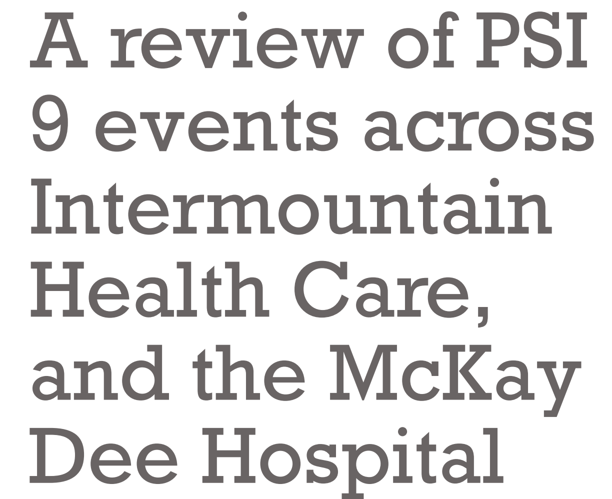
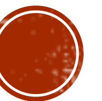
PATTERNS IN PERIOPERATIVE HEMORRHAGE



DISCLOSURES

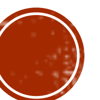
- Financial: none
- Future practice: Clínica Medicos OB fellowship in Memphis, TN.



WHAT ARE PATIENT SAFETY INDICATORS?

- Patient Safety Indicators (PSIs) are potentially avoidable complications and iatrogenic events that represent opportunities for improvement in the delivery of care. More specifically, they focus on potential in-hospital complications and adverse events following surgeries, procedures, and childbirth.

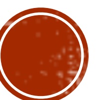
- Examples for which you have seen the inpatient measures taken– falls, CAUTIs.
    - Systemic changes: fall prevention orders, catheter pop ups



PSI 9: PERIOPERATIVE HEMORRHAGE OR HEMATOMA

- Perioperative hemorrhage or hematoma cases involving **a procedure** to treat the hemorrhage or hematoma, following surgery per 1,000 surgical discharges for patients ages 18 years and older.

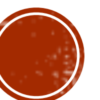
- Excludes cases with a diagnosis of coagulation disorder; cases with a principal diagnosis of perioperative hemorrhage or hematoma; cases with a secondary diagnosis of perioperative hemorrhage or hematoma present on admission; cases where the **only operating room procedure is for treatment of perioperative hemorrhage or hematoma**; obstetric cases.



GOALS

- PSIs are intended as : “accessible, reliable indicators of quality that they can use to flag potential problems or successes; follow trends over time; and identify disparities across regions, communities, and providers”

- Assess the incidence of adverse events and in-hospital complications and identify issues that might need further study.
- Difficult – all surgical specialties, and surgeries except for obstetrics.
- Many more variables than CAUTI for example
- **My goal: Review Intermountain PSI 9 events and search for demographic, pathologic, or surgical trends in their occurrence.**

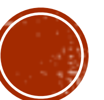


METHOD

Method: Chart review of randomized PSI 9 events across Intermountain, all at MKD and *hopefully* all at UVH.

Review IHC data and note any "disparities across regions, communities and providers"

- **Hospital specific case numbers**
- **Pt demographics**
- **Surgical specialties, specific operations**
- **anticoagulation**



PSI 9 NATIONAL DATA

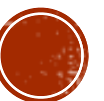
Table 1. Patient Safety Indicators (PSI) for Overall Population: Hospital-Level Indicators

INDICATOR	LABEL	NUMERATOR	DENOMINATOR	OBSERVED RATE PER 1,000 DISCHARGES
PSI 02	Death Rate in Low-Mortality Diagnosis Related Groups (DRGs)	1,058	2,105,316	0.50
PSI 03	Pressure Ulcer Rate	9,887	15,995,803	0.62
PSI 04	Death Rate Among Surgical Inpatients with Serious Treatable Complications	34,940	244,204	143.08
PSI 04 Stratum_DVT_PE	Death Rate Among Surgical Inpatients with Serious Treatable Complications Stratum: Deep Vein Thrombosis/Pulmonary Embolism (DVT/PE)	1,217	29,287	41.55
PSI 04 Stratum_PNEUMONIA	Death Rate Among Surgical Inpatients with Serious Treatable Complications Stratum: Pneumonia	9,368	104,069	90.02
PSI 04 Stratum_SEPSIS	Death Rate Among Surgical Inpatients with Serious Treatable Complications Stratum: Sepsis	10,866	50,494	215.19
PSI 04 Stratum_SHOCK	Death Rate Among Surgical Inpatients with Serious Treatable Complications Stratum: Shock/Cardiac Arrest	11,689	38,776	301.45
PSI 04 Stratum_GIHEMORRHAGE	Death Rate Among Surgical Inpatients with Serious Treatable Complications Stratum: Gastrointestinal (GI) Hemorrhage/Acute Ulcer	1,800	21,578	83.42
PSI 05	Retained Surgical Item or Unretrieved Device Fragment Count	629	--	--
PSI 06	Iatrogenic Pneumothorax Rate	4,315	23,213,480	0.19
PSI 07	Central Venous Catheter-Related Blood Stream Infection Rate	1,791	19,802,971	0.09
PSI 08	In Hospital Fall with Hip Fracture Rate	1,834	24,578,744	0.07
[illegible]	Postoperative Hemorrhage or Hematoma Rate	14,404	6,030,937	2.39
PSI 10	Postoperative Acute Kidney Injury Requiring Dialysis	2,921	3,175,873	0.92

Table 14. PSI 09 – Perioperative Hemorrhage or Hematoma Rate

GROUP	NUMERATOR	DENOMINATOR	OBSERVED RATE PER 1,000 DISCHARGES
Overall	14,404	6,030,937	2.39
Females	46% 6,556	3,114,724	2.10
Males	54% 7,848	2,916,213	2.69
0 to 17 years	--	--	--
18 to 39 years	1,501	649,372	2.31
40 to 64 years	6,247	2,504,019	2.49
65 to 74 years	3,631	1,561,200	2.33
75+ years	3,025	1,316,346	2.30
Private	4,383	1,950,203	2.25
Medicare	7,277	2,987,603	2.44
Medicaid	1,836	656,268	2.80
Other	456	217,479	2.10
Uninsured (self-pay/no charge)	452	219,384	2.06

-- Indicates Not Applicable



INTERMOUNTAIN HEALTH CARE PSI 9 DATA

IHC FACILITIES MAP

Intermountain Healthcare

MAJOR FACILITIES

Cassia Regional Hospital

Logan Regional Hospital

Bear River Valley Hospital

McKay-Dee Hospital

Layton
Layton Hospital

Salt Lake City
LDS Hospital
Primary Children's Hospital

Park City Hospital

Heber Valley Hospital

Murray
Intermountain Medical Center
TOSH - The Orthopedic Specialty Hospital

Sandy
Alta View Hospital

Riverton
Riverton Hospital

Provo
Utah Valley Hospital

Orem
Orem Community Hospital

American Fork
American Fork Hospital

Spanish Fork Hospital (Under Construction)

Sanpete Valley Hospital

Delta Community Hospital

Fillmore Community Hospital

Sevier Valley Hospital

Cedar City Hospital

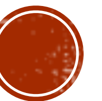
Garfield Memorial Hospital

Dixie Regional Medical Center

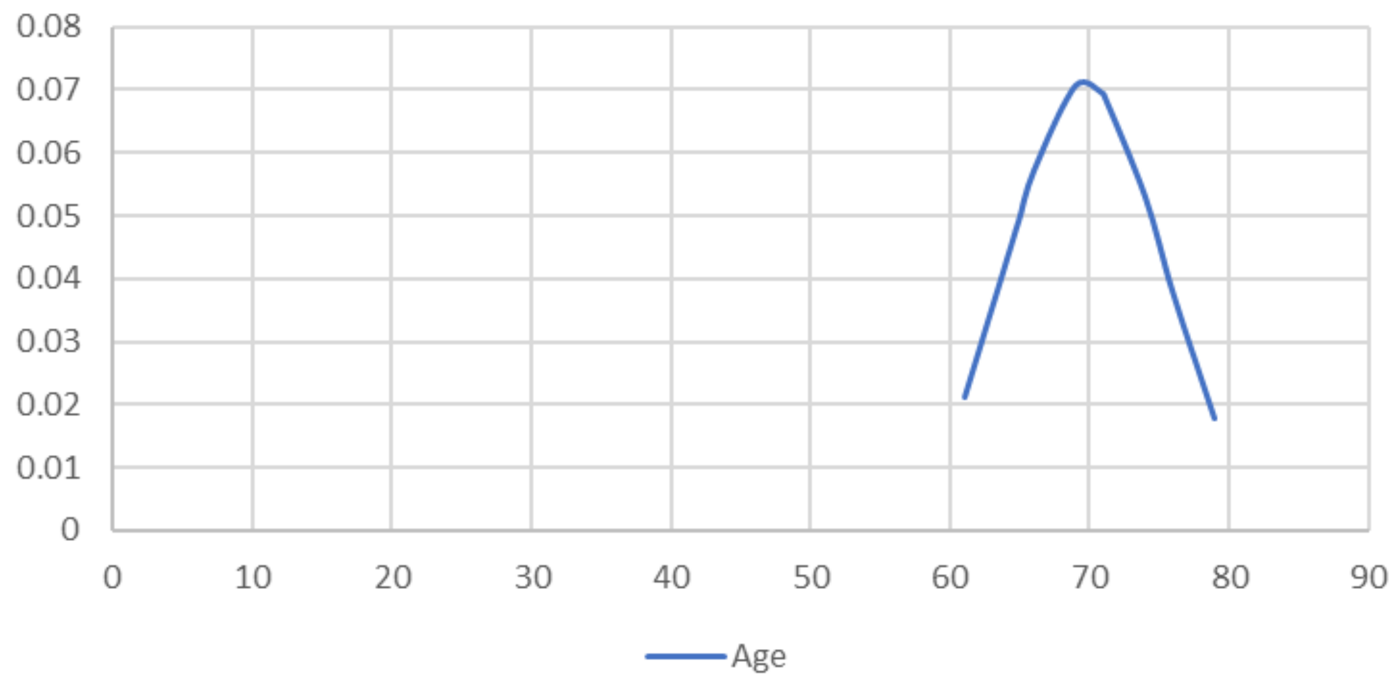
IDAHO
WYOMING
NEVADA
COLORADO
ARIZONA
NM

SYSTEM WIDE BASIC DATA

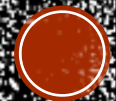
- Data from four facilities: Regional Medical Center in St. George, Utah Valley Hospital (UVH), McKay Dee Hospital (MKD), and Intermountain Medical Center (IMED) from 2019-2021.
- Total PSI 9 events: 138
  - UVH: 37
  - IMED: 58
  - STG: 17
  - MKD: 26



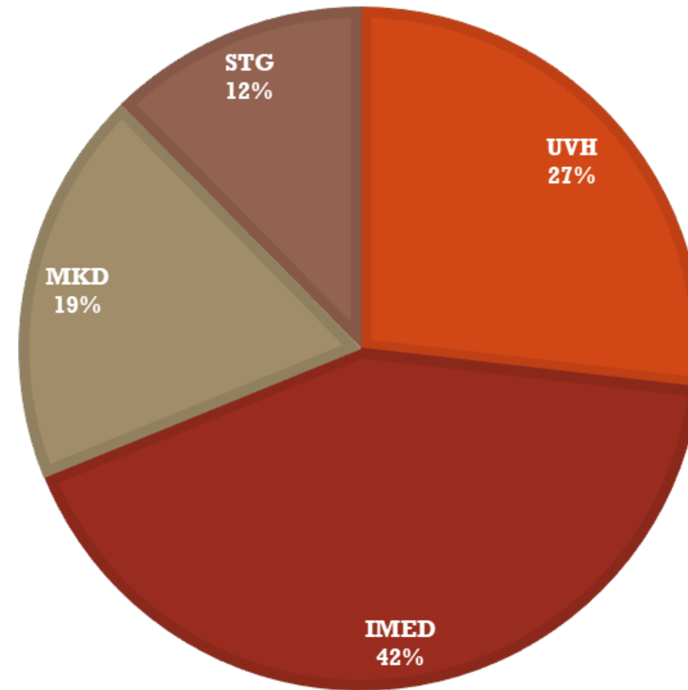
RANDOMLY SELECTED SUBSET DATA

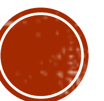


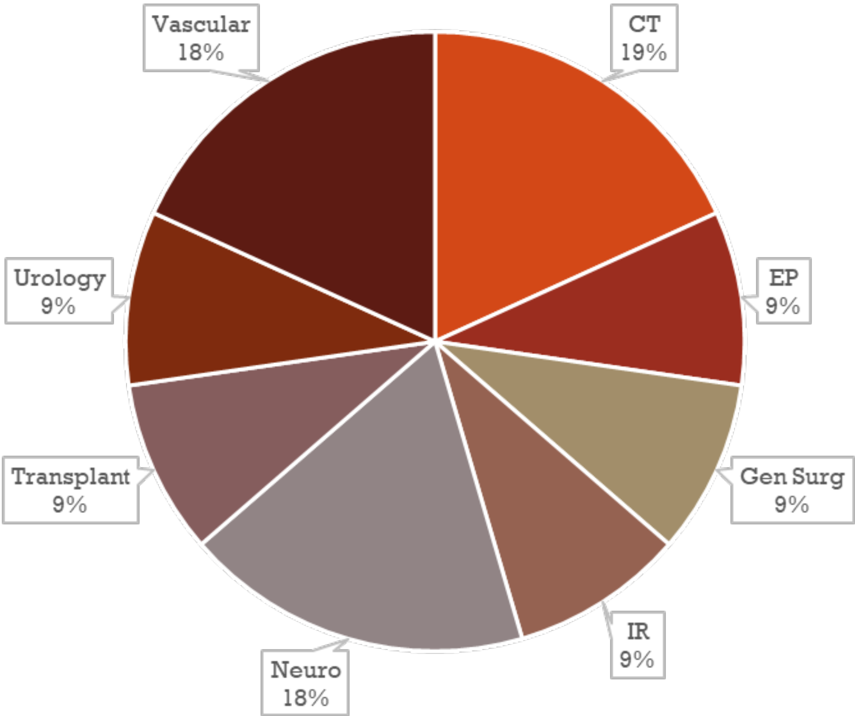
- Gender: 27% F 83% M
- 9% Pacific Islander, 91% White



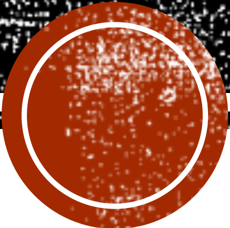
SYSTEM WIDE RAW EVENT PERCENTAGES



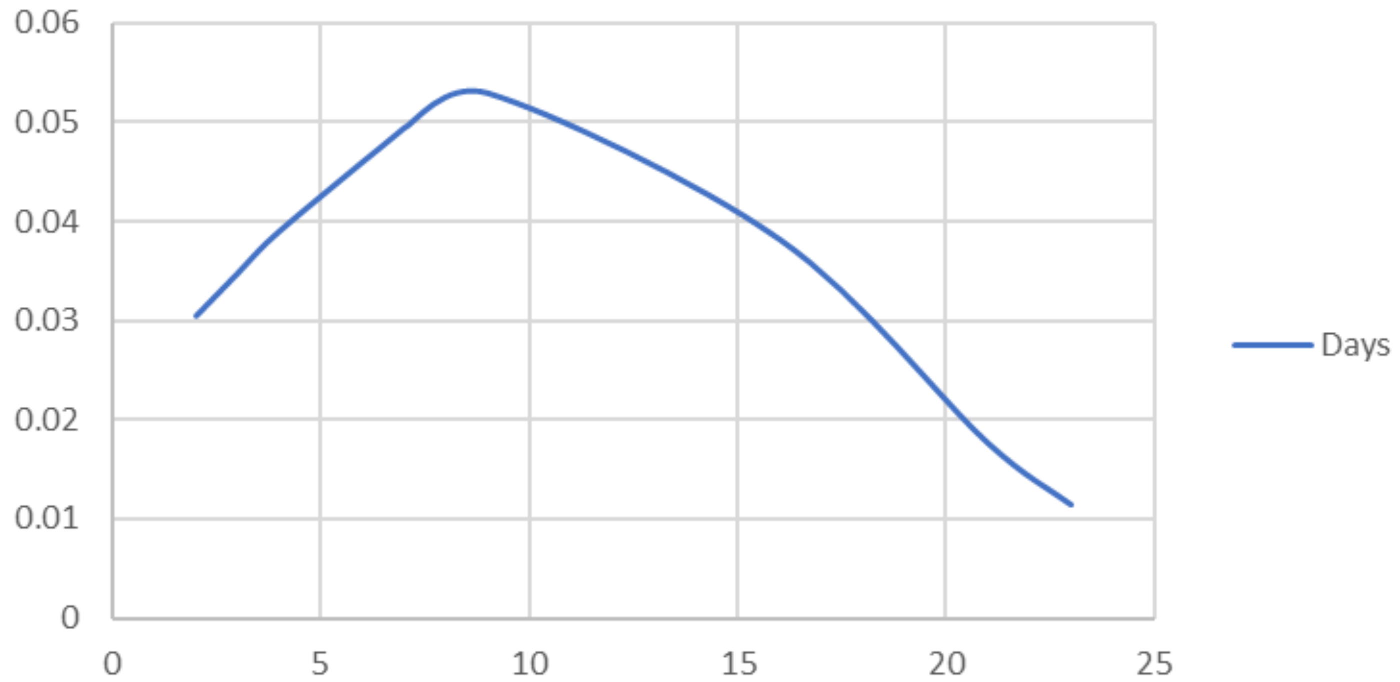



PSI 9 by surgical specialty
Vascular 18%
CT 19%
EP 9%
Gen Surg 9%
IR 9%
Neuro 18%
Transplant 9%
Urology 9%

SYSTEM WIDE SURGICAL SPECIALTY

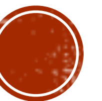


COUNTING THE COST



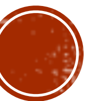
MCKAY-DEE PSI-9 OVERVIEW

- 2019-2021
- 26 events
  - 2021: 9
  - 2020: 9
  - 2019: 7
- Denominators: pending



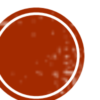
MKD PATIENT DEMOGRAPHICS

- Male 69%, Female 31%
- 96% White
- Did not review insurance

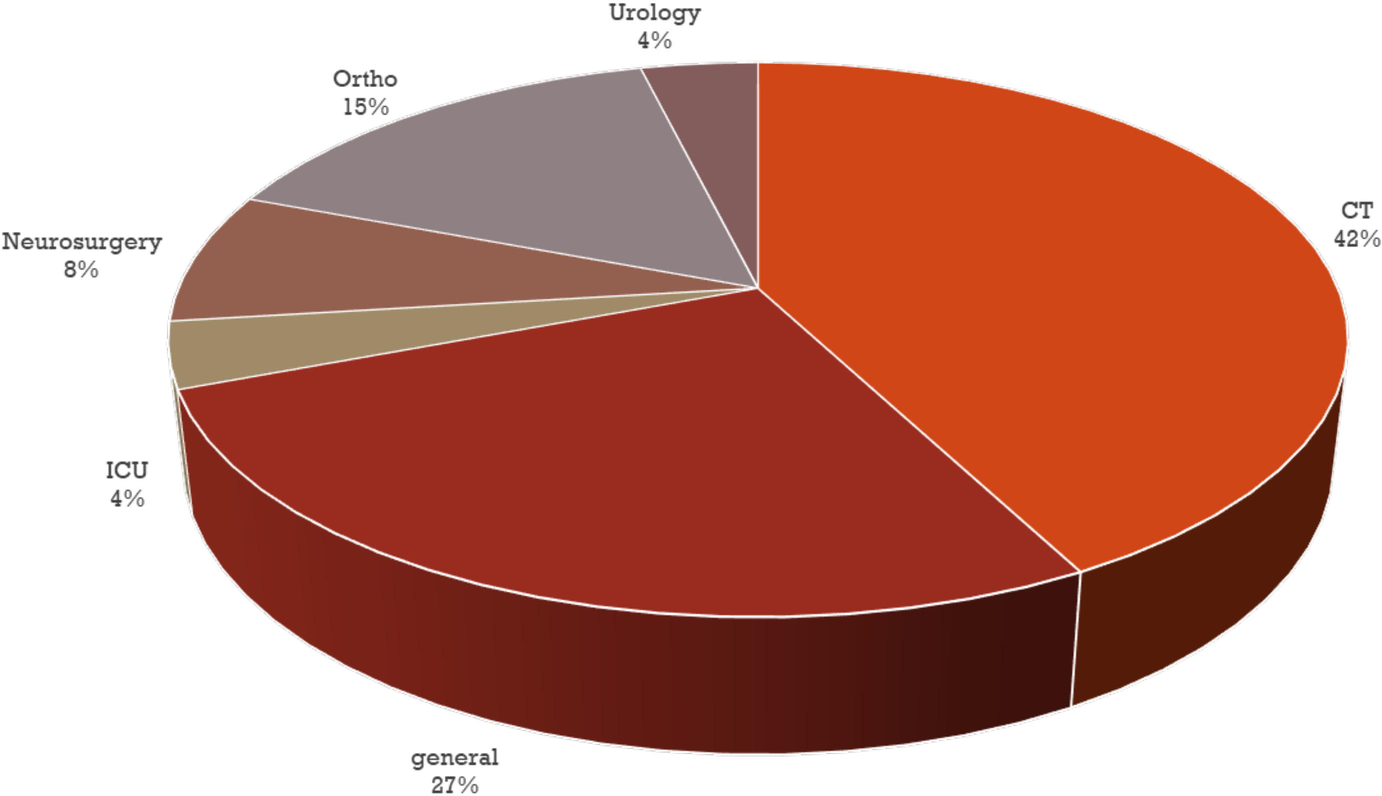


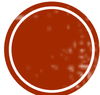
MKD - ANTICOAGULATION

- Documentation seldom stated directly when anticoagulation was held.
- Often free-text notes without medicine list
- INRs in Anesthesia documentation more consistent, but not always obtained

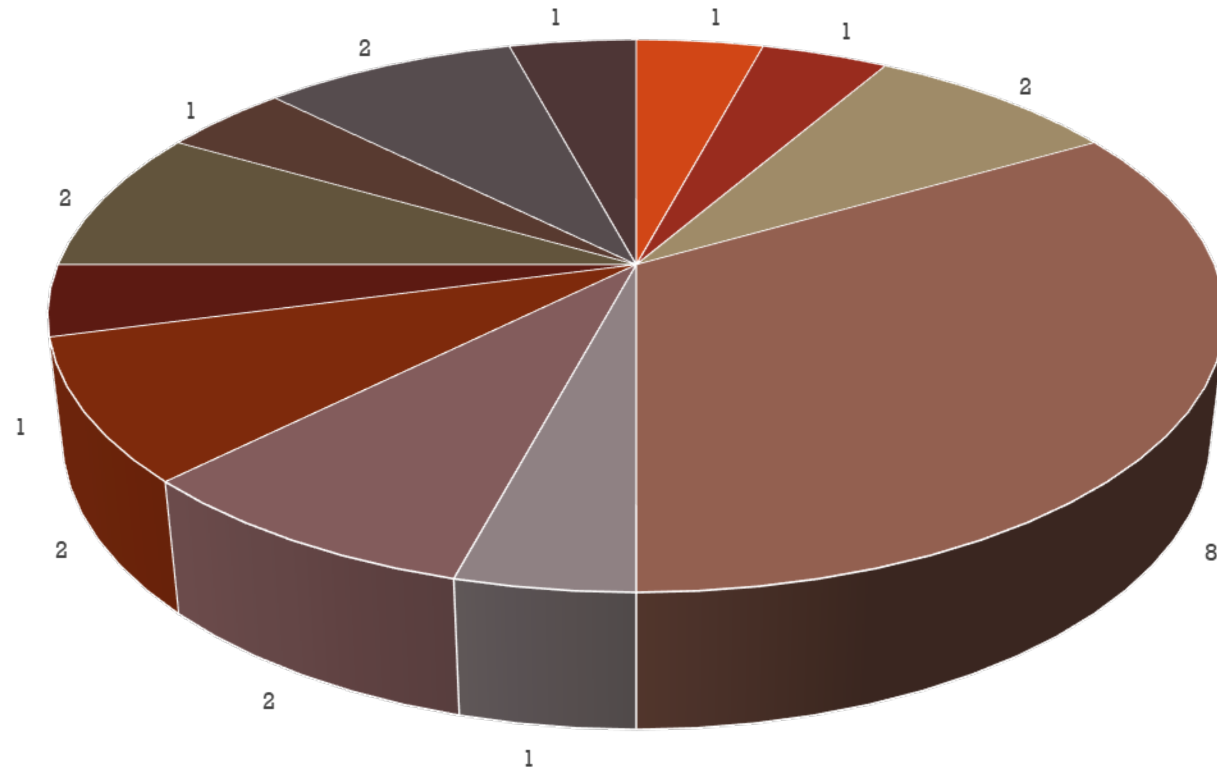


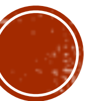
MKD SURGICAL SPECIALTY SHARES



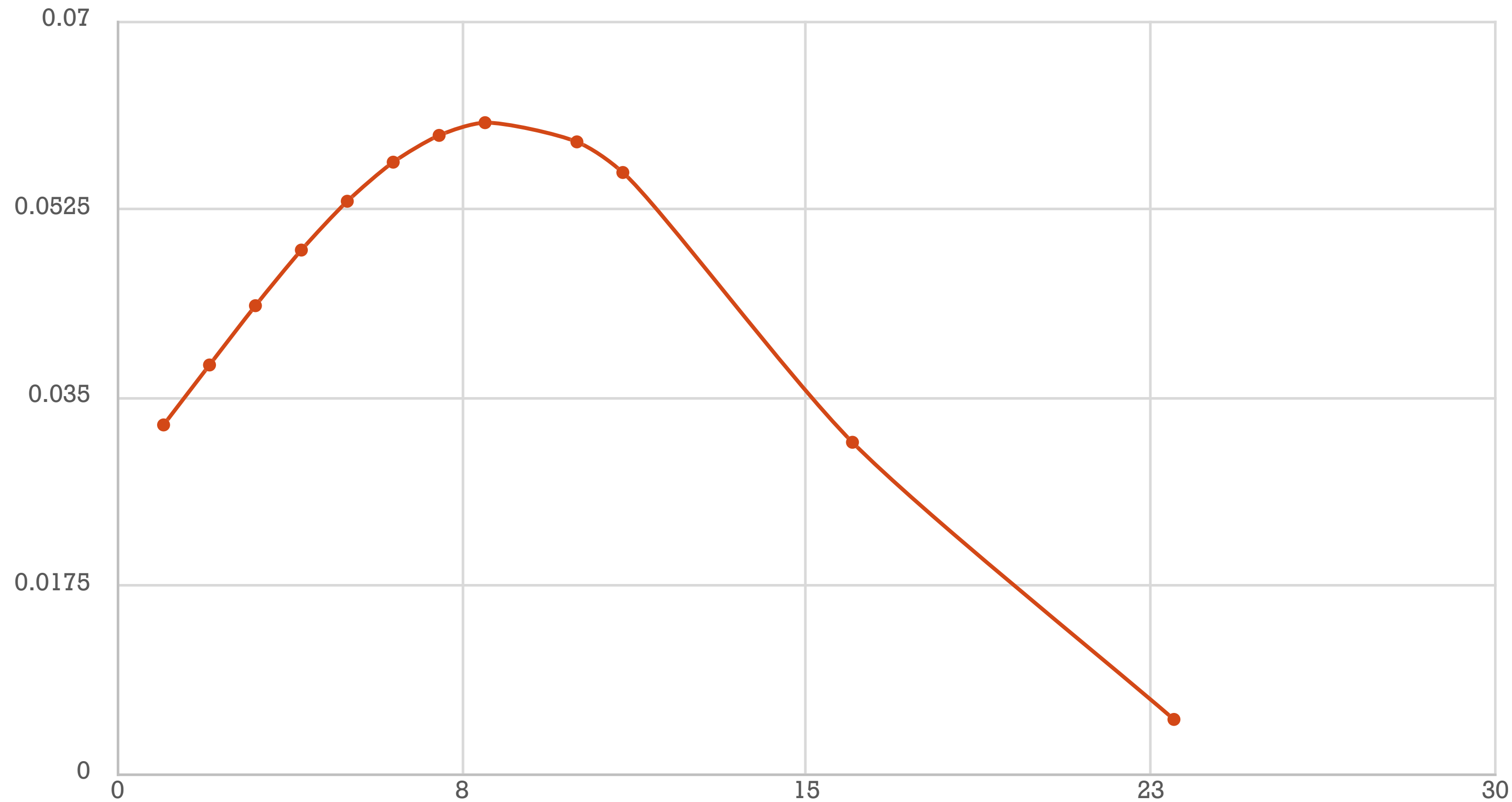


MKD PSI 9 SURGEON SHARE

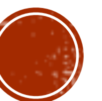




MKD OUTCOME GENERALIZATIONS

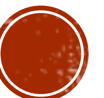


3 deaths/26 event cases. Unrelated/tangentially related to PSI 9 in these cases.



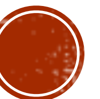
RECOMMENDATIONS

- None of the events I reviewed seemed obviously preventable.
- Several events did not meet criteria for PSI 9 on further scrutiny.
- In MKD system, somewhat disproportionate involvement of CT surgery, in UVH perhaps skewed toward neurosurgery. This is data without a denominator, no nationally tabulated data re: percentages of psi 9 events in high-risk surgery like CT
- Almost all bleeds were caught within a day, most within a few hours. One reviewed so far required 2 fixes.
- Documentation of anticoagulation and any cessation/reversal could likely use some work, however – adding requirements and fields to an already overcrowded system such as iCentra is not a great answer.
- Not enough minority demographics to make any meaningful conclusions re: disparity
- IHC considerably heavier skew toward males than national average, again no denominator to this data



FURTHER AVENUES FOR RESEARCH

- Yearly, hospital and specialty denominators
- Insurance status – serves as fair proxy for SES.
- CT, neurosurgery proportions in other hospital systems
- Anticoagulation documentation in other systems
- Reporting, Intervention, PPX protocol guidelines in place in other hospital systems



SOURCES

- https://qualitynet.cms.gov/inpatient/measures/psi/resources
- https://qualityindicators.ahrq.gov/downloads/modules/psi/v31/psi_guide_v31.pdf
- IHC house PSI 9 case compilation