the various councils, DHHA patients are rounded on during their stay and asked specific questions related to their care and experience. Rounds are documented through a program called My-Rounding, which allows DHHA to track data and address issues with the appropriate supervisors and/or departments and directly communicate with patients to resolve the problems. DHHA reaches out to patients after their visit as well, through emails, phone calls, surveys, and MyChart.

The various listening mechanisms used to seek actionable feedback from the VOC allow DHHA to identify patient and community needs, as well as opportunities for process improvement, strategic planning, and innovation. Feedback and insights from the VOC are communicated to DHHA leadership teams and incorporated into strategic goals and action plans for immediate change.

Figure 10.1: Patient Listening Methods

	IP	OP	ED	Comm
HCAHPS/CAHPS/Press Ganey Surveys	X	X	X	
Rounding	X	X	X	
AIDET	X	X	X	X
Focus Groups	X	X	X	X
Social Media	X	X	X	X
Music / Pet Therapy Visits	X			
Service Recovery	X	X	X	X
Patient Advocates	X	X	X	X
Pre-Admission Phone Calls		X		
Post-Discharge Phone Calls	X	X		
Community Health Educational Events	X	X		X
Reach Out and Read	X	X		
Patient Family Advisory Council (PFAC)	X	X	X	
Foundation Programs	X	X	X	
Advisory / Government Bodies	X	X	X	X
DHHA and Patient Experience Websites	X	X	X	X
Support Groups	X	X		
24 / 7 Nurse Hotline		X		
Complaint Submission	X	X	X	
Affiliate Hospital Boards	X	X	X	
Lean Event Participation	X	X	X	X
Leadership Development Institute (LDI)	X	X	X	
MyChart Patient Health Portal	X	X	X	
Mystery Shop Program	X	X	X	
IP = Inpatient, OP = Outpatient, ED = Emergency Department, Comm = Community				

Strategic planning incorporates VOC using a framework that includes a dimension dedicated to the patient experience. Liaised through the Chief Experience Officer, patient experience data is analyzed with plans created that focus on gaps within the patient experience. Multi-year goals specific to patient experience have been established and annual action plans created to ensure movement toward these goals. All patient experience goals established inside of strategic planning are monitored by senior leaders.

10.2. Patient Family Advisory Council (PFAC)

DHHA regularly hosts a PFAC to bring together patient and family advisers to foster a culture of patient- and family-centered care. The council consists of former and current patients, volunteers, employees, as well as non-DHHA patients. The PFAC is facilitated by the Patient Experience department, DHHA senior leaders, Manager of Service Excellence, and clinical and non-clinical managers. Council objectives include the sharing of ideas in the implementation of new and existing programs across the hospital, and identifying and articulating the patient and family perspective with regard to improving the patient experience. The council serves as a collaborative partner in strengthening the standard of excellence in the delivery of safe, comprehensive, and compassionate health care at DHHA. The PFAC provides DHHA with a VOC that allows DHHA to make immediate improvements or innovative changes to meet the needs of DHHA customers and improve the patient experience in all aspects of care delivery. DHHA has made improvements and introduced new programs through the work and input of the PFAC. As a result of its success, DHHA has recently

expanded the program to create new councils that segment the patient population to include those who represent a specific unit or clinic, most recently the Neonatal Intensive Care Unit (NICU) PFAC.

Patient Advocates

DHHA patient advocates meet with patients daily to help advocate for patients' rights and needs. Patient advocates identify opportunities for improvement and innovations to improve the patient experience, assist caregivers in meeting patient needs and expectations, educate staff on how to provide the best customer service possible, and serve as a resource for both patients and health care providers. Through the VOC, patient advocates have been able to implement change and improve communication with staff, patients, and family members.

Patient Advocate - Complaint Management

DHHA has implemented a complaint management system and process that is used across all DHHA inpatient and outpatient areas and clinics. Patient advocates respond to all grievances within three days and review, investigate, and resolve each patient grievance within seven business days, ensuring that the patient is satisfied with the progress and end result. All grievances submitted through the DHHA Web portal are immediately acknowledged. Through our grievance process and patient interactions and feedback, we have been able to make process improvements to enhance the patient experience and our ability to serve our patients.

Patient Rounding

To ensure that DHHA is listening to the VOC, DHHA utilizes a number of rounding methods with patients and customers, which consist of leader rounding and hourly rounding on patients, and leader rounding on employees and customers. DHHA leaders round on patients daily, to listen to and interact with patients about their experience at DHHA. Rounding has given DHHA an opportunity to learn from patients and customers, improving processes and services through the VOC. Through MyRounding, units and clinics document patient rounds in a systematic way that allows DHHA to track issues and rounding percentages by unit, with a minimum documented goal of 75 percent of patients being rounded on by a leader. DHHA then comparatively tracks responses in the Press Ganey survey that asks patients whether a leader rounded on them during their visit. This ensures that goals are being met and patients are being visited and heard on a regular basis.

We have increased focus and attention on patient experience. Steps are being taken to build meaningful relationships with patients and customers at each interaction by improving overall communication with patients, family members, visitors, and each other. A single example of this is the now widespread use of Acknowledge, Introduce, Duration, Explanation, Thank You (AIDET) communication – a standard introduction that employees are expected to use at each encounter with patients, visitors, and coworkers. Through our AIDET communication and daily interaction with patients, we are able to solicit feedback from patients and family members that enables us to improve our service and the patient experience. As we connect with our patients, we build and manage relationships that provide us with a forum for change.

10.3. Service Recovery

DHHA designed and implemented a Service Recovery (SR) program to provide employees with a channel for identifying and acting upon opportunities for improvement in the customer experience. The SR program provides staff members with resources, education, and strategies that allow employees to be owners of service recovery and provide timely and effective methods to correct any breakdowns in service and restore the relationship with the customer who experienced the service failure. Service issues are logged and tracked so that DHHA can correct the issues as they arise, and prevent similar breakdowns from occurring in the future. Issues are categorized and tracked by unit and/or clinic. Trends are identified and addressed at the appropriate level where a simple and flexible tier-based system is used to provide the right intervention for each customer.

Through consistent patient hourly and leader rounding, there is no delay in providing service recovery to our patients and families, as dissatisfaction is immediately brought to the front line where staff can address and resolve customer complaints. This approach is highly engaging for our patients and prevents the accumulation of complaints and grievances that can be costly and negatively impact our relationships with our patients in the long term. Through the deployment of these systematic processes, DHHA experienced a 41 percent decrease in the number of documented grievances in 2017. With this system in place, we are able to build relationships with our patients and family members, which improves their experiences while in our care.

10.4. Measuring Patient Satisfaction

DHHA primarily uses nationally administered surveys to determine patient satisfaction and engagement. We work with a third-party company (Press Ganey) who administers the surveys by telephone, mail, or email. Press Ganey is an approved CMS vendor that administers the surveys, and provides detailed reports and data which allows DHHA to continuously drive quality improvement. The surveys combine nationally required HCAHPS questions with patient-centered questions to provide the most comprehensive view of the overall patient experience. All departments are responsible for monitoring and posting scores on their communication boards, as well as addressing departmental concerns or issues during staff meetings and daily huddle meetings. DHHA units prioritize, track trends, and implement change through data, patient feedback and comments, and survey reports. Over the past several years DHHA has tracked the Overall Rating metrics at an institutional level (Figures 10.4-1—10.4-3).

Figure 10.4-1: Overall Rating of Hospital
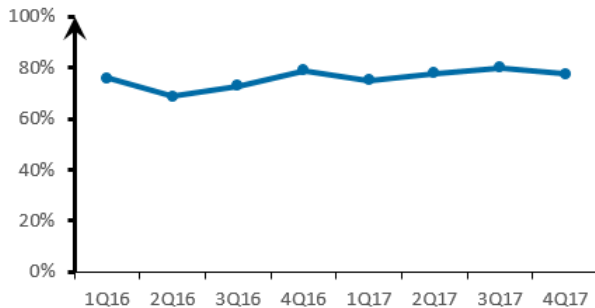
Source: Press Ganey

Figure 10.4-3: Overall Rating of Hospital—Specialty Care
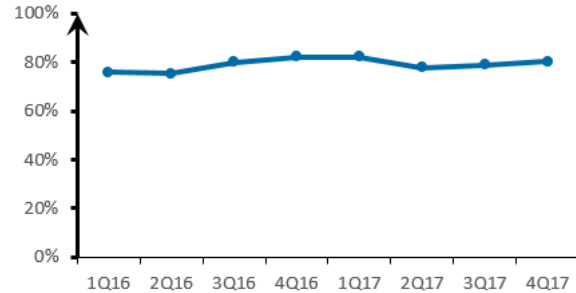
Source: Press Ganey

Figure 10.4-2: Overall Rating of Hospital—Primary Care
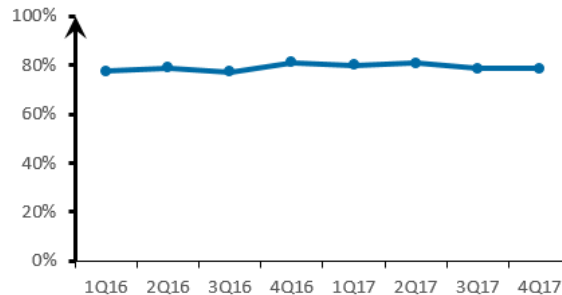
Source: Press Ganey

DHHA utilizes monthly priority reports generated from Press Ganey survey responses, which are specific to each unit, clinic, or area to determine the highest levels of dissatisfaction. The reports allow DHHA to directly address the issues that have the highest correlation to the overall provider or hospital rating in an effort to improve service and resolve dissatisfaction at all levels.

Additionally, DHHA hosts community forums, Town Hall meetings, focus groups, Patient Family Advisory Council (PFAC) meetings, as well as employee and physician engagement surveys to determine satisfaction and engagement by customer type and segment, and to ensure that initiatives meet the needs of stakeholders.

Furthermore, DHHA is currently conducting ground-breaking published research into patient experience based on clinical and social determinants of health that is not only advancing our knowledge in this area but also directly benefiting patients by integrating these findings into our improvement work and operations.

11. INFECTION PREVENTION

The mission of the Denver Health Infection Prevention and Antibiotic Stewardship programs is to support our staff in providing the highest quality and safest health care by:

- Reducing the risk of acquiring and transmitting infections in both the inpatient and outpatient settings.
- Ensuring the optimal antibiotic choice, dose, and duration of therapy for each patient to maximize the opportunity for a good clinical outcome and prevent antibiotic resistance, *Clostridium difficile* infection, and other adverse events.
- Decreasing infection-related costs.
- Engaging in research aimed at furthering knowledge of preventing healthcare-associated infections (HAI) and the optimal use of antibiotics.
- Providing leadership in community and national infection prevention and stewardship initiatives.
- Ensuring appropriate infection prevention and treatment for underserved populations such as those with opiate addiction.

The following summarizes the status of goals and achievements that were initiated as part of the 2017 program at Denver Health.

11.1. Hand Hygiene Adherence

Manual hand hygiene observations
Denver Health utilizes the World Health Organization's (WHO) 5 Moments of Hand Hygiene methodology to determine the facility's hand hygiene (HH) adherence rate. Denver Health monitors HH through both manual (inpatient and outpatient settings) and electronic (inpatient, B pavilion) observations. Manual observations are collected by IP, inpatient managers, and hospital leadership. The data were used to determine the monthly and quarterly HH rates. The organizational goal for hand hygiene in 2017 was 85% (Figure 11.1).

11.1: Inpatient Hand Hygiene Rates
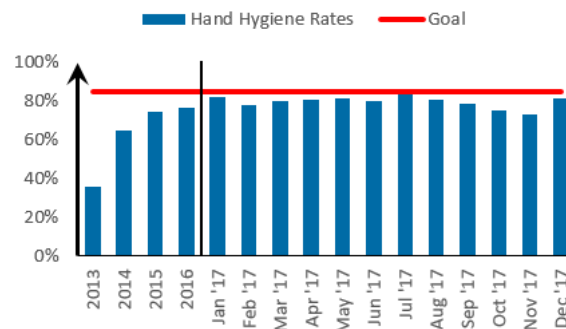
Electronic hand hygiene observations:
Electronic HH (eHH) is collected in the B pavilion (units 3B, 4B, PCU, and MICU). Data regarding individual eHH performance is provided to physicians and advanced practice providers via weekly emails. Nurses and healthcare partners receive feedback from both peer champions and nurse managers.

Besides absolute improvements in hand hygiene adherence, DHHA had a number of other accomplishments in 2017 including:
- Initiating a dispenser change throughout the institution.
- Continual focus on education.

Outpatient hand hygiene surveillance:
As most of the IP staff is based at the main hospital, IP staff is limited in their ability to perform a meaningful number of HH observations at the outpatient clinics. As a result, we rely upon trained HH champions at the various clinics to report HH rates. Each HH champion is trained in the 5 Moments of Hand Hygiene and provided access to the smart phone applications to report observations.

Challenges with outpatient hand hygiene surveillance:

Despite the intensive training, the HH observation received from HH champions were suspiciously high. Therefore a different approach was implemented. In January 2017, we trained RN and Medical Assistant students to collect HH observations during their rotations. They were trained to collect 30 observations in a two week period and submit the data to the ACS Project Coordinator. This approach was unsuccessful as students felt overwhelmed and uncomfortable with the task.

- **2018 Goals: Improve hand hygiene adherence.**
    ◊ The organizational goal for hand hygiene in 2018 will be set at 85%. Our efforts will include the following strategies:
    ◊ Continue dispenser change system wide in 2018 to align with electronic HH monitoring capabilities.
    ◊ Introduce electronic HH system to additional units. Evaluate changes to system rules for semi-private rooms if funding permits.
    ◊ Continue HH champion program monthly data collection.
    ◊ Continue leadership data collection and real time coaching with staff.
    ◊ Continue to focus education using new employee orientation, new physician education, nursing orientation and annual required competency training.
    ◊ Improve quality of outpatient HH observations by employing Float Team members to collect observations.
    ◊ Evaluate compliance data of soap and water vs waterless for *C. difficile* patients.
    ◊ The ACS Float Team which consists of RNs, MAs and Registration Clerks will be trained in collecting HH observations. Each Float Team employee will be given 4 hours each month to do HH observations in all of the ACS clinics.

11.2. Epic Infection Control (ICON) Module Validation

In April 2016, DHHA transitioned to the Epic electronic medical record and became one of the first hospitals to use the 2014 Infection Control module (ICON). In 2017, the IP team validated and improved the following reports:
- Appropriate surgical procedures (denominator) for publicly-reported and internally-monitored surgeries
- Possible surgical site infections (numerator) for publicly-reported and internally-monitored surgeries.
- Central line-associated bloodstream infection (CLABSI) (numerator).
- Catheter-associated urinary tract infections (CAUTI) (numerator).
- *Clostridium difficile.*
- Multidrug resistant organisms with notification to inpatient floors.
- Publicly-reported conditions (e.g. gonorrhea, chlamydia, syphilis, pertussis, influenza).

In 2017, validation of the denominator data for both central lines and urinary catheters was completed. The Epic electronic medical record system ties into many, if not all, of the surveillance activities.

11.3. Device-Related Infections

In 2016 and 2017, Denver Health publicized the Target Zero initiative, and Target Zero will continue as a major institutional focus in 2018. In 2018, an additional Target Zero indicator, venous thromboembolism (VTE), will be added to the initiative. As an institution, DHHA's goal is to decrease our Target Zero count by at least 10% annually. We are pleased to report that we decreased Target Zero events by nearly 30% in the past year, from 242 total events in 2016 to 141 total events in 2017. The Target Zero initiative is enormously helpful in engaging the frontline staff in HAI prevention. In summary, unit-level, and individual-level data are posted on our Target Zero website which is available to all staff members.

Central venous catheters, endotracheal tubes, and urinary catheters increase a patient's risk for Healthcare Associated Infections (HAI). Denver Health tracks its device-related infections through the CDC's National Healthcare Surveillance Network (NHSN). The Standardized Infection Ration (SIR), a metric generated within NHSN, is used to compare Denver Health to other like units at comparable facilities. It uses important risk factors in historical data to calculate the expected number of infections given a patient population's risk factors for a specific infection event, and subsequently compares this number statistically with the actual number of infections observed. Risk factors that used to calculate the expected number of infections for CLABSI and CAUTI include location within the hospital, facility type, affiliation with an accredited medical school, and number of beds.

Below are listed specific interventions to decrease device-related infections that were undertaken in 2017.

Central Line-Associated Bloodstream Infections (CLABSI)

Hospital-wide surveillance for CLABSI began in 2010. Denver Health CLABSI rates over the last 5 years are shown in Figure 11.3-1.

Figure 11.3-1: CLABSI per 1000 Central Line Days

	2013	2014	2015	2016	2017	2017 SIR
MICU	0.9	0.6	1.4	1.4	1.1	0.9
SICU	0.3	1.9	4.5	3.1	2.7	1.8
PCU	0.8	0.9	4.9	0	0	-
PICU	0	0	0	0	0	-
NICU	2.4	1.8	5.6	3.4	0	-
Med/Surg	1.9	1	1	0.9	0.6	0.6

In 2017, a Vascular Access Committee was formed with a "shared governance" structure to oversee the dissemination of new products and practices throughout the hospital. For example, taking lessons learned in the 2015 NICU CLABSI reduction and spread it to other units.

Interventions:
- Regular audits were conducted for adherence to best practice central line care and to the TPN Guideline.
- Bedside audits on central line maintenance practices are performed on a biweekly basis.
- Real-time CLABSI notifications were provided to nurse managers and physicians as well as the monthly line listing to each unit.
- Universal decolonization was continued in the critical care units (including chlorhexidine bathing and mupirocin nasal ointment) and chlorhexidine bed baths for patients on acute care floors.
- Avoidance of unnecessary central lines.

For all units, DHHA's central line utilization was significantly lower than NHSN benchmarks in 2017 based on the NHSN's standardized utilization ratio (SUR). The SUR is a ratio of observed to expected device days, calculated based on 2015 NHSN national benchmark data. Findings are described in Figure 11.3-2.

Figure 11.3-2: Central Venous Catheter Utilization*

	2013	2014	2015	2016	2017	2017 SUR
MICU	52%	53%	43%	49%	31%	0.59†
SICU	54%	37%	39%	31%	29%	0.51†
PCU	32%	29%	34%	20%	18%	0.89†
PICU	17%	14%	12%	9%	10%	0.27†
NICU	22%	22%	28%	19%	14%	0.75†
Med/Surg	13%	11%	11%	11%	9%	0.47†

*Device days / patient days
†Significantly different compared to 2015 NHSN benchmark data

Ventilator Associated Pneumonia (VAP)
VAP rates in the MICU, SICU, and PCU have historically been monitored and benchmarked against national mean rates for comparable units using NHSN. In the MICU and SICU, VAP rates have remained low overall from 2014-2017, decreasing in 2014 and 2015 with some increase in 2016 and 2017. The PCU did not have any NHSN-defined VAP in 2017 (Figure 11.3-3).

Figure 11.3-3: VAP per 1000 ventilator Days

	2013	2014	2015	2016	2017
MICU	0.3	0.0	0.0	1.0	0.7
SICU	4.4	1.2	0.3	1.2	2.0
PCU	1.3	2.8	0.0	0.0	0.0

In 2017, NHSN implemented standardized infection ratios (SIR) for ventilator associated events (VAE), wherein each case is risk-adjusted based on 2015 data using the following indicators: unit location type, facility type, affiliation with an accredited medical school, and number of hospital beds.

The NHSN SIR for VAE was investigated as a benchmarking tool in 2017, but since PVAP events cannot be risk adjusted separately from IVAC events, NHSN's benchmarking is sub-optimally aligned with our institutional surveillance schema. We continue to

evaluate using Trauma Quality Improvement Program (TQIP) benchmarking. TQIP uses NHSN definitions for case determination, but calculates a quarterly rolling benchmark rather than a static benchmark like NHSN.

Since the change in NHSN definitions for VAP, rates have decreased substantially and continue to remain low relative compared to those observed with the old definitions.

Interventions:
- Minimize duration of ventilation
- Daily assessment of readiness to wean
- Daily interruption of sedation
- Elevate head of bed
- Regular oral care
- Continuous aspiration of subglottic secretions
- Spontaneous breathing screening

Catheter-Related Urinary Tract Infections (CAUTI)
Hospital-wide surveillance for CAUTI began in 2013. Although this is a low morbidity/mortality infection, it is a priority for IP because CAUTI a) can be caused by antibiotic-resistant pathogens, b) is not reimbursed by CMS, and c) is an indicator of nursing quality. In 2015, NHSN made significant changes to the CAUTI definition which decreased the number of CAUTI reported to NHSN. NHSN no longer publishes benchmark pooled means and percentiles, focusing instead on risk-adjustment through the standardized infection ratio (SIR). In 2017, NHSN updated the benchmark data used for risk-adjustment to 2015 data. Overall the new benchmark data has had the effect of decreasing the number of expected infections for both CAUTI and CLABSI. Denver Health CAUTI rates over the last 5 years is shown below (Figures 11.3-4 and 11.3-5).

Figure 11.3-4: CAUTI per 1000 catheter days

	2013	2014	2015	2016	2017	2017 SIR
MICU	1.6	2.7	1.2	1.5	0.9	0.7
SICU	2.7	4.4	3.3	2.6	1.8	0.8
PCU	3.2	5.5	4.3	3.5	3.5	2.4
PICU	5.9	19.0	10.6	0.0	10.3	-
Rehab	7.7	15.6	4.8	7.3	0.0	-
Med/Surg	4.3	3.8	2.5	2.1	1.2	1.1

Figure 11.3-5: Urinary Catheter Utilization*

	2013	2014	2015	2016	2017	2017 SUR
MICU	77%	71%	67%	67%	56%	0.96†
SICU	80%	77%	75%	67%	59%	1.02
PCU	50%	43%	39%	32%	25%	1.08†
PICU	15%	10%	11%	9%	15%	0.87†
REHAB	15%	13%	18%	19%	15%	1.96†
MED/SURG	14%	11%	9%	7%	7%	0.45†

* device days / patient days
† significantly different compared to 2015 NHSN benchmark data.

In 2017, IP staff updated the CAUTI and CLABSI education modules. All staff that performs central line insertions, intubations, ventilator care, and catheter care were assigned these updated modules.

The nursing staff designated CAUTI reduction as a major goal in 2016 and 2017, and they will continue this in 2018. To this effect, the nurse educators along with IP staff perform weekly rounds to audit urinary catheter maintenance care. Additionally, Nursing Informatics developed a standard place for nurses to document urinary catheter care and maintenance.

- **Interventions:**
  ◊ Bundled order for urinary catheters that includes insertion, maintenance, and removal when the "indication for insertion" is resolved.
  ◊ In 2017, IP staff partnered with ICU leadership to conduct a Buddy System trial for Foley catheter insertions. The goal of the trial was to reduce CAUTIs occurring within 5 days of insertion. While one RN inserted the catheter, a second RN observed the procedure ensuring that there were no breaks in sterile technique. During the trial period there were no CAUTIs occurring under 5 days after insertion.

- **2018 Goals: Decrease the Rate of Device-Related Infections**
  ◊ Central venous catheters, endotracheal tubes, and urinary catheters pose increased risk for HAI. The following interventions will be continued or implemented to decrease risk for infection from these devices in 2018:
    • Provide monthly line listings of CAUTI, CLABSI, and VAP to both unit leadership and attending physicians.
    • Promote awareness of Target Zero initiative and website.

- Participation in the HIIN collaborative with submission of monthly data on process measures to decrease CLABSI, CAUTI, SSI, and VAP.
- Quarterly collaboration with TQIP coordinator to ensure that our data is adequately aligned.

◊ CAUTI
- Optimize the Epic bundled urinary catheter order set for both nurses and providers.
- Validate and track urinary catheter audits via Epic nursing documentation.
- Implement the Buddy System for Foley insertions in all critical care units and acute care units.
- Reduction of Foley Catheter insertion in the ED.
- Provide more easily accessible education on Foley insertion for acute care nurses.
- Increase rounding to weekly to evaluate Foley maintenance.

◊ CLABSI
- Update chlorhexidine bathing protocols in both critical care and acute care patient areas.
- Increase frequency of central line rounds and TPN audits to three times a week for prevention elements. Support the Vascular Access Committee in evidence-based evaluations of new products.

11.4. Surgical Site Infection (SSI) Rates

DHHA performs SSI surveillance for 17 procedures including two nationally-reported procedures, five state-reported procedures, and ten additional procedures that we deem to be high impact to our patient population. SSI rates over the last five years and benchmarking based on the Standardized Infection Ratio (observed/expected infection rate based on individual patient risk) are shown in the table below (Figure 11.4-1).

Because of our vertically integrated system, DHHA has the advantage of doing thorough post-discharge infection surveillance that most hospitals are unable to do. The ability to do thorough surveillance may make rates appear higher than other hospitals reporting to NHSN.

Colon SSI Prevention Bundle
In 2015, a multidisciplinary group was formed to focus on Colon SSI reduction. The team consisted of OR technicians and nurses as well as general surgeons and infection preventionists. A colon bundle was created which consisted of pre-, intra-and post-operative interventions. Since the introduction of the colon bundle, we have observed a reduction in colon SSI throughout 2016

Figure 11.4-1: SSI per 100 Operations

	2013	2014	2015	2016	2017	2017 SIR
Knee Arthroplasty	0.0	0.6	0.0	0.6	1.0	-
Hip Arthroplasty	2.0	2.0	5.3	2.8	3.3	2.6
Abdominal Hysterectomies	1.4	4.8	3.9	1.2	4.8	1.9
Vaginal Hysterectomies	1.4	2.9	0.0	3.0	1.2	-
Craniotomies	4.1	2.5	0.9	3.9	4.1	2.4
Spinal Fusions	4.2	1.4	1.2	1.3	0.6	0.3
C-sections	0.3	0.9	0.0	1.7	2.0	2.0†
Herniorrhaphy	1.2	1.8	1.6	1.6	1.9	3.1†
Colon Surgeries	14.5	9.8	11.0	11.0	6.2	0.9
Breast Surgeries	1.8	0.8	1.7	2.2	1.0	1.8
Prostate and Nephrectomy Surgeries∞	0.0	6.8	7.1	1.9	0.0	-
Open reduction of fracture	2.6	2.3	2.2	1.8	1.4	1.1
Vascular surgery‡	-	4.8	4.8	2.0	0.8	0.6

†significant SIR
∞Nephrectomy procedures added January 2014.
‡Vascular surgery SSI surveillance began January 2014. Procedures under surveillance include abdominal aortic aneurysm, AV shunt for dialysis, carotid endarterectomy, and peripheral vascular bypass.

and 2017, and anticipate that this will continue into 2018 (Figure 11.4-2). In 2016 and 2017, we worked closely with the pre-operative, operative, and post-operative teams to further develop and implement all elements of the colon bundle.

Figure 11.4-2: Colon Surgery Infections per 100 Procedures
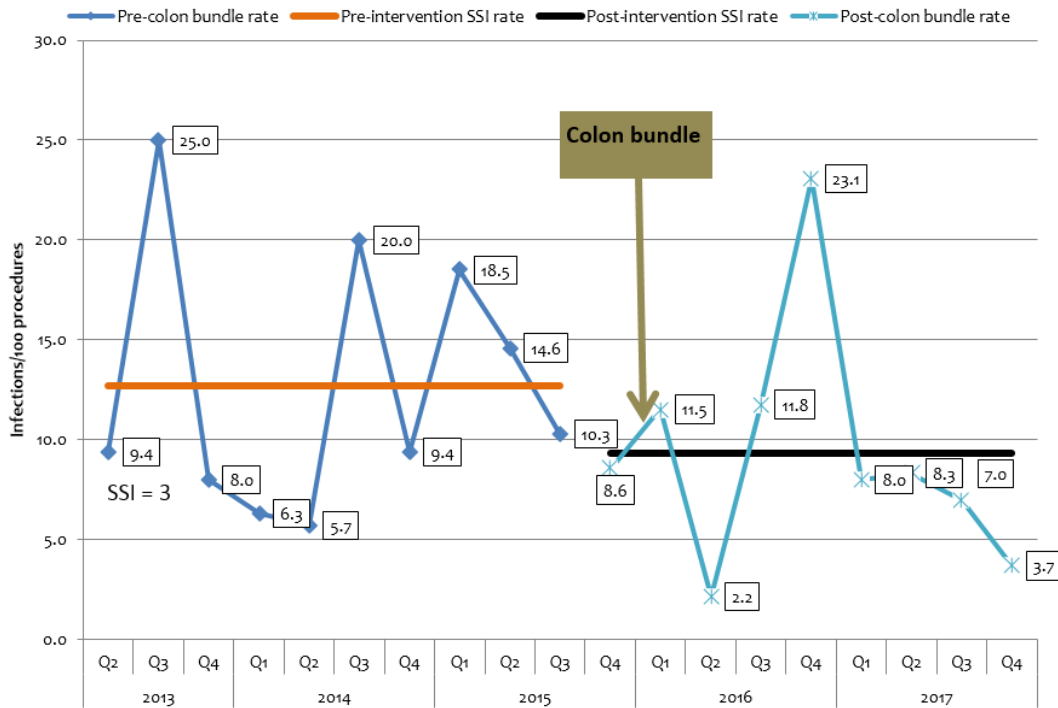
Perioperative skin preparation

We evaluated the quality of perioperative skin preparation in 2017. It was found that adherence to both the AORN and manufacturer recommendations could use significant improvements (Figure 11.4-3). In-service sessions by the skin preparation manufacturers were undertaken with the staff. A post-education evaluation of skin preparation revealed significant improvements.

Figure 11.4-3: Improvements in Perioperative Skin Preparation, 2017
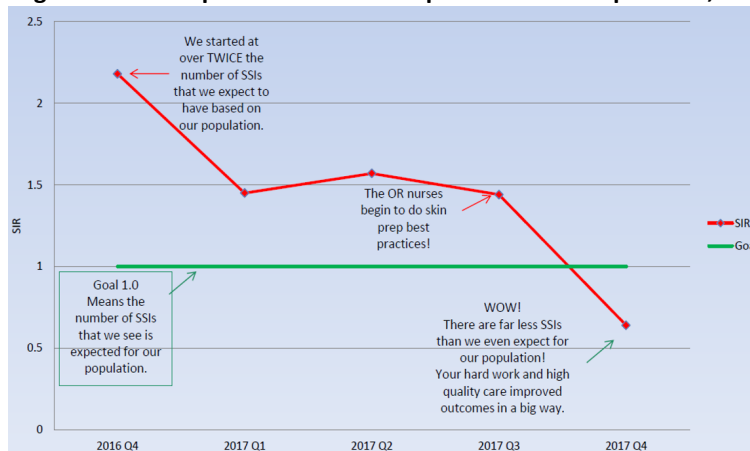
Surgeon-specific reports

The IP Department generates a surgeon-specific report to submit for their Ongoing Physician Performance Evaluations (OPPE) biannually. This report continues and has been in place to fulfill a JC requirement as well as provide important feedback to surgeons about their infection data.

- In 2017, other procedure-specific interventions were performed including:
  ◊ Notified OR leadership of SSI each month.

- ◊ Updated the annual SSI training module for all staff that care for surgical patients
- ◊ Updated the pre-operative antibiotic policy and loaded onto antimicrobial stewardship smartphone app for providers to use.

- ■ **2018 Goals: Decrease surgical site infection (SSI) rates.**
  - ◊ The following surgeries will be targeted for SSI surveillance in 2018:
    - Prosthetic knee and hip replacements
    - Abdominal and vaginal hysterectomies
    - Craniotomies
    - Spinal fusions
    - Herniorrhaphy
    - Colon resection
    - Breast surgeries
    - Prostate surgeries
    - Open reductions and fixations
    - Vascular surgeries
    - Nephrectomy
    - C-sections
  - ◊ Continue to report SSI rates after arthroplasty, abdominal hysterectomies, breast surgeries and colon surgeries to the state of Colorado.
  - ◊ Continue to provide SSI reports to individual surgeons to submit for their Ongoing Physician Performance Evaluations (OPPE). This will fulfill a JC requirement as well as provide important feedback to surgeons about their infection data.
  - ◊ Continue to send monthly line listings of SSI to the OR leadership and attending surgeon.
  - ◊ Work with the preoperative, operative, and postoperative teams to implement all elements of the colon bundle.
  - ◊ Assist with the implementation of an OB/GYN bundle to prevent SSI.
  - ◊ Implement instrument tracking via SPM in the outpatient setting.
  - ◊ We will evaluate the quality of perioperative skin preparation with Chloraprep, Hibiclens, and povidone-iodine preparations.
  - ◊ Monitor perioperative antibiotic adherence to guidelines.
  - ◊ Add surveillance for SSI after prostate biopsy as an ambulatory surgery quality metric.
  - ◊ Participation in the HIIN collaborative with submission of monthly data on process measures to decrease SSI.
  - ◊ Greater collaboration with TQIP coordinator to ensure that our data is adequately aligned.

11.5. Multi-Drug Resistant Organisms (MDRO)

Our goal is to minimize hospital-associated spread of MDROs and other organisms identified as significant at DHHA. Daily surveillance of MDROs and organisms of significance in 2017 included in Figure 11.5-1.

Methicillin-resistant *Staphylococcus aureus* (MRSA)
Active surveillance screening was discontinued in both the MICU and SICU during 2014 as universal decolonization and CHG bed bathing was implemented and continued to be the standard of care in 2015. With Epic roll-out, charts that had been identified with an "XX" to allow identification of colonized patients on readmission or in the clinic setting now have 'MRSA' infection added to their chart which persists for each inpatient and outpatient encounter until resolved by an IP staff member. Patients who are identified as having Vancomycin-resistant Staphylococcus aureus (VISA/VRSA) will also be flagged accordingly. Routine monitoring continues to show that the healthcare-associated transmission remains low relative to

Figure 11.5-1: Rates of MDRO at DHHA

	2013	2014	2015	2016	2017
Acinetobacter baumannii	0.09	0.07	0.10	0.06	0.13
Aspergillus	0.03	0.03	0.02	0.02	0.08
Hospital-acquired *Clostridium difficile*	0.44	0.54	0.85	0.75	0.54
Extended spectrum beta lactamases (ESBLs)	0.15	0.08	0.11	0.37	0.41
Hospital-acquired Methicillin-resistant *Staphylococcus aureus* (MRSA)	0.15	0.27	0.26	0.28	0.23
Carbapenem-resistant *Pseudomonas aeruginosa*	0.04	0.06	0.04	0.10	0.10
Vancomycin-resistant enterococci (VRE)	0.35	0.25	0.15	0.13	0.16
Carbapenem-resistant *Enterobacteriaceae* (CRE)- previously KPC	0.01	0.00	0.01	0.03	0.00
Hospitalized Influenza*	1.06	0.95	0.50	1.07	1.69

* Per 1000 patient days (includes community-onset and hospital-onset cases

colonization/infection burden even in the absence of admission screening (Figure 11.5-2).

Figure 11.5-2: Hospital Acquired MRSA Infections
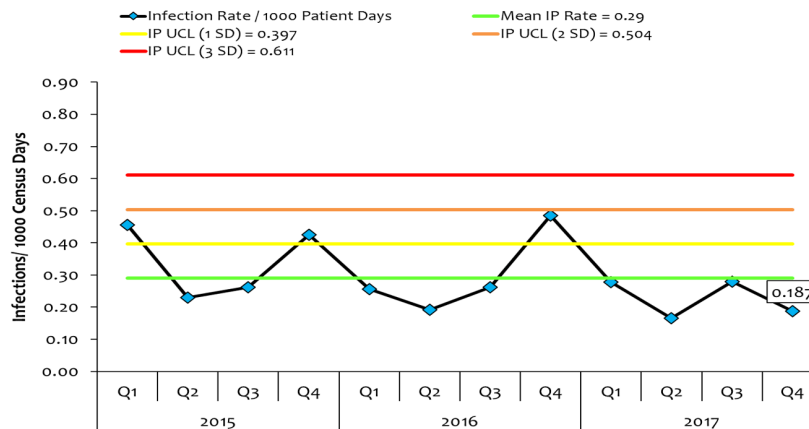
Vancomycin-resistant enterococci (VRE)

Rates of VRE have demonstrated a clear downward trend over the past 3 years, and remained at or below the historical average during most of 2017 (Figure 11.5-3). Each case was reviewed in detail and any potential clusters evaluated. Monthly VRE rectal screens were conducted in SICU, MICU in 2017. Patients identified as positive are then isolated and a 'VRE' flag is automatically electronically added to their chart in Epic, replacing the previous system of flagging patients with a "VV." The antibiotic stewardship program continues to be closely involved in the VRE reviews and discussions.

Figure 11.5-3: Vancomycin Resistant Enterococcus
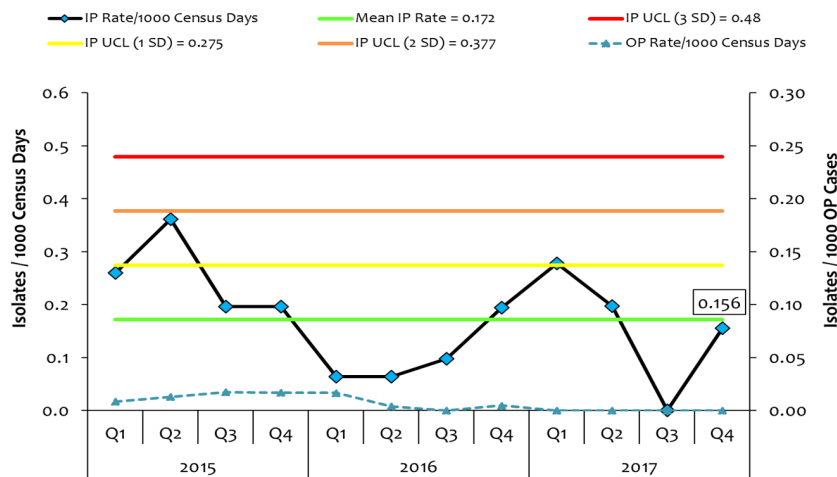
Clostridium difficile

Rates of community-acquired *C. difficile* have increased steadily over the past few years while hospital-acquired *C. difficile* decreased between 2015 to 2017 (Figure 11.5-4). *C. difficile* was a major institutional focus in 2017. DHHA initiated probiotic administration for inpatients on broad spectrum antibiotics in 2017. DHHA also contracted with OpenBiome to provide fecal transplants to patients with recurrent *C. difficile* colitis. Additionally, Environmental Services (EVS) substituted Perisept (peracetic acid) as the default cleaning product in the hospital. Previously, we had been cleaning with Virex for most rooms and bleach for known patients with *C. difficile* colitis.

Perisept has activity against *C. difficile* spores and is less caustic to hospital equipment and staff members. IP assisted EVS with the purchasing of two additional UV light devices. By the 4th quarter of 2017, approximately >90% of inpatient and ED rooms previously occupied by patients with *C. difficile* colitis had been treated with UV lights after terminal clean at discharge. ED and urgent care rooms, OR suites, the hemodialysis unit, and the admission-discharge unit are also treated with a UV light (Figure 11.5-5).

Figure 11.5-4: *C. difficile* Inpatient Hospital Acquired and Community Acquired Infection Rate
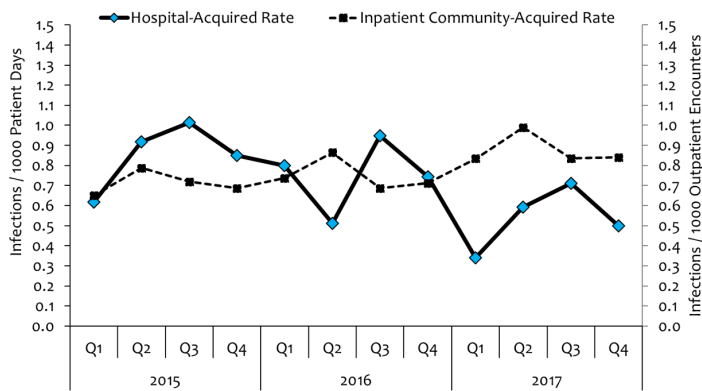
Figure 11.5-5: Proportion of Rooms Previously Occupied by Patients with *Clostridium difficile* Infection that Received UV Disinfection Treatment
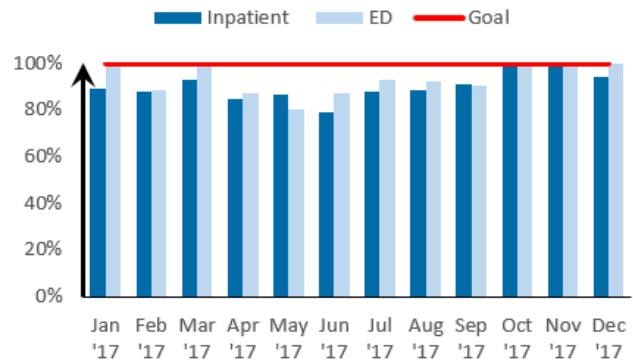
Carbapenem-resistant Enterobacteriaceae (CRE)

Previously noted as KPC and Extended-spectrum beta lactamases (ESBLs). In 2013 an outbreak of CRE in a large teaching hospital in Denver prompted increased surveillance at our institution and monthly surveillance in the critical care units continued in 2017. The increased screening and rapid identification and isolation of these patients have proven to be very effective in controlling cases within our facility. Rates of multi-drug resistant gram-negative organisms such as extended-spectrum beta-lactamase (ESBL)-producing *E. coli* continue to increase in our outpatient population which is consistent with national trends. Rates of imipenem-resistant *P. aeruginosa* infections have progressively declined at DHHA over time and remain low. Aggressive surveillance, isolation, and antibiotic stewardship have kept these organisms from becoming endemic at DHHA.

Electronic monitoring of significant labs is performed to minimize paper waste, improve efficiency, and minimize data entry burden for staff. We review these data daily, weekly, and monthly to identify clusters that may indicate an outbreak situation. Surveillance data are reported quarterly to the Infection Prevention committee (Figure 11.5-6).

We maintain a close relationship with the microbiology lab. IP attends microbiology rounds each week during which we discuss any concerning infection patterns, incoming microbiology testing platforms, and interesting clinical cases.

Figure 11.5-6: Culture positive rate for Carbapenem-Resistant Enterobacteriaceae (CRE) Organisms
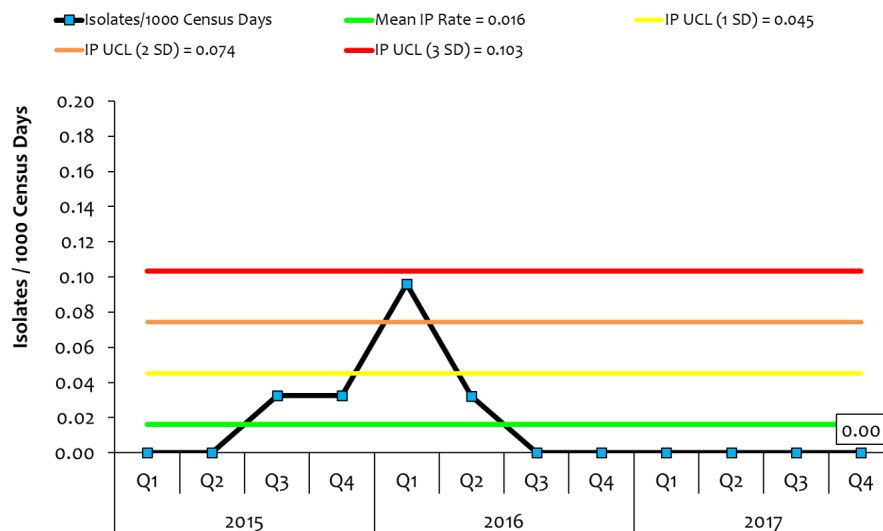
- **2018 Goals:** Decrease healthcare transmission of multi-drug resistant organisms (MDRO)/ensure containment of organisms of significance
  - ◊ Daily surveillance of the following MDROs/organisms of significance will continue in 2017:
    - Aspergillus
    - Multi-drug resistant *Acinetobacter baumannii*
    - Multi-drug resistant *Pseudomonas aeruginosa*
    - Carbapenemase-producing *Enterobacteriaceae* (CRE)
    - Extended spectrum beta lactamases (ESBL)
    - Methicillin-resistant *Staphylococcus aureus* (MRSA)
    - Vancomycin-resistant *Staphylococcus aureus* (VRSA/VISA)
    - Vancomycin-resistant enterococci (VRE)
    - *Clostridium difficile*
    - Influenza virus
  - ◊ Continue to review microbiology reports and communicate with the microbiology laboratory to identify clusters of infection so that we may act as early as possible and prevent further spread.
  - ◊ Decrease healthcare associated cases of *C. difficile*
  - ◊ Environmental cleaning quality assurance via Hygiena ATP technology and UV lights.
  - ◊ Antibiotic stewardship progress on probiotic and fecal transplantation therapies.
  - ◊ Improve identification and testing process for community onset *C. difficile*.
  - ◊ Reduce room movement of patients with *C. difficile*.
  - ◊ Develop a flu syndromic surveillance program within Epic to provide timely surveillance data to inform the status of respiratory illness in the community.
  - ◊ Decrease risk of HAI related to construction and ensure that design of new or remodeled facilities optimizes infection prevention.
  - ◊ Continue to attend meetings starting with predesign and preconstruction.
  - ◊ Attend weekly meeting for all ongoing construction projects.
  - ◊ Conduct routine walk-throughs on all construction areas.
  - ◊ Perform ICRAs prior to the start of any construction; perform in-service for contractors about the infection prevention concerns related to hospital construction.

11.6. Construction-Related Healthcare-Associated Infection

There was a substantial amount of construction in 2017 including planning for the new Outpatient Medical Clinic. Infection Control Risk Assessments (ICRAs) were done prior to the start of any construction and the contractors are in-serviced about the infection prevention concerns related to hospital construction. Environment of Care rounds were made by the Infection Prevention staff routinely.

Rates of *Aspergillus* isolated in clinical cultures also were reviewed by the Infection Prevention Committee (IPC) on a regular basis. There was a slight increase in cases during 4th quarter 2017 (Figure 11.6-1). All cases were reviewed and were determined to be community onset cases and no links to hospital admissions or active construction in the facility.

**Figure 11.6-1: Culture Positive Rate for Aspergillus**
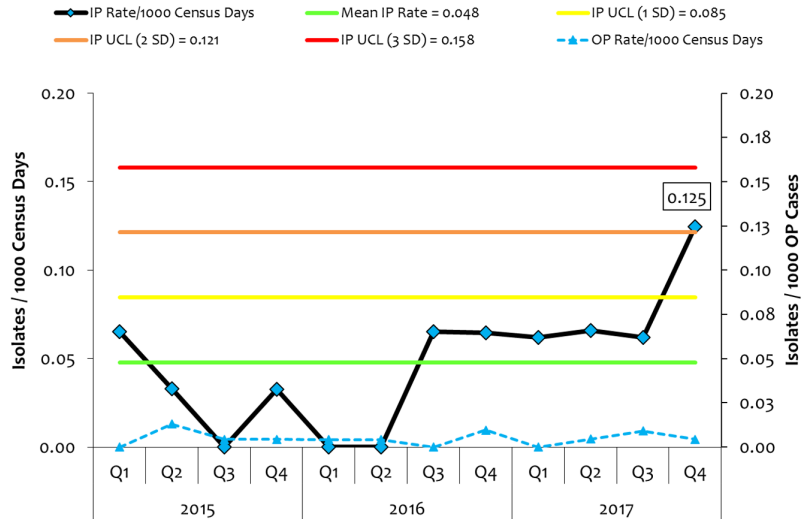
11.7. Collaboration with Center for Occupational Safety & Health (COSH)

Infection Prevention works closely with COSH to decrease occupational infection related hazards through the following processes:
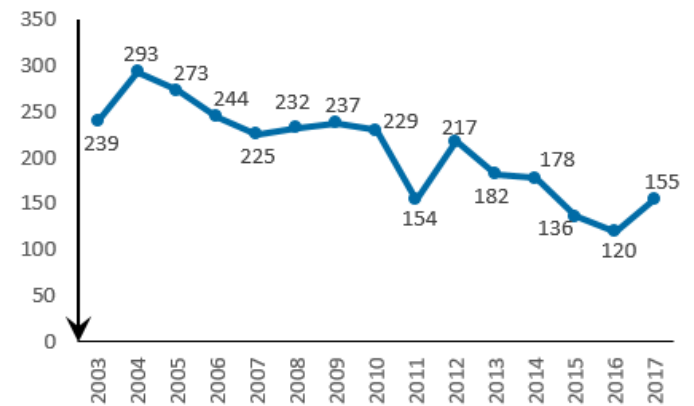
- Universal employee influenza vaccination
- New employee orientation
- Annual competency training on blood borne pathogen exposures
- Consultation with COSH providers regarding employee exposures to potentially infectious pathogens
- Development of protocols for the OUCH line
- Representation on Products Committee to identify devices to minimize employee exposures
- Guidance for employees to return to work after a potentially infectious condition

COSH collects exposure details regarding each exposure event. The details collected allow better direction of the education opportunities. These data are presented at the Infection Prevention Committee meetings. During these discussions, input from experts and front line staff are gathered on how to formalize interventions and better prevent these exposures in the future. Below are a few of the data available from COSH (Figures 11.7-1 and 11.7-2).

Figure 11.7-1: Number of Exposures
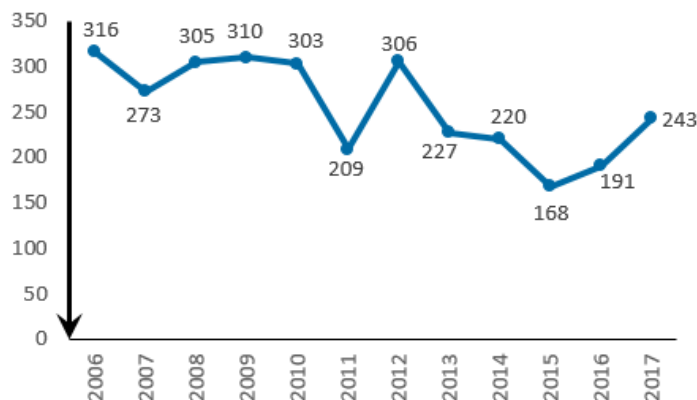
Figure 11.7-2: Number of Blood borne Pathogen Expo-

Influenza Vaccination

DHHA has mandated employee influenza vaccination since the 2011-2012 influenza season. The rationale for implementing such a policy reflects our appreciation that influenza is a serious illness that results in significant patient mortality each year. In addition, up to 25% of Healthcare workers (HCWs) contract influenza each season. We also appreciate that influenza seasons correlate with

staffing shortages, as evidenced by an increase in sick calls at DHHA correlating with influenza peak activity during the past five flu seasons. Healthcare workers might work while ill and/or might have minimal symptoms but be able to transmit virus to patients or co-workers. It is also clear that the vaccine is most effective in younger, healthier people, such as our employee population. Finally, there are data showing:

- Decreased mortality in patients (LTCF).
- Decreased influenza among vaccinated HCWs.
- Decreased nosocomial influenza among hospitalized patients.
- ~ 50% fewer sick days in workers who receive influenza vaccine.

DHHA has successfully implemented, and continues to refine, an electronic tracking system that allow managers to track real time the status of their employee as well as the IP team to track and report data as needed. The developed tracking system, HANDI, has been recognized by the CDC as a superior tool for mass vaccination clinics and the development team has received national awards.

IP and COSH have successfully partnered with the other academic teaching facilities in the Denver area to assure all residents and faculty have been vaccinated. **Ultimately, DHHA has vaccinated >98% of all employees/contractors against seasonal influenza since the implementation of this policy (Figure 11.7-3).** There is a ~2% exemption rate for those medical contraindications or religious waivers each year.

Figure 11.7-3: Influenza Vaccination Rate Among Targeted Employees
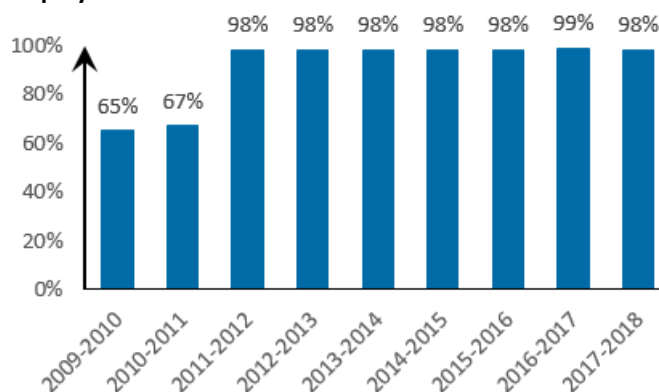
*The 2017-2018 season is not finalized until 3/31/16 per CDPHE Reporting Requirements

- **2018 Goals: Collaboration with Center for Occupational Safety & Health (COSH) to decrease occupational infection related hazards.**
  - ◊ Infection Prevention will continue to work closely with COSH in 2017 to decrease occupational infection related hazards through the following processes:
    - Review employee exposure data at Infection Prevention meetings at least semi-annually.
    - Education at new employee orientation and annual competency training about reporting of exposures ongoing.
    - Refine the blood borne pathogen exposure testing protocol.
    - Collaboration and implementation of the universal influenza vaccination program.

11.8. Collaboration with Environmental Services (EVS)

Infection Prevention continues to work closely with the Environmental Services (EVS) program to focus on environmental cleaning protocols. In 2017, our accomplishments included:

- Expanded use of Hygiena surface monitoring. Prior to 2017, IP performed swabs on five high touch surfaces in rooms after cleaning and provided feedback to the cleaning staff on which surfaces were cleaned optimally and sub-optimally. In 2017, this responsibility was transitioned to EVS managers.
- Expanded use of ultraviolet machines. We purchased two additional ultraviolet machines in 2016 and trained EVS management in their use. They are currently being used after terminal clean of a room in which a patient with *C. difficile* resided.

Additionally, the ultraviolet light machines are used weekly in each operating room, emergency department room, adult urgent care room, and in the admission-discharge and hemodialysis units.

- Improved communication between EVS and clinical leadership. While we piloted monthly meetings dedicated to improving communication between EVS and nursing management, we found that these were poorly attended. Therefore, we dedicated time during monthly Infection Prevention Committee meetings for EVS to provide data regarding their use of ultraviolet lights and cleaning products. Because Infection Prevention Committee meetings have clinical representation from a variety of settings, we have found that this meeting is an ideal forum for these data to be presented.
- Evaluated cleaning processes in the Operating Room (OR). IP staff closely evaluated all the processes utilized in the OR for case turnovers and terminal cleans. We observed numerous staff while cleaning rooms and evaluated the use of products and the process. We swabbed numerous surfaces for ATP using the Hygiena ATP technology. After a thorough evaluation, we determined there were many areas of opportunity for improvement. We supplied EVS and OR staff with numerous recommendations that included process changes, education and regular evaluation.

- **2018 Goals: EVS**
  - ◊ Infection Prevention will continue to work closely with environmental services program in 2018. Some of the initiatives shall include:
    - Transitioning the ATP swabs from infection prevention staff to EVS management. EVS management will be providing this information to staff members in real time to improve the quality of our terminal cleans.
    - Increase the use of ultraviolet lights in rooms in which a patient with *C. difficile* has resided.
    - Consistently use the ultraviolet on a weekly basis in the operating rooms, emergency department, adult urgent care, admission-discharge unit, and hemodialysis units.
    - Develop a daily and weekly deep cleaning protocol for the operating room based upon AORN standards.

11.9. Ebola and Other High Risk Pathogen Preparedness

The 2014-2015 Ebola epidemic in West Africa was the largest in history with over 28,600 cases and over 11,300 deaths. With the first imported case into the US, our Ebola preparedness activities were put into place, and we quickly completed a comprehensive plan to safely care for Ebola patients at DHHA. Our Ebola plan and preparedness work was validated by CDPHE as well as the CDC, and National Ebola Training and Education Center (NETEC). In 2015, DHHA was recognized by the CDC to be the Department of Health & Human Services (HHS) Region 8 Ebola & Special Pathogens Regional Treatment Center. DHHA was awarded $3 million dollars to continue to enhance our Ebola and other high risk pathogen program over the next five years (2015 – 2020). In 2017, infection prevention had several achievements including:

- Completing and exceeding all grant deliverables by stated deadlines. DHHA met and exceeded the exercise deliverables required to maintain the RESPTC designation including perform quarterly hospital, state, regional, and federal exercises. We participated in an annual NETEC site visit to evaluate our capability to care for patients with high risk pathogens. Additionally, we continually acquire and inventory supplies for trainings, exercises, and potential treatment needs.
- Conducting quarterly staff personal protective equipment (PPE) practice, drills, and simulation training. We continue to train and track staff competence in donning and doffing high level PPE.
- Supporting training and education opportunities for high risk infection team (HITeam) members. HITeam members attended national and federal educational and training opportunities hosted by NETEC and the Center for Domestic Preparedness (CDP) and the Federal Emergency Management Agency (FEMA). The training and educational classes provided hands-on experience for members to learn, apply, and share the best practices for high risk pathogens in the country at our facility.

- **2018 Goals: Ebola and High Risk Infection Preparation.**
  - ◊ Infection Prevention will continue to work to lead the preparation work to safely transport and care for patients with Ebola or other high-risk pathogens in 2018. Some of the activities will include:
    - Meet all grant deliverables for the grant year ending in 2018 as defined in collaboration with the Colorado Department of Public Health and Environment (CDPHE). The deliverables include, but are not limited to, annual updates of the hospital-wide Ebola Emergency Operations Plan, outlining improvement plans, and ensuring supplies and training are supportive of the needs of Denver Health's role as a Regional Ebola & Special Pathogens Treatment Center (RESPTC) for the Department of Health and Human Services (HHS) Region 8.
    - Conduct and participate in hospital, state, regional, and federal exercises in conjunction with federal partners to assess logistical capabilities and communication capacities across the RESPTCs.

- Expand beyond the Ebola Emergency Operations Plan to develop plans specifically addressing and preparing for other high risk infectious diseases. Efforts will be focused on developing a 10-bed respiratory plan in conjunction with the Emergency Preparedness Coordinator.
- Optimize Epic to better facilitate and support the High Risk Infection (HITeam) and biocontainment unit (BCU) for suspected and confirmed patients with Ebola or special pathogens.
- Expand and refine the process for asking travel history questions in the screening, admissions, and intake areas at the hospital to reflect real-world infectious disease outbreaks.
- Design, build, and operationalize a simulation center at Denver Health to support training and education of the hospital staff including the HITeam for Ebola and special pathogens.

11.10. Identification of Additional High Risk Areas for HAI

In addition to the goals and achievements above, standardization of high level disinfection and cleaning of shared patient equipment were major goals in 2017.

High level disinfection (HLD)
High level disinfection is performed in 15 of our departments and clinics. On routine audits, it was found that practices were not as precise as the organization would expect. The program was revamped to include major re-education and auditing efforts including:
- Rewriting the policy regarding high level disinfection.
- Establishing detailed instructions for each area.
- Confirming the competency of each staff performing HLD in every area.
- Creating an annual employee competency.
- Developing an audit tool.
- Creating an HLD Council.

Shared medical equipment, low level disinfection
On routine rounds, it was determined that shared medical equipment such as Dynamaps (blood pressure cuff, thermometer, pulse oximeter), language line telephones, ultrasound machines, bladder scanners, EKG machines, phlebotomy carts, and IV poles and pumps were inadequately cleaned between patients. The IP staff performed ATP swabs of these items on select inpatient floors and found that the most opportunity to improve cleanliness was by targeting the Dynamaps and other mobile patient equipment (MPE). With input from the front line staff members, the team developed a cleaning protocol to encompass (1) cleaning between every patient use; and (2) daily deep cleaning. It was implemented on 4 pilot floors, and initial results showed a 70% decrease in ATP levels on these floors on many MPE (Figure 11.10-1).

Figure 11.10-1: Patient Equipment Cleaning Intervention Using ATP
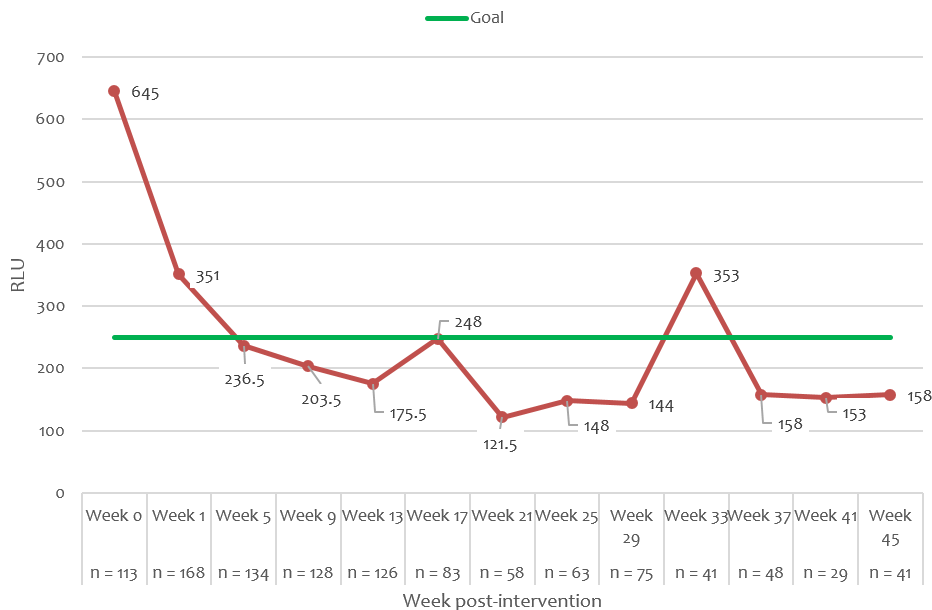
- **2018 Goals: High Level Disinfection.**
  - ◊ In 2018 continued work on standardization of high level disinfection across the organization. Specifically:
    - Develop standard work for all OPA and Trophon high level disinfection in both inpatient and outpatient clinics.
    - Annual competencies for all staff performing high level disinfection.
    - Biweekly audits on all high level disinfection areas for 3 months or longer depending on results.
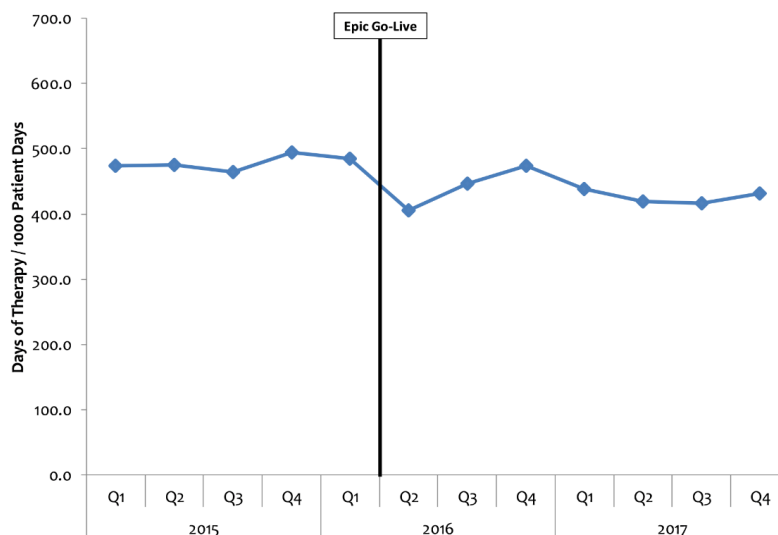   - HLD council.

12. ANTIBIOTIC STEWARDSHIP

In 2017, the AS Program maintained the following interventions and surveillance activities with goals of optimizing antibiotic use for our patients in order to maximize the chance for good clinical outcomes and prevent antibiotic resistance, *Clostridium difficile* infection, and other adverse events.

- Quarterly antibiotic utilization and cost surveillance.
- Development of antibiograms and assessment of antibiotic resistance trends.
- Formulary restriction and pre-authorization (via the Antibiotic Stewardship Pager) for broad-spectrum, toxic, or high-cost antibiotics.
- Daily post-prescription review with real-time prescribing recommendations to providers.
- Development, implementation, and maintenance of Clinical Care Guidelines for common infections.
- Review of new FDA-approved antimicrobials for addition to the Denver Health formulary.
- Expansion and maintenance of the Antibiotic Stewardship smartphone application and the Antibiotic Stewardship subsite on the Pulse.
- Active Antimicrobial Subcommittee of P&T.
- Submission of antibiotic utilization data to the CDC/NHSN Antibiotic Use (AU) module.

The following figures (Figure 12-1 and 12-2) illustrate that over the last 3 years at Denver Health, there have been stable or decreasing trends in total antibiotic use and use of antibiotics with a broad spectrum of gram-positive or gram-negative activity. The black line between quarters 1 and 2 in 2016 represents the implementation of Epic. At this time, there was a change in the antibiotic utilization data collection methodology; therefore, pre- and post-Epic data may not be directly comparable.

Figure 12-1: Total Antibiotic Use

Figure 12-2: Total Resistant Gram-Positive and Broad Gram-Negative Antibiotics
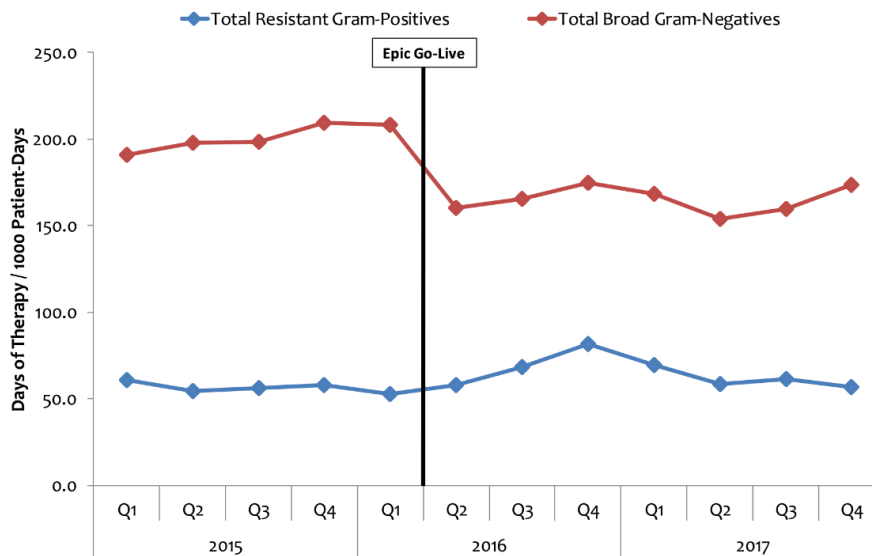
2018 Goals:

In 2018, the AS Program will maintain the following interventions and surveillance activities with goals of optimizing antibiotic use for our patients in order to maximize the chance for good clinical outcomes and prevent antibiotic resistance, *Clostridium difficile* infection, and other adverse events:

- Quarterly antibiotic utilization and cost surveillance.
- Development of antibiograms and assessment of resistance trends.
- Formulary restriction and pre-authorization (via the Antibiotic Stewardship Pager) for broad-spectrum, toxic, or high-cost antibiotics.
- Daily post-prescription review with real-time prescribing recommendations.
- Development, implementation, and maintenance of Clinical Care Guidelines for common infections.
- Review of new FDA-approved antimicrobials for addition to the Denver Health formulary.
- Expansion and maintenance of the Antibiotic Stewardship smartphone application and the Antibiotic Stewardship subsite on the Pulse.
- Active Antimicrobial Subcommittee of P&T.
- Submission of antibiotic utilization data to the CDC/NHSN Antibiotic Use module.

12.1. Infectious Diseases Diagnostic Testing Stewardship

C. difficile testing
- Purpose: To improve *C. difficile* testing on inpatients by performing the right test on the right patients in order to more accurately identify patients with *C. difficile* infection and reduce false-positive tests
- Goals/outcomes: Reduction in redundant tests (i.e., multiplex PCR + antigen/toxin test), reduction in *C. difficile* tests in patients with a recent positive test, and reduction in *C. difficile* tests in patients without true diarrhea.

Urine cultures
- Purpose: To reduce the volume of urine cultures sent on inpatients without clinical evidence of urinary tract infection in order to reduce false-positive results and misdiagnosis of catheter-associated urinary tract infection (CAUTI).
- Goals/outcomes: Reduction in the volume of urine cultures and reduction in the hospital rate of CAUTI.

Blood cultures
- Purpose: To reduce redundant and/or unnecessary blood cultures to reduce false-positive cultures and health care costs.
- Goals/outcomes: Reduction in the number of blood culture sets drawn within 24 hours of each other.

Multiplex PCR testing:
- Purpose: To optimize the use of respiratory and stool multiplex PCR panels to facilitate appropriate antibiotic use.
- Goals/outcomes: Specific outcomes to be determined.

Progress to date:
- The AS Program worked with the microbiology lab to develop a consistent process to cancel the Stool PCR test ordered for patients who develop diarrhea more than 72 hours after hospital admission (preferred test is *C. difficile* antigen/toxin test).
- The AS Program worked with Epic to add scripting within the Stool PCR and *C. difficile* antigen/toxin test orders to promote ordering of the appropriate test based on time since admission.
- The two above interventions resulted in increased appropriate use of the antigen/toxin test and decreased inappropriate use of the Stool PCR test for the evaluation of hospital-onset diarrhea (see Figure 12.1-1).
- The AS Program developed a clinical care guideline for the evaluation of hospital-onset diarrhea to assist providers with the appropriate diagnostic work up
- The AS Program worked with Epic to incorporate scripting in the urinalysis with reflex to culture order to promote appropriate use of this test for the evaluation of urinary tract infection
- The AS Program developed an Epic best practice advisory (BPA) to promote increased use of the urinalysis with reflex to culture. The BPA fires when a standalone urine culture is ordered, recommending a urinalysis with reflex culture unless a clinical exception is present. The provider is required to document the reason for the exception from a drop down list.
- Education was shared with providers regarding the ordering of the Multiplex Respiratory PCR panel. It was recommended to only order the respiratory PCR panel if the results would change the management of the patient.

Figure 12.1-1: Hospital-Onset Diarrhea Specimens—Rapid *C. difficile* vs Multiplex PCR
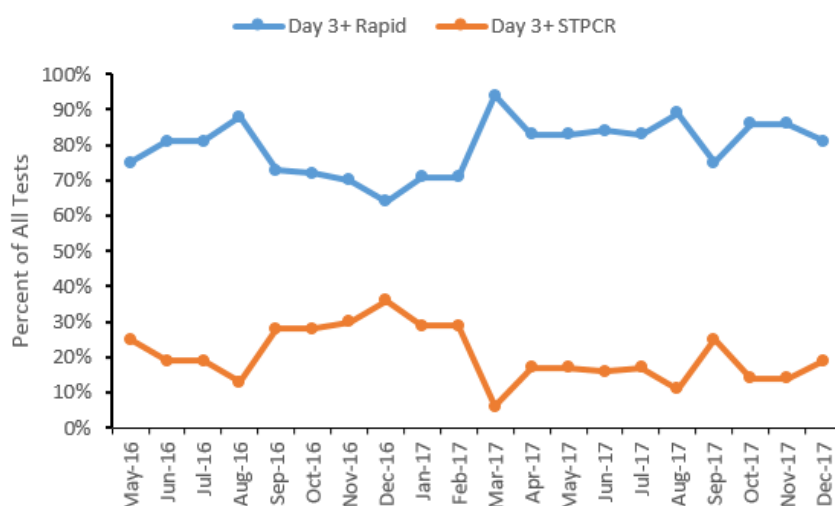
12.2. Antibiotic Stewardship Education

Implement patient/family education
- Provide patients being discharged on antibiotic therapy with appropriate antibiotic education (CDC educational flyer and information in after visit summary).
- Provide antibiotic education posters and/or pamphlets in the waiting rooms of the emergency department and urgent care center.
- Implement annual provider education.
- Implementation of antibiotic stewardship education slides in the required annual Infection Prevention module.
- Maintain and expand the Antibiotic Stewardship smartphone application for clinicians, pharmacists, and nurses.
- Targeted education sessions to increase clinician, pharmacist, and nursing knowledge regarding antibiotic stewardship.
- Enhance the dissemination the antibiotic stewardship smartphone app (e.g., nursing, outpatient clinics) and track utilization.

- ■ **Progress to date:**
  - ◊ A required annual education module on antimicrobial stewardship was developed and implemented for all clinical employees**.**
  - ◊ Education was provided to relevant provider groups and pharmacists regarding the use of probiotics for inpatients receiving antibiotics with a high risk for *C. difficile* infection.
  - ◊ Education was provided to MICU providers and pharmacists regarding the optimal use of procalcitonin in the ICU.
  - ◊ Education was provided to relevant provider groups and pharmacists regarding a new Meningoencephalitis multiplex PCR rapid diagnostic test.
  - ◊ A nurse was invited to be a member of the Antimicrobial Subcommittee of P&T.
  - ◊ Musculoskeletal infections were added to the antibiotic stewardship smartphone application.

Patient education achievements

The document below, Figure 12.2-1, is a patient education poster from the CDC that is now displayed in several locations in the ED and AUCC waiting rooms.

Figure 12.2-1: CDC Patient Education Poster
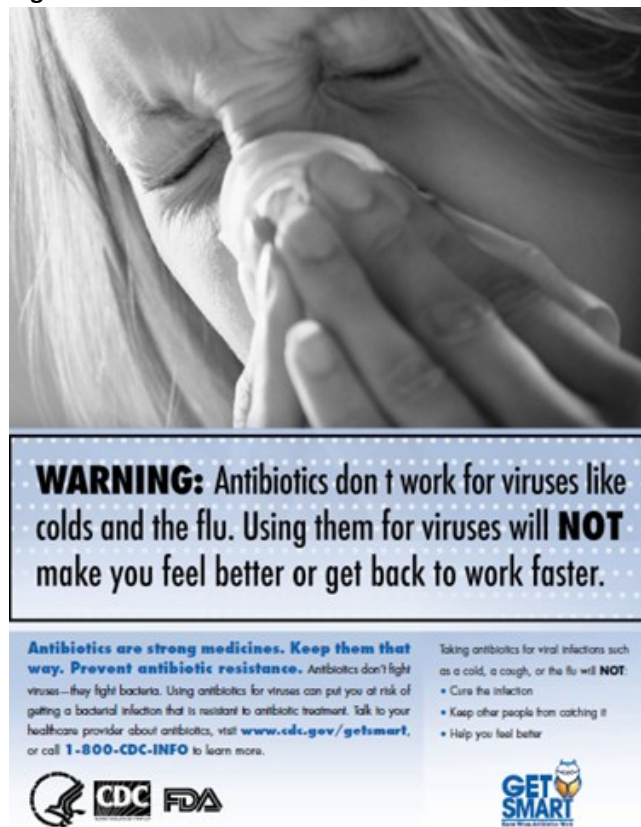
Source: CDC

Provider education achievements

A provider education plan was developed and initiated. Dr. Jenkins will lead an educational session on a targeted antimicrobial stewardship topic for Hospitalists every 2-3 months. The first session was held in January 2018, and the topic was prevention of *C. difficile* infection. Education was provided to outpatient providers on improving antibiotic use for sinusitis, pharyngitis, and other respiratory tract infections.

The document below (figure 12.2-2) is provided to all patients receiving antibiotics from the discharge pharmacy.

Figure 12.2-2: Handout with Antibiotics

Source: CDC

Pharmacist education achievements

A pharmacist education plan was developed and initiated. Dr. Shihadeh will lead an educational session on an infectious disease/antimicrobial stewardship topic for pharmacists once a quarter. The first session was October 2017, and the topic was on antibiotic dosing in critically ill patients and in obese patients. A timeline for future educational sessions is as follows: Q1 2018 Aminoglycoside indications, dosing, and monitoring; Q2 Skin and soft tissue infections; Q3 Pneumonia; Q4 Urinary tract infections; Q1 2019 Practical ID and Microbiology.

12.3. Antibiotic Stewardship in the Outpatient Setting

- **Goal:** Develop longitudinal surveillance of outpatient antibiotic prescriptions for targeted antibiotics and/or targeted infections using Epic electronic prescribing data.

- **Progress to date:**

The AS Program used electronic prescribing data in Epic to develop outpatient antibiotic utilization surveillance starting with three clinics – Webb, Eastside, and Westside. The Figure 12.3-1 below shows the overall rate of antibiotic prescriptions per 1,000 encounters. Figure 12.3-2 shows the rate of prescribing stratified by adult versus pediatric patients. And Figure 12.3-3 compares the rate of prescribing among the three clinics. We are also able to track use of categories of antibiotics (e.g., broad-spectrum antibiotics) or use of specific antibiotics (e.g., fluoroquinolones) to monitor trends, inform the development of interventions, and measure the impact of interventions.
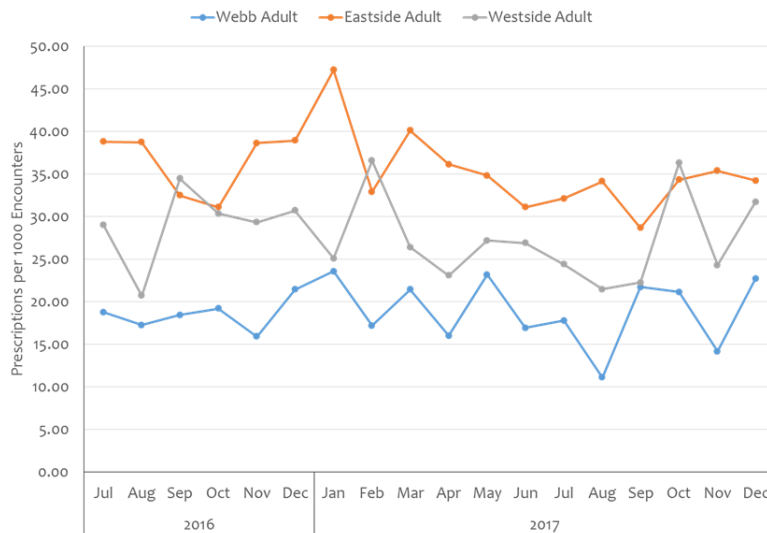
Figure 12.3-1: Overall Antibiotic Prescribing at Selected Primary Care Clinics
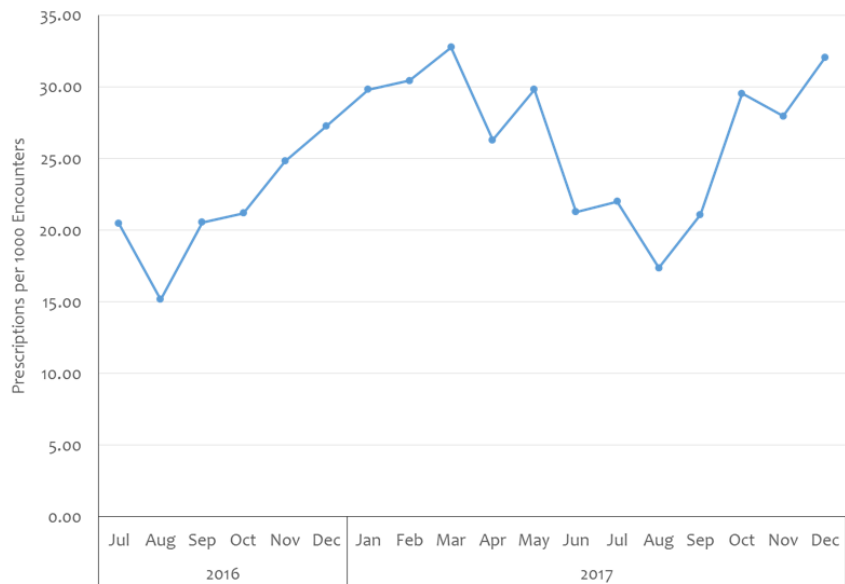
Figure 12.3-2: Overall Antibiotic Prescribing at Selected Primary Care Clinics
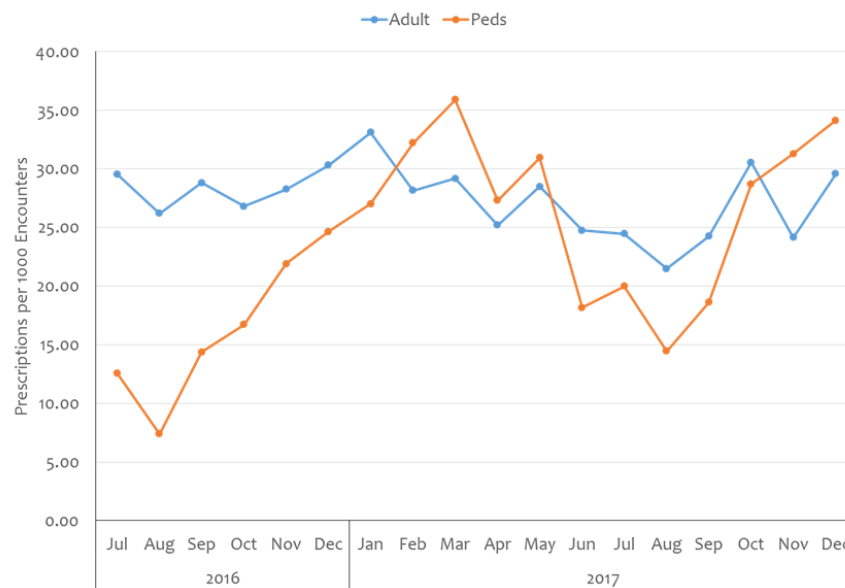
Figure 12.3-3: Overall Antibiotic Prescribing at Selected Primary Care Clinics


Goal: Complete an analysis of factors associated with inappropriate antibiotic prescriptions for acute pharyngitis and sinusitis and barriers to appropriate prescribing.

- **Progress to date**

We performed a detailed review of approximately 200 cases of sinusitis and 340 cases of pharyngitis to evaluate the overall appropriateness of antibiotic prescriptions and the frequency of specific prescribing errors. Figure 12.3-4 shows the main results of this analysis.

Figure 12.3-4: Sinusitis and Pharyngitis Antibiotics
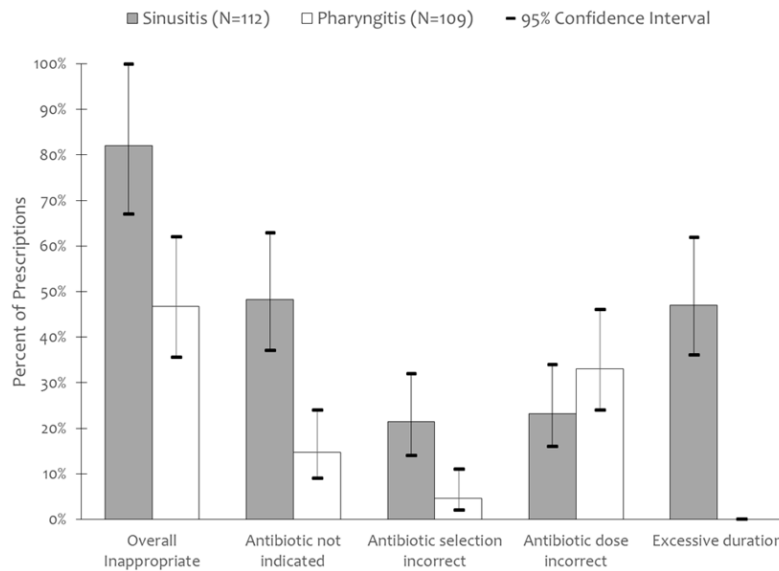
By logistic regression, urgent care center or emergency department sites of visits for sinusitis was an independent risk factor for prescribing antibiotics when not indicated and for excessive durations of antibiotic therapy. This suggests urgent care and the emergency department are important areas of focus for future interventions to improve prescribing for sinusitis. For pharyngitis, prescription of amoxicillin was independently associated with dosing errors. The AS Program is working to change the available order options within Epic to improve the accuracy of amoxicillin dosing.

12.4. Antibiotic Overuse Intervention in ACS

- **Progress to date**

The AS Program developed a multifaceted intervention to improve antibiotic prescribing for common outpatient acute respiratory tract infections. The intervention includes: (1) provider education; (2) display of letters committing to judicious antibiotic use signed by providers in all examination rooms; (3) display of Centers for Disease Control and Prevention patient education materials in examination rooms and waiting rooms; (4) revision of institutional guidelines for sinusitis and pharyngitis; (5) communication skills training for providers; (6) exploration of Epic-based tools to standardize management of these infections; and (7) individualized prescribing feedback to providers with comparison to peers. The intervention is being pilot-tested in three Internal Medicine clinics (Webb, Eastside, and Westside) and was initiated in December 2017. Over the next 6 to 12 months, the impact of the intervention on prescribing will be evaluated.

Goal: Participate in the Telligen outpatient antibiotic stewardship initiative

- **Progress to date:**

After extensive discussions with Telligen and Denver Health leadership regarding the potential benefits and downsides of participating in this initiative, it was decided that it would not substantially benefit Denver Health to participate. The AS Program has since launched the pilot intervention to improve antibiotic prescribing in the three Internal Medicine clinics as described above.

Other 2017 achievements

- The AS Program underwent a successful survey by The Joint Commission in May, 2017. The surveyors were impressed with the program, classifying it as "best practice."

- The AS Program tracked monthly use of the DHHA antibiotic smartphone application during 2017. The results were presented at the national IDWeek meeting in San Diego in October, 2017 and submitted for publication in February 2018.

- The AS Program worked closely with Microbiology laboratory to implement a new meningoencephalitis rapid multiplex PCR test and to educate providers regarding the new test.

- The AS Program worked with the Microbiology lab to update a key antibiotic susceptibility testing panel which is currently being validated.

- For antibiotic shortages, with careful inventory management and appropriate utilization, the AS Program avoided the need to implement alternative agent strategies or pharmacy automatic substitutions.

- The AS Program performed an evaluation of pre-procedural antibiotic prophylaxis administered by Interventional Radiology. The findings were presented at the national IDWeek meeting in San Diego in October, 2017.

- The AS Program continued to participate in the Colorado Hospital Association's Statewide Antibiotic Stewardship initiative focused on improving antibiotic use for patients hospitalized with urinary tract infection (UTI). The intervention implemented at Denver Health consisted of development and implementation of a clinical care guideline for inpatients with urinary tract infection and prospective audit of inpatients being treated for UTI with feedback to providers to increase adherence to the guideline. Use of fluoroquinolones and durations of therapy (two main goals of the intervention) have declined over the course of the intervention.

- A new pharmacist managed procalcitonin protocol and formal antibiotic timeout for the MICU was developed as part of a pharmacy resident research project. The protocol will be implemented in 2018.

- A protocol to administer a probiotic to patients receiving certain antibiotics in the hospital to prevent antibiotic-associated diarrhea and *C. difficile* infection was implemented in March, 2017. Providers are ordering the probiotic approximately 95% of the time that one of the target antibiotics is ordered.

- The AS Program implemented a protocol to perform fecal microbiota transplants for patients with recurrent *C. difficile* infection using frozen, pre-screened specimens from a company called OpenBiome. Five transplant procedures have been performed to date.

- An Epic Best Practice Advisory (BPA) was developed to promote uptake of the urinalysis with reflex culture test. Since the BPA went live, there has been increased use of the reflex test and an intended decrease in use of standalone urine cultures.

- The AS Program performed a comprehensive literature review of the efficacy of various perioperative prophylaxis antibiotic regimens for colorectal surgeries. In collaboration with the General Surgery service, it was opted to change current practice to a regimen associated with lower surgical site infection rates (cefazolin plus metronidazole).

12.5. New Initiatives for 2018 Antibiotic Stewardship

Based on a needs assessment completed in December 2017 by the AS Program committee and Chief Quality Officer, the AS Program will focus on the development and implementation of the following new initiatives in 2018.

1) Long-acting lipoglycopeptide infusions to complete therapy and reduce length of stay for select patients receiving prolonged inpatient IV antibiotic courses

An increasing number of patients are being kept in the hospital for prolonged antibiotic courses (4 – 8 weeks) for serious gram-positive infections when outpatient IV antibiotic therapy is not thought to be safe or feasible and placement is not an option (e.g., injection drug users). This is a burden for our patients, puts them at risk for hospital-acquired infections, and strains Denver Health's limited resources. Safely shortening these hospitalizations could substantially benefit our patients and Denver Health. For select patients with gram-positive infections planned to be treated as inpatients with 4 – 8 weeks of IV antibiotics, the final 7 – 10 days of therapy will be given as single infusion of dalbavancin – a new antibiotic requiring only once weekly dosing – allowing for earlier discharge.

Goal: Reduce the length of stay required for patients with select gram-positive bacterial infections kept inpatient only for safe administration of long-term IV antibiotics

Outcome measures
- Number of patients receiving long-acting lipoglycopeptide infusions
- Inpatient days averted (absolute and proportion of planned stay)
- Rate of clinical success after completion of treatment with lipoglycopeptide

2) Development of a penicillin (PCN) allergy skin testing program

We will develop a standardized process through which the AS Program performs structured, in-person allergy assessments of patients with a reported PCN allergy followed by PCN skin testing in appropriate cases.

Goal: Optimize choice of antibiotic therapy by confirming or refuting the presence of a PCN allergy in inpatients with a reported PCN allergy

Outcome measures
- Number of patients evaluated by skin testing program
- Number of patients with PCN allergy de-labeled by history alone
- Number of patients who undergo PCN skin testing
- Number of patients with PCN allergy de-labeled by skin testing
- Number of MICU beta-lactam desensitizations averted

APPENDIX A: GLOSSARY OF TERMS AND ABBREVIATIONS

A-B

ACI…..Advancing Care Information
ACS…..Ambulatory Care Services
ACT…..Post Fall Documentation
AHRQ…..Agency for Healthcare Research and Quality
AIDET…..Acknowledge, Introduce, Duration, Explanation, Thank You
AIU…..Adoption, Implementation, and Upgrade
AQA…...Ambulatory Quality and Accountability
AQIDC…..Ambulatory QI and Design Committee
ARRA…..American Recovery and Reinvestment Act
AS…..Antibiotic Stewardship
ASPEN…..American Society for Parenteral and Enteral Nutrition
ATP…..Adenosine Triphosphate
AU…..Antibiotic Use
BB…..Bounce backs
BCT…..Blunt Chest Trauma
BCU…..Biocontainment Unit
BERT…..Behavioral Health Emergency Response Team
BH…..Behavioral Health
BMI…..Body Mass Index
BPA…..Best Practice Advisory

C

CABG…..Coronary Artery Bypass Graft
CAHPS…..Consumer Assessment of Healthcare Providers and Systems
CAUTI…..Catheter-Associated Urinary Tract Infection
CC…..Complication of Comorbidity
CCN…CMS Certification Number
CDC…..Centers for Disease Control and Prevention
CDS…Clinical Decision Support
CDI…..Clinical Documentation Integrity
CDI….*Clostridium difficile* Infection
CDP…..Center for Domestic Preparedness
CDPHE…..Colorado Department Public Health and Environment
CEU…..Continuing Education Units
CHA…..Colorado Hospital Association
CHS…..Community Health Services
CLABSI…...Central Line-Associated Blood Stream Infection
CMS…..Centers for Medicare & Medicaid Services
COPD…..Chronic Obstructive Pulmonary Disorder
COSH…..Center for Occupational Safety and Health
CPOE…..Computerized Provider Order Entry
CRE…...Carbapenem-resistant *Enterobacteriaceae*
CT…..Computed Tomography
CVD….. Cardiovasular Disease

D

DH…..Denver Health
DHEG…..DH East Grand Community Clinic and Emergency Center
DHHA….Denver Health and Hospital Authority
DPH…..Denver Public Health

DPSQ…..Department of Patient Safety and Quality
DRC…..Designation Review Committee
DRG…..Diagnosis Related Group
DVT…..Deep Vein Thrombosis

E-F

eCQM…..Electronic Clinical Quality Measures
ED…..Emergency Department
EH…..Eligible Hospital
eHH…..Electronic Hand Hygiene
EHR…..Electronic Health Record
EMP…..Emergency Management Program
EOP…..Emergency Operations Plan
EP…..Eligible Provider
ER…..Emergency Room
ESBL…...Extended spectrum beta lactamases
EVS…..Environmental Services
FDA…..Food and Drug Administration
FEMA…..Federal Emergency Management Agency
FFS…..Fee for Service
FFY…..Federal Fiscal Year
FQHC…..Federally Qualified Health Center
FUH…Follow Up after Hospitalization

G-H

GCS…..Glasgow Coma Scale
HAC…..Hospital Acquired Condition
HAI…..Healthcare Associated Infection
HAPI…..Healthcare Acquired Pressure Injuries
HBIPS…..Hospital-Based Inpatient Psychiatric Services
HCW…..Healthcare Workers
HCAHPS…..Hospital Consumer Assessment of Healthcare Providers and Systems
HF…..Heart Failure
HH…...Hand Hygiene
HHS…...Health and Human Services
HITeam…..High Risk Infection Team
HIIN…Hospital Improvement Innovation Network
HLD…..High Level Disinfection
HQIP…..Hospital Quality Incentive Program
H&P…..History and Physical

I-L

ICON…...Infection Control Epic Module
ICRA…..Infection control risk assessment
IMM…..Influenza Immunization
IP…..Inpatient
IP…..Infection Prevention
IPC…..Infection Prevention Committee
IPFQR…..Inpatient Psychiatric Facility Quality Reporting
IPF-SUB…..Alcohol Use
IQR…..CMS Inpatient Quality Reporting Program
IRB…..Institutional Review Board
JC…...Joint Commission

M

MACRA…..Medicare Access and CHIP Reauthorization Act

MCC…..Major Complication or Comorbidity
MDRO……Multi-Drug Resistant Organisms
MEWS…..Modified Early Warning System
MICU……Medical Intensive Care Unit
M&M…..Morbidity & Mortality
MPE…..Mobile Patient Equipment
MRI…..Magnetic Resonance Imaging
MRSA……Methicillin-resistant *Staphylococcus aureus*
MSEC…..Medical Staff Executive Committee
MSSP…..Medicare Shared Savings Program
MU…..Meaningful Use

N

NDNQI…..The National Database of Nursing Quality Indicators
NETEC…..National Ebola Training and Education Center
NHSN…..National Healthcare Surveillance Network
NICU……Neonatal Intensive Care Unit
NIMS…..National Incident Management System
NORE…..Department of Nursing Outcomes, Research, & Evidence Based Practice
NTDB…National Trauma Databank

O

OAS…..Outpatient and Ambulatory Surgery
OB/GYN…..Obstetrics and Gynecology
O/E…..Observed to Expected Ratio
OP…..Outpatient
OPPE…..Ongoing Physician Performance Evaluations
OQR…..CMS Hospital Outpatient Quality Reporting
OR……Operating Room

P

PACS…..Picture Archiving Computer System
PC…..Perinatal Care Conditions
PCN…..Penicillin
PCI…..Percutaneous Coronary Intervention
PCR…..Polymerase Chain Reaction
PCU……Progressive Care Unit
PDMP…..Prescription Drug Monitoring
PE…..Pulmonary Embolism
PFAC…..Patient Family Advisory Council
PFS…..Physician Fee Schedule
PI…..Process Improvement
PI…..Promoting Interoperability
PICU……Pediatric Intensive Care Unit
PN…..Pneumonia
PN…..Patient Navigator
POA…..Present on Admission
PPE…..Personal Protective Equipment
PQRS…..Physician Quality Reporting System
PSI…..Patient Safety Indicator
PY…..Program Year

Q

QI…..Quality Improvement
QPP…..Quality Payment Program
QRUR…..Quality and Resource Use Report

R

RAF…..Risk Adjustment Factor

RCCO…..Regional Care Collaborative Organization
RESPTC…..Regional Ebola & Special Pathogens Treatment Center
RN…..Registered Nurse
ROM…..Risk of Mortality
RRT…..Rapid Response Team

S

SEP…..Severe Sepsis and Septic Shock
SEWS…..Standardized Early Warning Score
SGR…..Sustainable Growth Rate
SI…..Safety Intelligence
SICU…..Surgical Intensive Care Unit
SIR……Standardized Infection Ratio
SOI…..Severity of Illness
SR…..Service Recovery
SSI……Surgical Site Infection
STK…..Stroke Measures
SUR……Standardized Utilization Ratio

T-U

TIN…..Tax Identification Number
TJC…..The Joint Commission
TMD…..Trauma Medical Director
TNC…..Trauma Nurse Coordinator
TOB…..Tobacco Use
TPN……Total Parenteral Nutrition
TQIP……Trauma Quality Improvement Program
UTI…..Urinary Tract Infection

V-Z

VAE……Ventilator Associated Events
VAP…..Ventilator Associated Pneumonia
VISA…..Vancomycin Resistant *Staphylococcus aureus*
VLBW…..Very Low Birth Weight
VM…..Value-Based Payment Modifier
VOC…Voice of the Customer
VON…..Vermont Oxford Network
VRE…..Vancomycin-resistant enterococci
VRSA…..Vancomycin Resistant *Staphylococcus aureus*
VTE…..Venous Thromboembolism
WHO……World Health Organization
WQ…..Workqueue

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