



# Developing Dynamic Data-Driven Dashboards

Diversity, Equity, Inclusion and Justice (DEIJ) Task  
Force Webinar Series

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# Intermountain Health

Not-for-Profit Integrated Health System Based in Salt Lake City, Utah



## Mission

**"HELPING PEOPLE LIVE THE HEALTHIEST LIVES POSSIBLE"**



## HOSPITALS & CLINICS

**33 Hospitals**  
**4800 Beds**  
**385 Clinics**  
**9 States**



## selecthealth.

### INSURANCE

**1,030,000 Members**



## OUR TEAM

**60,000 Employees**  
**2950 Employed Physicians**



## REHABILITATION SERVICES

**1,900 Employees (PT, OT, SLP, ATC)**  
**Wellness, Acute, IRF, Home Care, Outpatient**

*OUR MISSION: Helping people live the healthiest lives possible.*

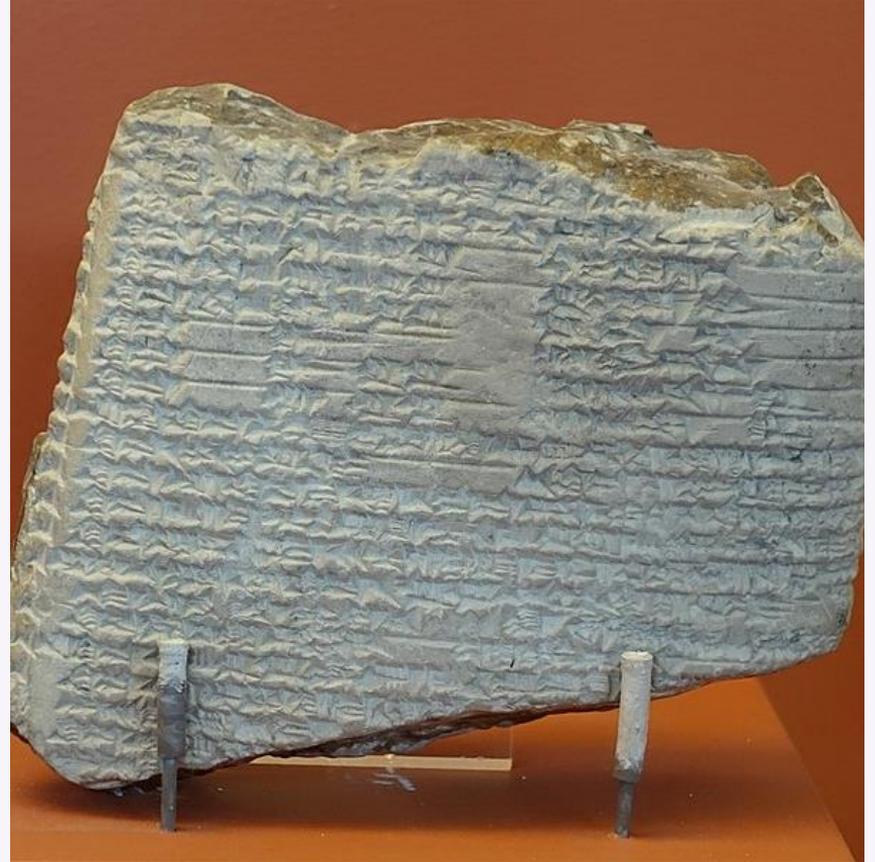
*OUR VISION: Be a model health system by providing extraordinary care and superior service at an affordable cost.*

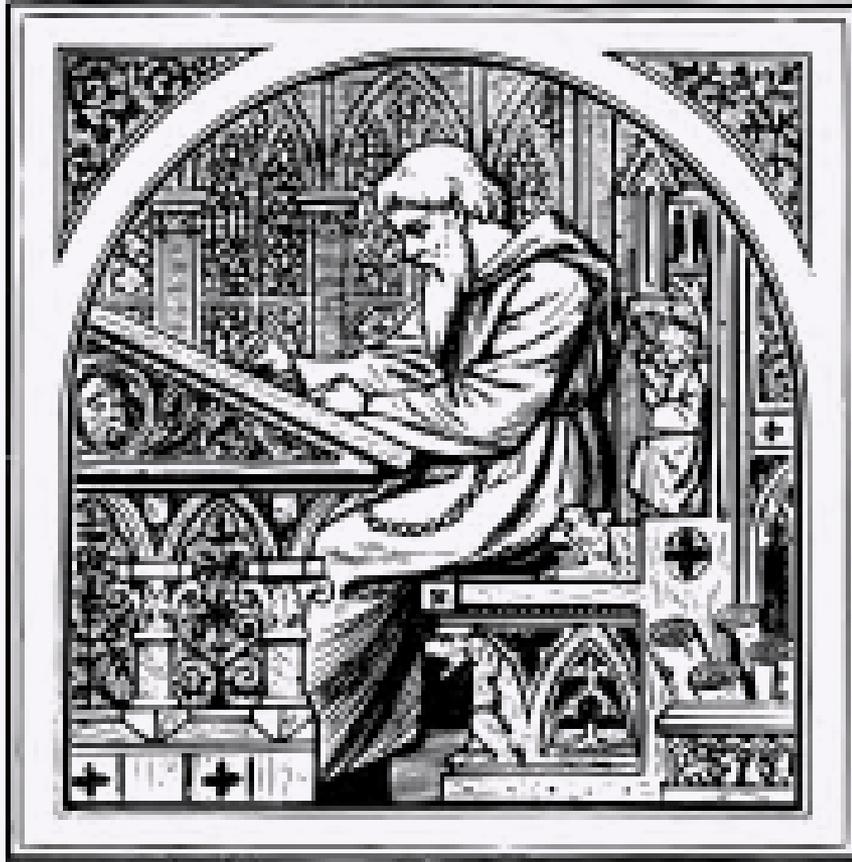
# A Brief History of Healthcare Data

# Healthcare Data in the Ancient World

3000 BC – 400 AD

- Recorded on Clay Tablets, Papyrus, etc.
- Contained references to medical information for high class individuals
- Medical problems often ‘fixed’ by spells, sacrifice, or astrology





# Healthcare Data in the Middle Ages

400 AD – 1700 AD

- Case Histories maintained for “Interesting” cases
- Translation of ancient medical texts into Arabic used for teaching purposes

# Healthcare Data in the Age of Enlightenment

1700 – 1900

- 1793 – New York Hospital begins storing admit and discharge information
- 1800s – Selected physician notes were compiled into one volume to include “the history of the disease, the causes producing it, the remedies employed, and the result of the case...”<sup>1</sup>





# Healthcare Data in the Early-Mid 1900s

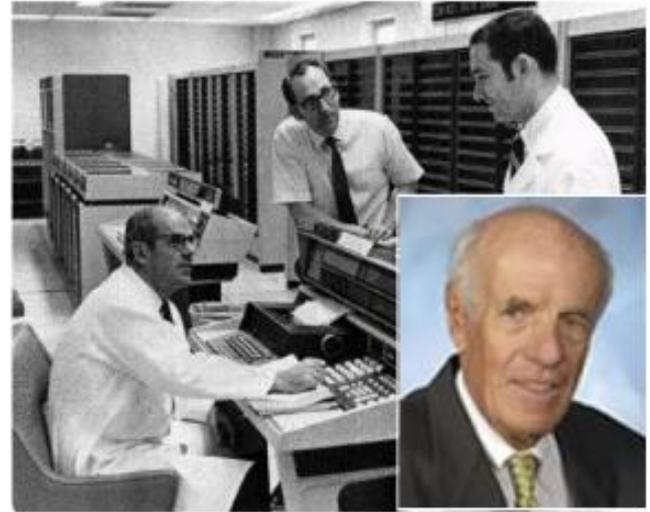
1900 – 1960s

- Paper Medical Records were widely documented, standardized, and regulated
- Medical Transcriptionists and Stenographers
- First patient identification implemented at St. Mary's Hospital in Rochester, MN in 1907

# Electronic Medical Record

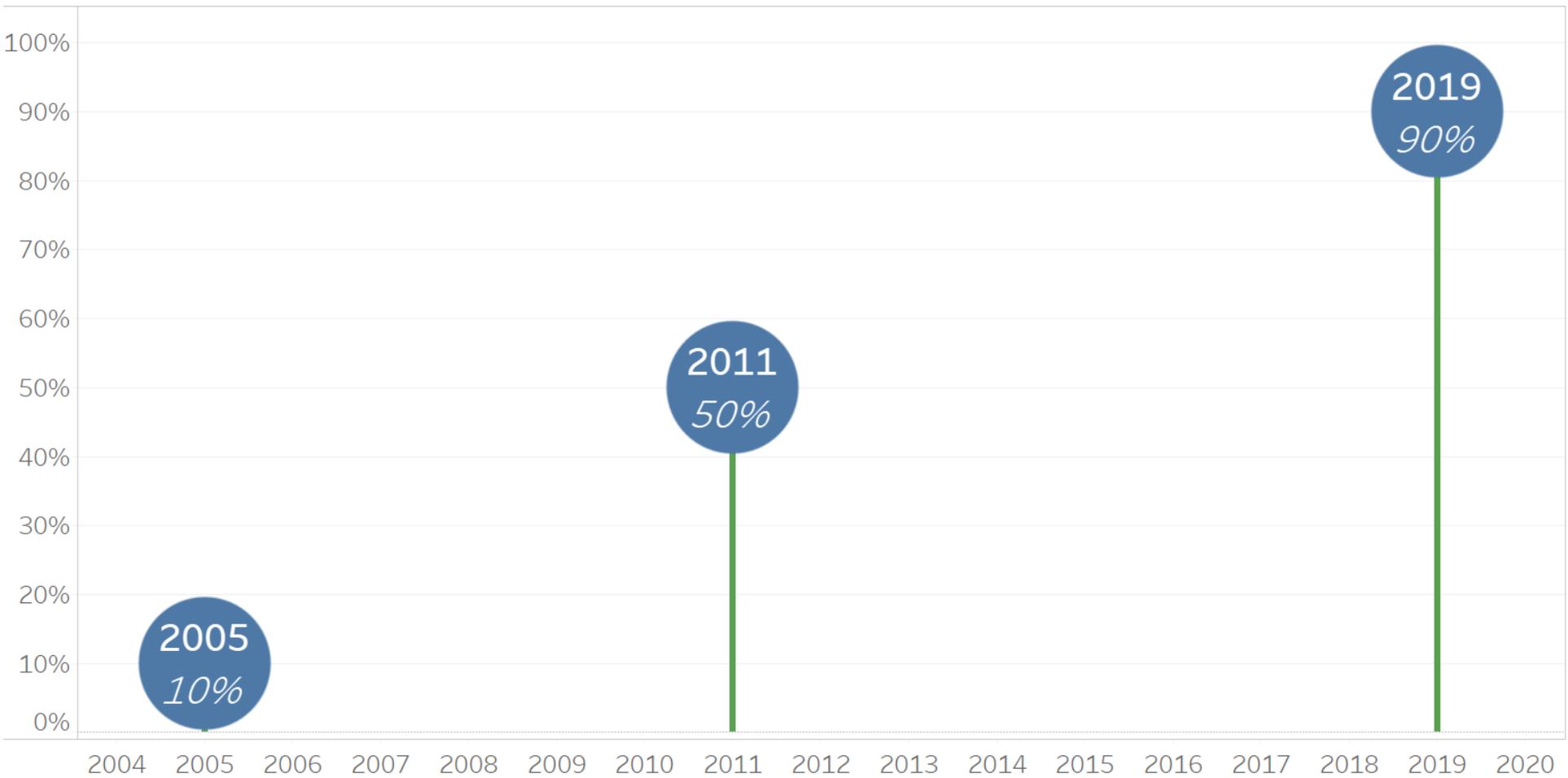
## 1960s – Present

- 1968 - Intermountain Healthcare becomes first hospital system in the US to implement an electronic medical record (EMR) system<sup>1</sup>, known as HELP (Health Evolution through Logic Processing). Inpatient care only.
- 1983 – Outpatient care setting integrated into medical record at Intermountain Healthcare.
- 1998 – Intermountain Healthcare Establishes Enterprise Data Warehouse (EDW)



\*Homer Warner and Brent James, early pioneers in adopting the electronic medical record

## % of Physicians Using an Electronic Medical Record



# The Data Journey

# Data Inputs

Registration	Electronic Medical Record	Billing	Patient Reported Outcomes	Other/Supplemental Data
Age	Medical Treatment	Insurance	Body Area	Patient Feedback
Gender	Medications	Billed Amount	Chronicity	Distance to Facility
Language	Dates (Admit, Discharge, Surgery, etc.)	Units of Service	Surgical / Non-Surgical	Scheduling Data
Race	Location	Patient Payment		Derived Socioeconomic Variables
Ethnicity	Caregiver(s)	Insurance Payment		
Religion	Diagnosis	Remaining Balance		
Marital Status	Documentation			
City/State/Zip				

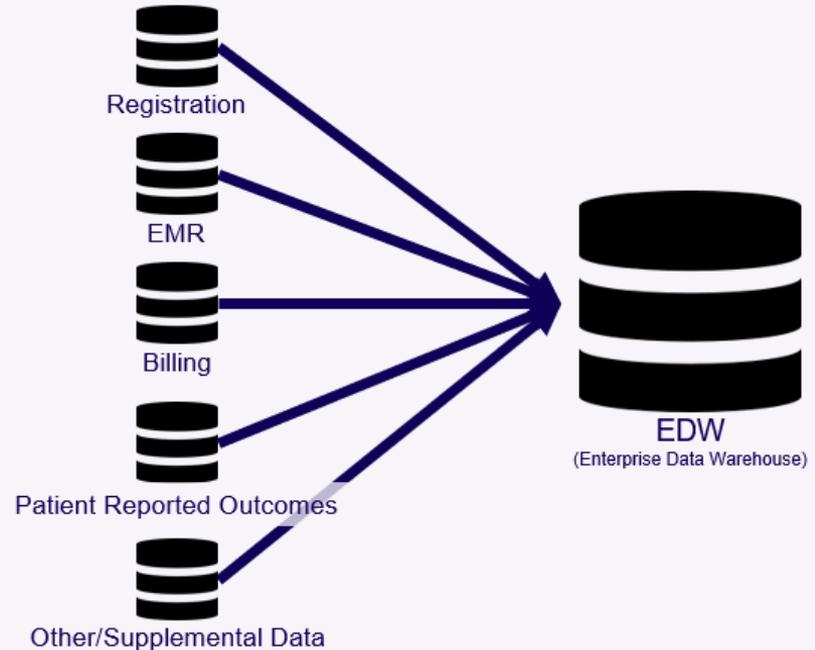
# EMR Products

- EPIC
- Cerner
- And many more!

The Epic logo is rendered in a bold, italicized, red sans-serif font.

# The Data Warehouse

- Data is stored in a data warehouse – a central repository for all the data coming into a data ecosystem
- Can be On Premise or Cloud-Hosted
- Examples Include Amazon Redshift, Google BigQuery, Snowflake, Microsoft Azure, Oracle, etc.
- At Intermountain Health, a team of data architects oversee the process of bringing the data from the source into the EDW.



# Data Visualization – Bringing the Data to Life

- Common Tools for Data Visualization:

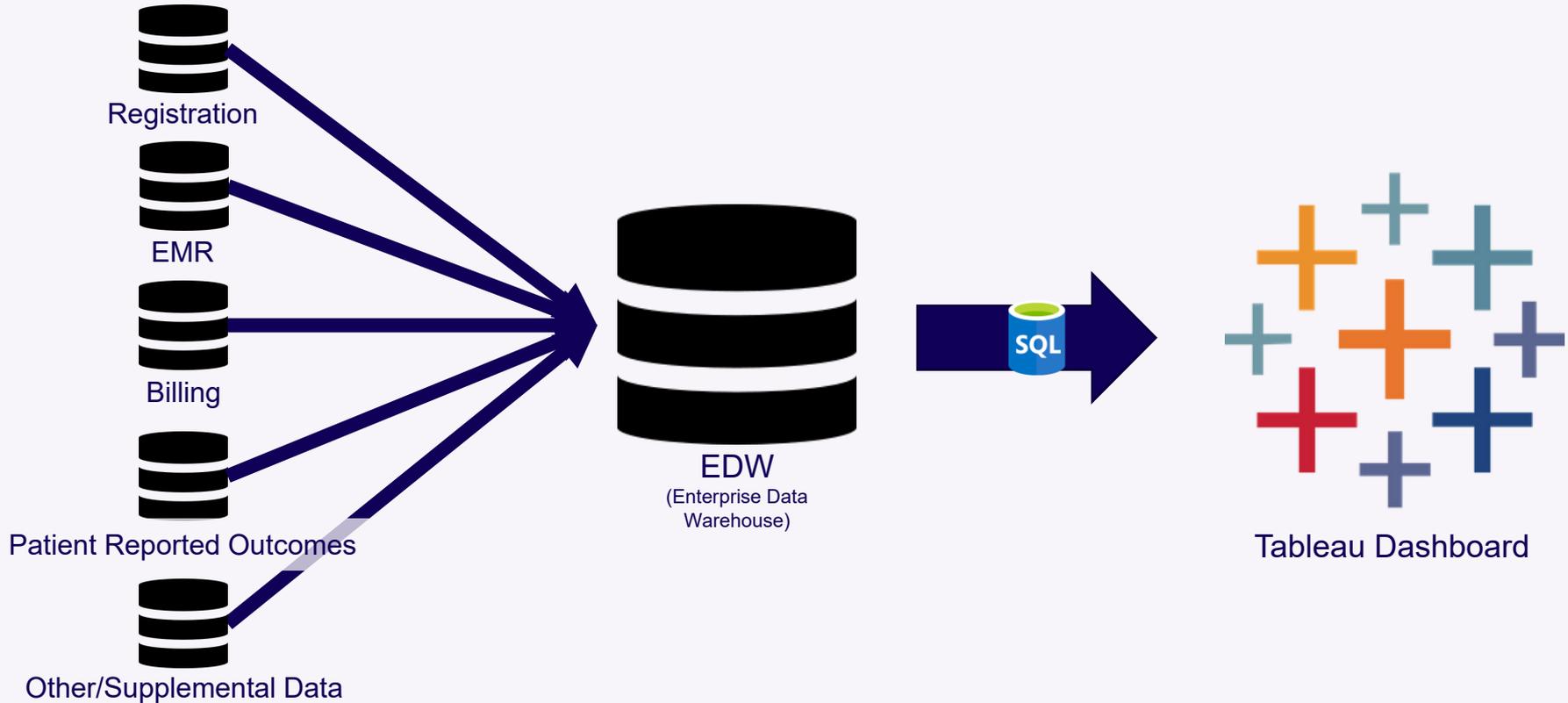
- Tableau (Salesforce)
- Power BI (Microsoft)
- Looker (Google)
- Domo
- Qlik
- And many more!



- The tools for storing, visualizing and consuming data varies widely for many Healthcare organizations



# Data Journey at Intermountain Health



# Working with Data Professionals

Bridging the Communication Gap Between Clinician and Analyst

# Is this Helpful?

	A	B	C	D	E	F	G	H	I	
1	SUMMARY OUTPUT									
2										
3	<i>Regression Statistics</i>									
4	Multiple R	0.97012								
5	R Square	0.941133								
6	Adjusted R Squa	0.926416								
7	Standard Error	515.7254								
8	Observations	11								
9										
10	ANOVA									
11		<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>				
12	Regression	2	34017672.79	17008836	63.94955	1.20086E-05				
13	Residual	8	2127781.758	265972.7						
14	Total	10	36145454.55							
15										
16		<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>	
17	Intercept	-1642.04	1151.801633	-1.42563	0.191804	-4298.10333	1014.015	-4298.1033	1014.01533	
18	Unit Price	9.909374	0.876228512	11.30912	3.36E-06	7.888787251	11.92996	7.88878725	11.9299604	
19	Promotion	8.133162	2.624163278	3.099335	0.014681	2.081830676	14.18449	2.08183068	14.1844934	
20										

# Remember

- There's a lot of jargon out there
- There are too many terms to cover here
- Data terminology is always changing
- Don't be afraid to ask questions



# Educational Background of Data Professionals

- Mathematics
- Statistics
- Computer Science
- Information Systems
- Finance
- Economics
- Many, Many More

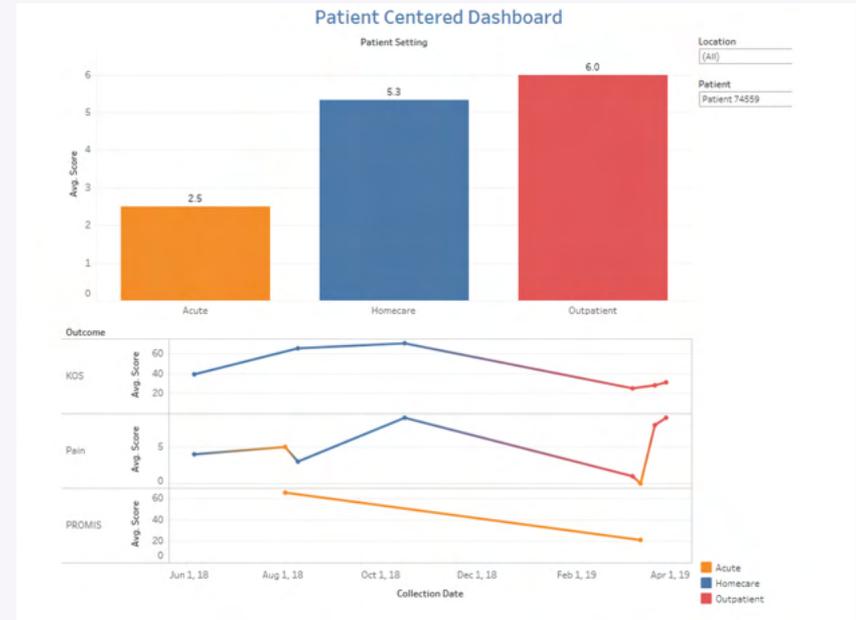
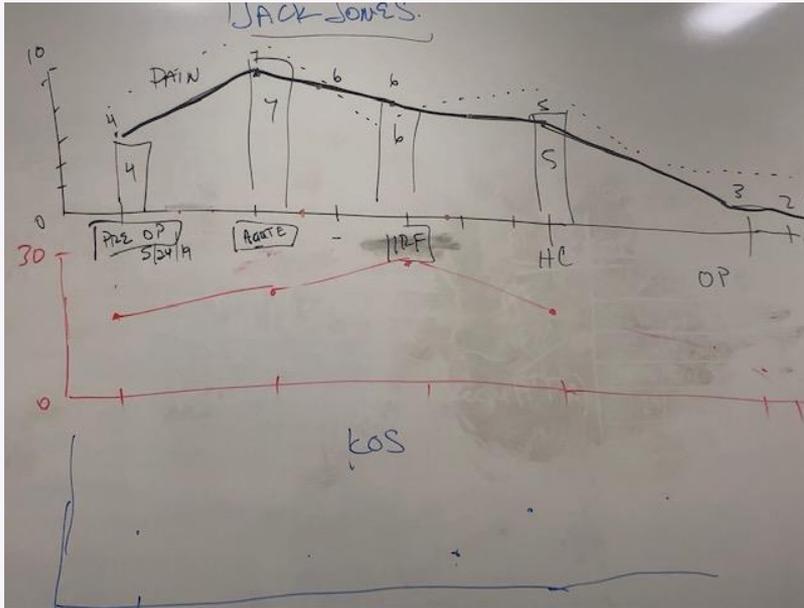


# Communication Tips

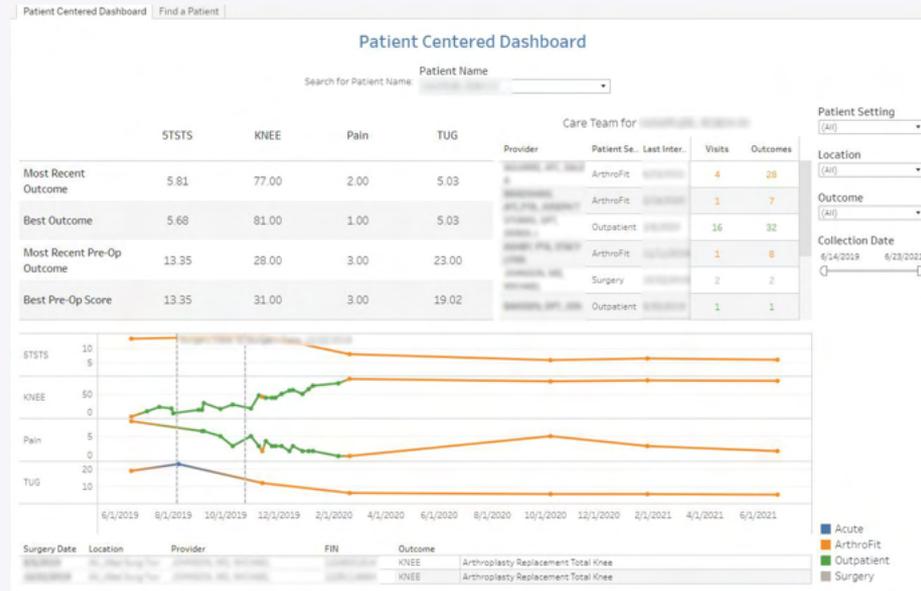
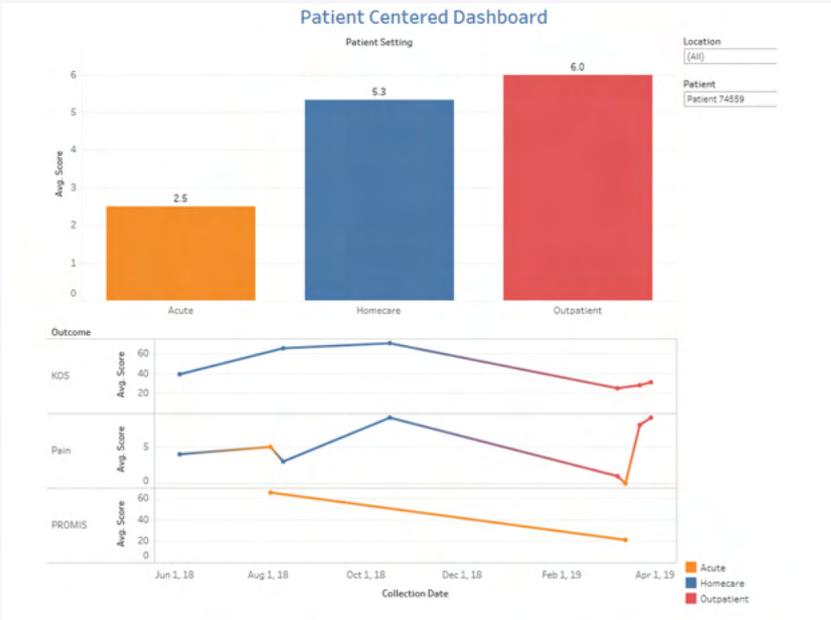
- Explain the “Why”
- Be Specific
- Avoid Jargon and Acronyms
- Give enough time for the data to be collected, queried, and analyzed
- Dashboard development is cyclical and iterative.
- Be clear about prioritization of work



# Whiteboard → First Draft



First Draft → 2<sup>nd</sup> → 3<sup>rd</sup> → .... → ~~Final~~ **Current** Version

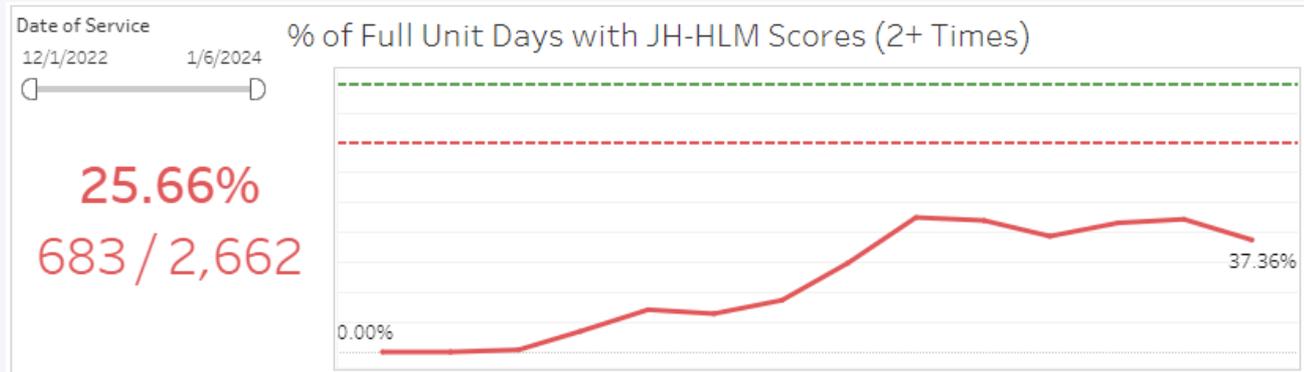
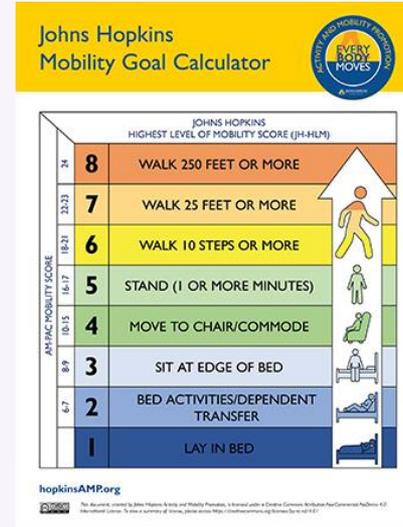


# Data

Who, What, When, Where, How, Why

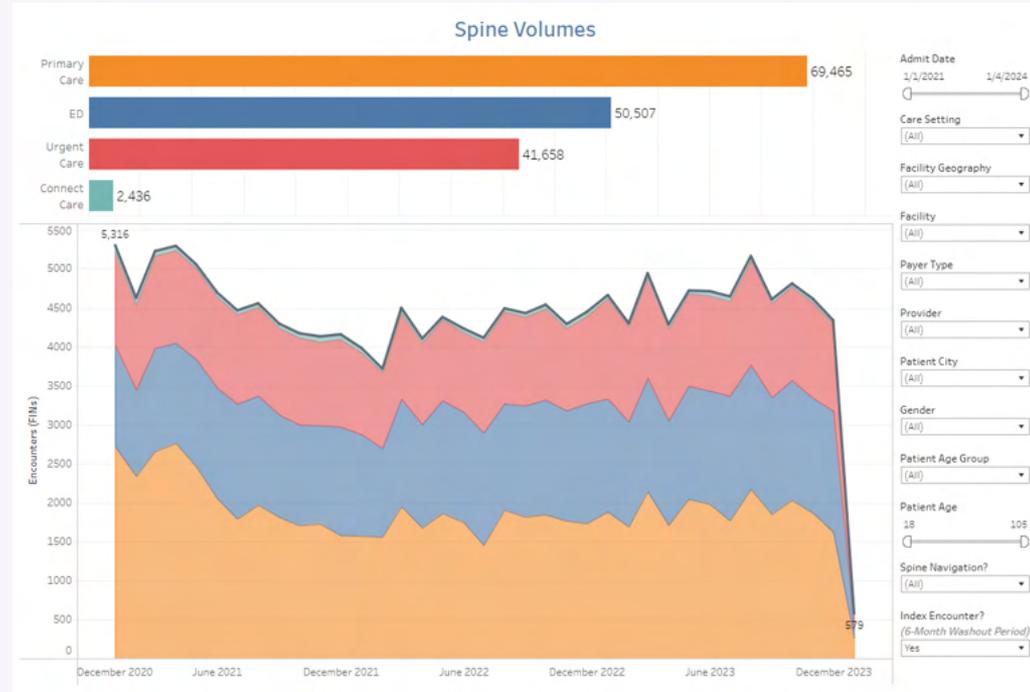
# Who does Data Collection?

- Nurse
- Doctor
- Therapist
- Front Desk
- Patient

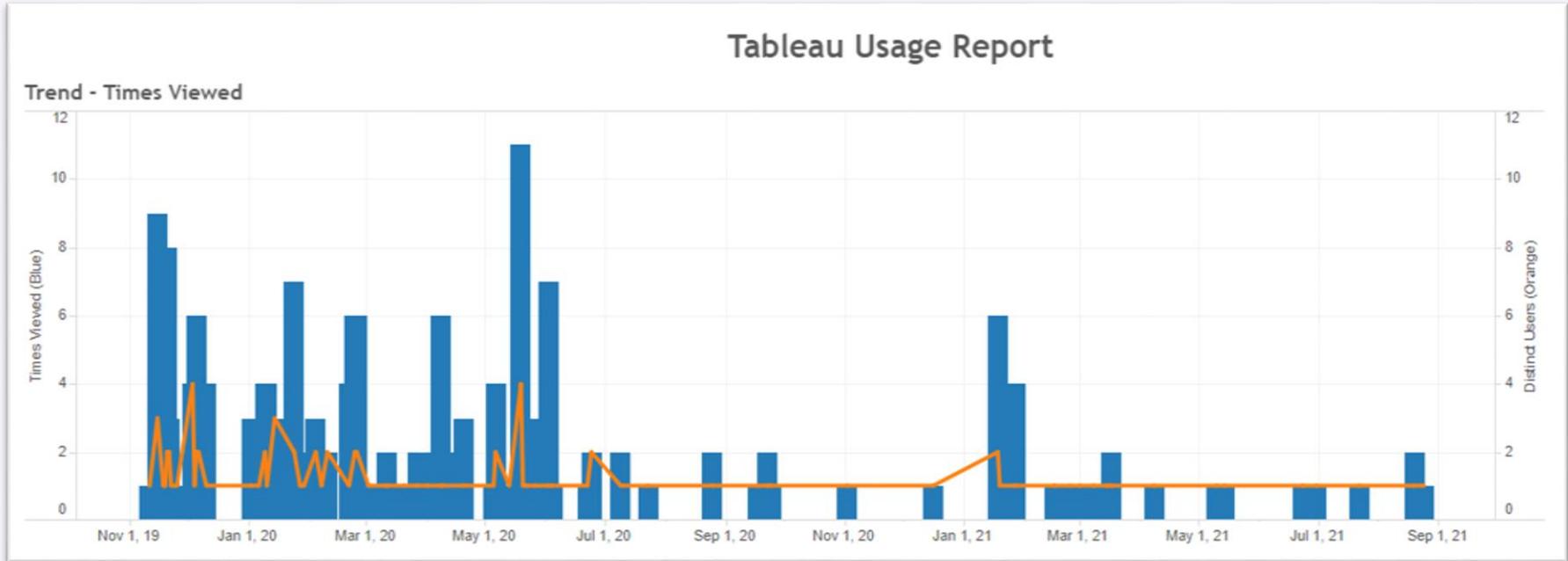


# Who is the Population of Interest?

- Timeframe of Data Collection
- What are the inclusions and exclusions?
- What variables will be used to define the population?



# Who will be using this Data?



# What Data?



What are the variables?



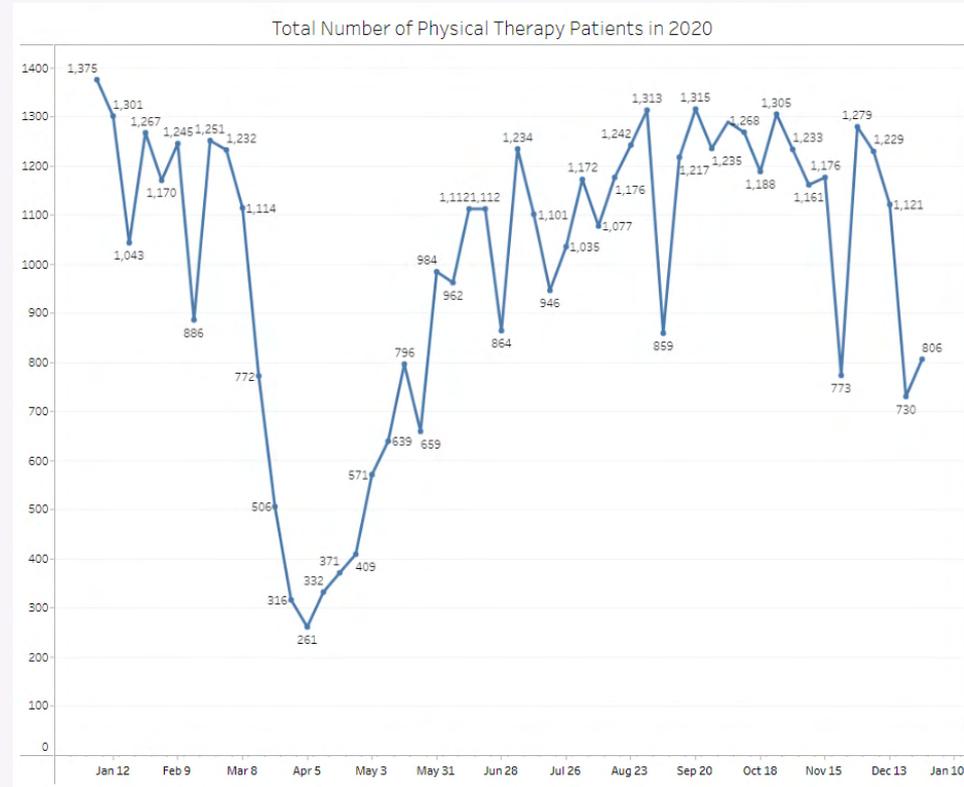
How are the variables defined?



What is the metric?

# When?

- What time of day is the data collected?
- When in relation to the patient visit?
- Are there temporal influences in the data?



# When?

## % of Shifts with JH-HLM Documented

**31.97%**

7,131 / 22,302

Day/Night	Patient Shifts	% of Patient Shifts w/ JH-HLM
Day	10,242	43.33%
Night	12,060	22.33%
All Shifts	22,302	31.97%

Unit	Patient Shifts	% of Patient Shifts w/ JH-HLM
MK_ICU	9,180	15.39%
SG_ICU East Twr	13,122	43.58%

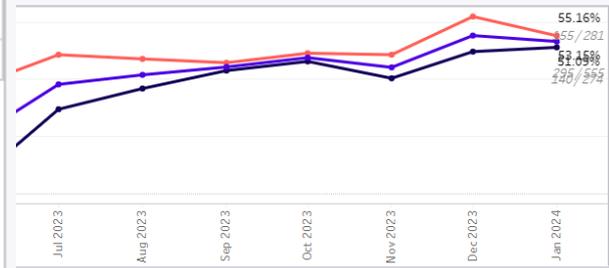
Shift Start Date  
 1/1/2023 1/8/2024  
  
 Last 13 months

Day/Night  
 (All)

Unit  
 (Multiple values)

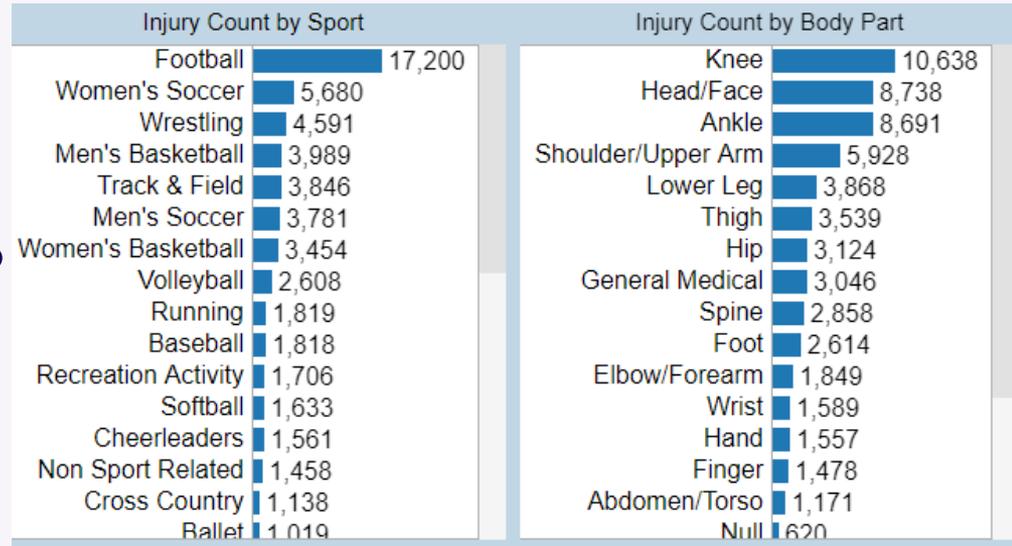
Caregiver Discipline  
 All

Day/Night	Patient Shifts	% of Patient Shifts w/ JH-HLM
Day	10,242	43.33%
Night	12,060	22.33%
All Shifts	22,302	31.97%



# Where?

- Where is the data physically collected?
- Where is the data collected electronically?
- Where is the data stored?
- Where will the data be analyzed?



# Where?

### ICU Volumes

Monitor usage and information where, when, and how our customers engage with member coordination across the system.

### MKD ICU Volumes

Adult ICU, PT only  
Adult ICU, Therapy Only, Therapy on Acute Floor (AF)  
Data Range: Last 13 Months

Month	Volume
Jan	144,300
Feb	150,000
Mar	159,000
Apr	170,000
May	170,000
Jun	162,000
Jul	165,000
Aug	179,000
Sep	170,000
Oct	170,000
Nov	170,000
Dec	170,000

### ICU Therapy Treatments per Patient

Adult ICU, PT only  
Data Range: Last 13 Months

Encounters	Treatments per Patient
1,007	2.66

ICU	Encounters	Treatments per Pt.
HL_Thoracic ICU	421	3.91
HL_General ICU	1,230	3.01
HL_Neuro ICU	146	3.29
HL_Muscle ICU	1,023	3.17
HL_Pulm ICU	1,023	2.81
HL_PSA ICU	303	2.81
HL_Onc ICU	1,007	2.66
HL_Geriatric ICU	199	2.59
HL_Breast/Thyroid ICU	1,879	2.48
HL_Spinal ICU	244	2.47
HL_GI ICU	412	2.33
HL_Card Thor ICU	1,023	2.33
HL_Uro ICU	1,023	2.33
HL_Oth ICU	409	2.06
HL_Peds ICU	134	2.00
HL_PICU	133	1.36

### ICU Therapy Treatments per Patient

Adult ICU, OT only  
Data Range: Last 13 Months

Encounters	Treatments per Patient
499	1.56

ICU	Encounters	Treatments per Pt.
HL_GI ICU	1,023	3.27
HL_Thoracic ICU	1,023	2.98
HL_Neuro ICU	134	2.98
HL_Muscle ICU	1,023	2.40
HL_Pulm ICU	1,023	2.30
HL_PSA ICU	303	2.30
HL_Onc ICU	1,023	2.10
HL_Geriatric ICU	199	2.10
HL_Breast/Thyroid ICU	1,879	1.94
HL_Spinal ICU	244	1.94
HL_GI ICU	412	1.77
HL_Card Thor ICU	1,023	1.77
HL_Uro ICU	1,023	1.77
HL_Oth ICU	409	1.77
HL_Peds ICU	134	1.77
HL_PICU	133	1.77
HL_Geriatric ICU	199	1.56
HL_Breast/Thyroid ICU	1,879	1.56
HL_Spinal ICU	244	1.56
HL_GI ICU	412	1.56
HL_Card Thor ICU	1,023	1.56
HL_Uro ICU	1,023	1.56
HL_Oth ICU	409	1.56
HL_Peds ICU	134	1.56
HL_PICU	133	1.56

### ICU Therapy Treatments per Patient

### ACCESS

Provide usage and information where, when, and how our customers engage with member coordination across the system.

### MKD ICU - Same Day Response

% of Orders Addressed Same Day (8:00 pm to 4:00 pm, all Therapy)  
Data Range: Last 13 Months

Month	Response %
Jan	60.16%
Feb	63.84%
Mar	68.97%
Apr	67.17%
May	68.97%
Jun	68.97%
Jul	68.97%
Aug	68.97%
Sep	68.97%
Oct	68.97%
Nov	68.97%
Dec	92.42%

### % of ICU Patients Receiving PT

% Patients in Adult ICU, All Facilities (MID Focus), PT only  
Data Range: Last 13 Months

ICU	% Patients Receiving PT
HL_Thoracic ICU	90.70%
HL_General ICU	89.16%
HL_Neuro ICU	89.16%
HL_Muscle ICU	89.16%
HL_Pulm ICU	89.16%
HL_PSA ICU	89.16%
HL_Onc ICU	89.16%
HL_Geriatric ICU	89.16%
HL_Breast/Thyroid ICU	89.16%
HL_Spinal ICU	89.16%
HL_GI ICU	89.16%
HL_Card Thor ICU	89.16%
HL_Uro ICU	89.16%
HL_Oth ICU	89.16%
HL_Peds ICU	89.16%
HL_PICU	89.16%

### % of ICU Patients Receiving OT

% Patients in Adult ICU, All Facilities (MID Focus), Seen in ICU, OT only  
Data Range: Last 13 Months

ICU	% Patients Receiving OT
HL_Thoracic ICU	89.16%
HL_General ICU	89.16%
HL_Neuro ICU	89.16%
HL_Muscle ICU	89.16%
HL_Pulm ICU	89.16%
HL_PSA ICU	89.16%
HL_Onc ICU	89.16%
HL_Geriatric ICU	89.16%
HL_Breast/Thyroid ICU	89.16%
HL_Spinal ICU	89.16%
HL_GI ICU	89.16%
HL_Card Thor ICU	89.16%
HL_Uro ICU	89.16%
HL_Oth ICU	89.16%
HL_Peds ICU	89.16%
HL_PICU	89.16%

### % of ICU Patients Receiving SLP

### AMPAC Data & JH-HLM

Utilize AMPAC & JH-HLM metrics to track ICU Mobility Program

### AMPAC Prioritization - PT mobility score % of patients with score >22

Facility Scores (MID Focus), Therapy on Acute Floor (AF)  
Data Range: Last 13 Months

Total Scores	Patients	Median Score	% Above Cutoff
2,629	984	12	3.77%

### AMPAC Compliance - OT activity score % of patients with score >22

Facility Scores (MID Focus), Therapy on Acute Floor (AF)  
Data Range: Last 13 Months

Total Scores	Patients	Median Score	% Above Cutoff
764.0	489.0	13.0	5.76%

### AMPAC Mobility T-Score Change

Adult ICU, PT only  
Data Range: Last 13 Months

Facility	Aug 2023/T Score	Aug 2023/T Score Diff
HL_Thoracic Hospital	6,732	0,434
HL_Hatterman Hospital	6,630	1,111
HL_Neuro Hospital	6,303	6,303
HL_Muscle Hospital	6,282	6,086
HL_Pulm Hospital	6,147	6,294
HL_PSA Hospital	6,207	6,335
HL_Onc Hospital	6,700	6,459
HL_Geriatric Hospital	6,614	6,677
HL_Breast/Thyroid Hospital	6,668	6,214
HL_Spinal Hospital	6,166	6,166

### AMPAC Mobility Discharge Disposition

MID Focus, Seen in ICU, PT in ICU, First ICU Mobility Score (MID Focus), PT in ICU, PT in ICU  
Data Range: Last 13 Months

### JH-HLM

### Time to JH-HLM Mobility Score

Facility All Facilities (MID Focus), Therapy on Acute Floor (AF)  
Data Range: Last 13 Months

Median Time (Hours) to % of Encounters with First JH-HLM at or Above Th.:

41.4 98.3%

### MKD ICU Mobility by Visit Count

MID Patients Seen in the ICU, PT in the ICU, First ICU Mobility Score (MID Focus), PT in ICU, PT in ICU  
Data Range: Last 13 Months

### AMPAC Mobility Discharge Disposition

MID Focus, Seen in ICU, PT in ICU, First ICU Mobility Score (MID Focus), PT in ICU, PT in ICU  
Data Range: Last 13 Months

### AMPAC Mobility Discharge Disposition

### Length Of Stay

Identify impact of ICU mobility on hospital length of stay (LOS)

### Average ICU LOS (MID Focus)

Adult ICU, OT, Therapy Only, Therapy on Acute Floor (AF)  
Data Range: Last 13 Months

Avg. ICU LOS (MID): 3.873

### Average Overall Hospital LOS (MID ICU Focus)

Adult ICU, OT, Therapy Only, Therapy on Acute Floor (AF)  
Data Range: Last 13 Months

Avg. Overall LOS (MID): 7.435

### MKD ICU Duration & # of Visits by AMPAC Mobility Grouping

Encounter Filter: Discharge Facility (MID Focus), Seen in ICU, PT in ICU  
Therapy Filter: Therapy Only (MID Focus), Discharge PT in ICU  
Data Range: Last 13 Months

### MKD ICU Duration & # of Visits by AMPAC Mobility Grouping

### Discharge Disposition

% Discharge to Home, SNF, etc.

### ICU Discharge Rate to Home (MID Focus)

Home Discharge, MID Focus, Patients seen in the ICU, Recreated Therapy on Acute Floor (AF)  
Data Range: Last 13 Months

63.7%

384 / 603

### ICU Discharge to SNF (MID Focus)

SNF Discharge, MID Focus, Patients seen in the ICU, Recreated Therapy on Acute Floor (AF)  
Data Range: Last 13 Months

ICU Discharge to SNF: 13.8%

222 / 1,604

### ICU Discharge to SNF (MID Focus)

### ICU Discharge to SNF (MID Focus)

### Readmissions

Track readmissions to identify ICU mobility impact.

### Hospital 30-Day Readmissions

MID Readmission, Patients seen in the ICU, Recreated Therapy on Acute Floor (AF)  
Data Range: Last 13 Months

31.0%

4,646 / 14,983

### Hospital 30-Day Readmissions

### Hospital 30-Day Readmissions

### Hospital 30-Day Readmissions

### Safety

### Therapy Caregiver Injuries - MKD

Encounter Type - Patient Handling, Discharge (MID Focus), and Non-OSHA (MID Focus)  
Data Range: Last 12 Months

2023: 4

### Therapy Caregiver Injuries - MKD

### Therapy Caregiver Injuries - MKD

### Therapy Caregiver Injuries - MKD

### Patient Falls

MID, Fall, Inpatient, All Therapy  
Data Range: Last 13 Months

2023: 11

# How will the data be collected?

- Paper vs Electronic
- Random Sample vs Retrospective
- What software is used?
- How is the data stored/aggregated?
- Dictation, Transcription, Automation, Manual Entry?

# How will the data be analyzed?

- Data must be:
  - Valid
  - Accurate
  - Accessible
- Analysis must account for Variation

# Challenges with Data Validity

- Invalid data recorded (e.g., numeric field allows text)
- Data is queried incorrectly
- Unusable at scale (example: free-text)

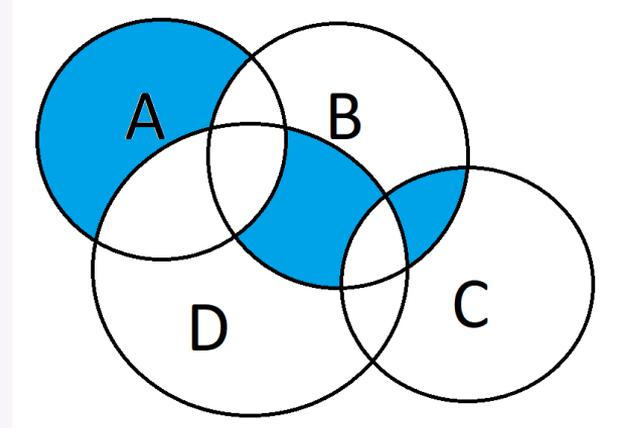


WARNING! The data points you are about to view are real and may be painful to see. Viewer discretion is advised

	Score	Pain	
<b>Correct Data!</b>	Lower extremity function scale (LEFS)	55	2
Total Possible Shown as Denominator	Lower extremity function scale (LEFS)	59/80	2
Score/Pain Format Used	Lower extremity function scale (LEFS)	60/4	
73%? Does that mean 73/80 or 58/80=73%	Lower extremity function scale (LEFS)	73%	
94 is above max score of 80	Lower extremity function scale (LEFS)	94	1
NR? = Not Rated? No Result? Nuclear Reactor?	Lower extremity function scale (LEFS)	NR	5
My personal favorite	Lower extremity function scale (LEFS)	785	

# Challenges with Data **Validity**

- Invalid data recorded (e.g., numeric field allows text)
- **Data is queried incorrectly**
- Unusable at scale (example: free-text)



# Challenges with Data Validity

- Invalid data recorded (e.g., numeric field allows text)
- Data is queried incorrectly
- **Unusable at scale (example: free-text)**

**Other Balance Information**

Segoe UI

STS= 22 in 30 secs

SLS= R: 10 L: 10

Tandem= R: 10 L: 10

Grip= R: 56,54,50 Ave: 53  
L: 50,44,41 Ave: 45

**Other Balance Information**

Segoe UI

9

30 second repeated sit> <stand: 7 repetitions

**Other Balance Information**

Segoe UI

9

Sit<>stand= 9 reps in 30 sec

Grip= R= 51,54,49, av:52; L= 50,47,45 av:47

Tandem= R: 10sec L: 10sec

SLS= R: 10 sec L: 10 sec

# Challenges with Data Accuracy

- Data collection / definitions / metrics not standardized
- Data recorded incorrectly
- EMR does not reflect current/accurate data

## Performance Outcome Measure (Ref)

	Score	As
Timed Up and Go (0.0 sec)	20	<A
5 Times Sit to Stand (0.0 sec: '0' if unable)		<A

## Functional Testing (ref)

	Total Score	Co
Right Knee ROM Degrees		
Left Knee ROM Degrees		
TUG	8.44	
5 Rep Sit to Stand	10.24	

# Challenges with Data Accuracy

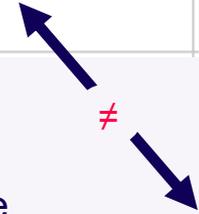
- Data collection / definitions / metrics not standardized
- **Data recorded incorrectly**
- EMR does not reflect current/accurate data

Patient-Reported Score

Survey Type	Survey Completed	Survey Score
LEFS	In Clinic	51

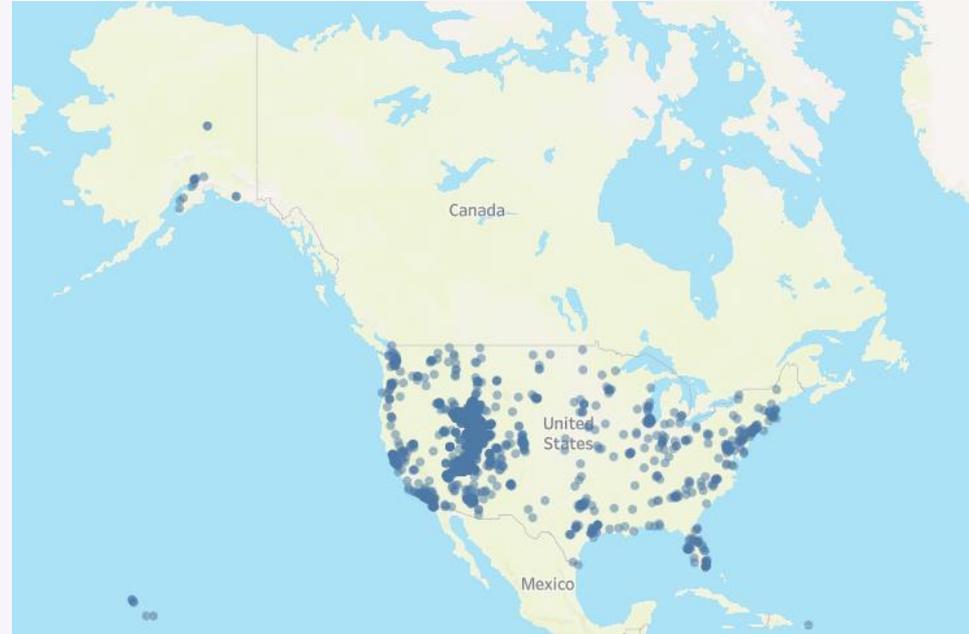
Documented Score

Lower extremity function scale (LEFS)	55
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# Challenges with Data Accuracy

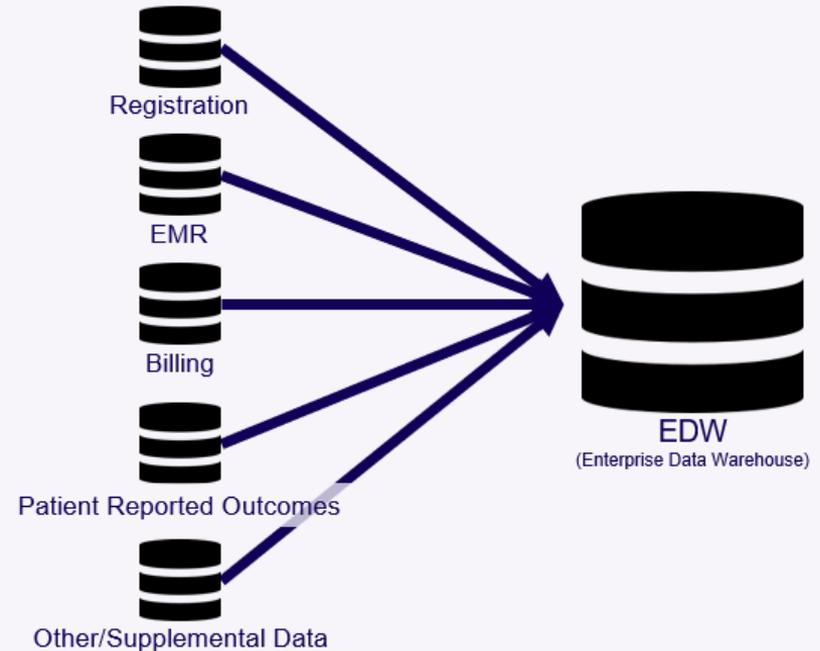
- Data collection / definitions / metrics not standardized
- Data recorded incorrectly
- **EMR does not reflect current/accurate data**



Patient Home Address Heatmap for Physical Therapy Visits

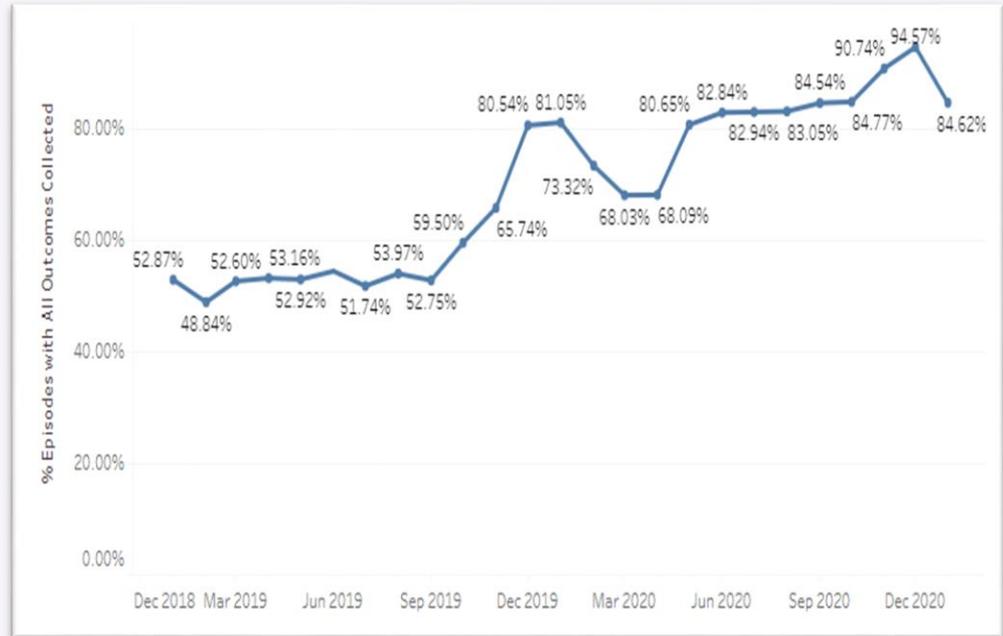
# Challenges with Data Accessibility

- Disparate data systems ( multiple EHRs, 3<sup>rd</sup>-party apps, etc.)
- Failure to capture data at time of visit
- Patient exits system prematurely



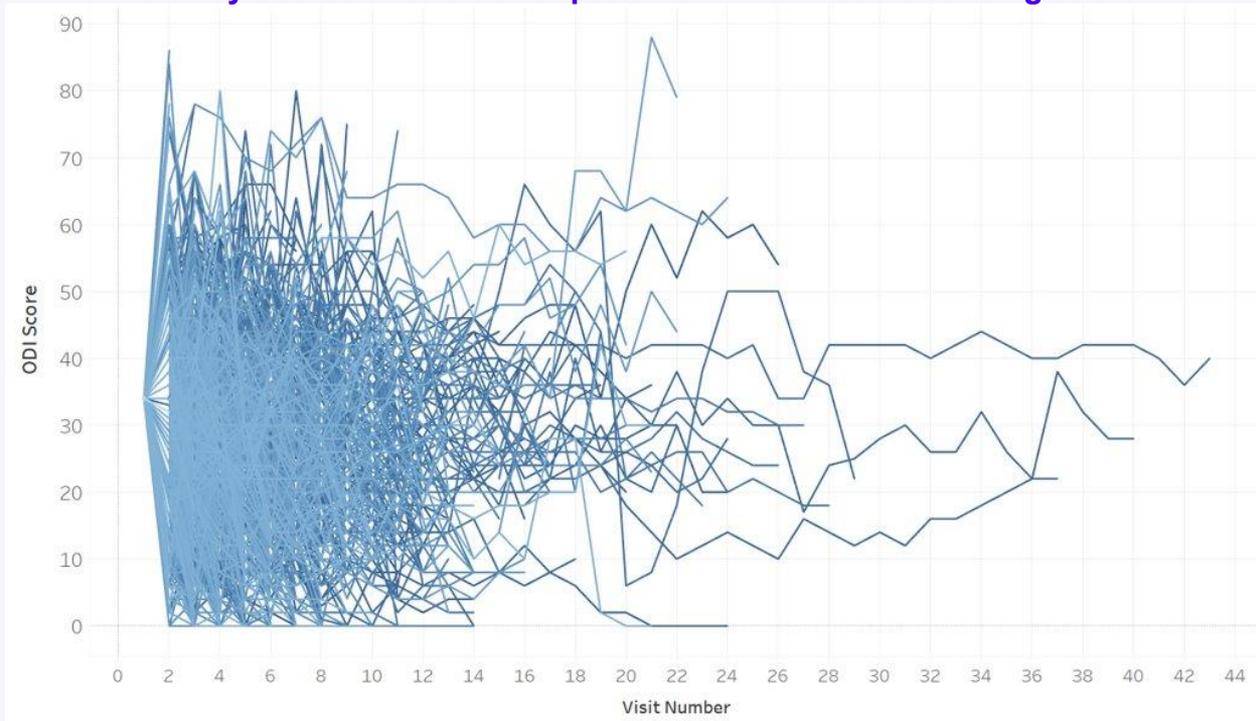
# Challenges with Data Accessibility

- Disparate data systems ( multiple EHRs, 3<sup>rd</sup>-party apps, etc.)
- **Failure to capture data at time of visit**
- **Patient exits system prematurely**



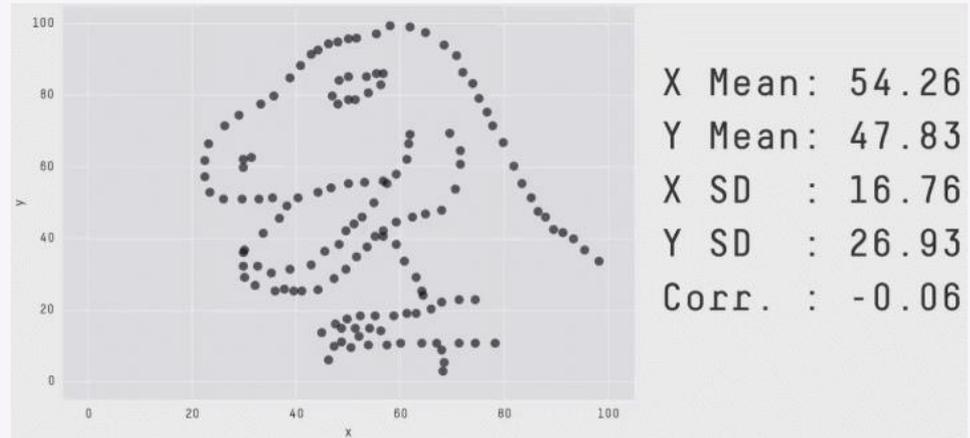
# Account for **Variation** in the Data

Survey scores over time for patients with the same starting score



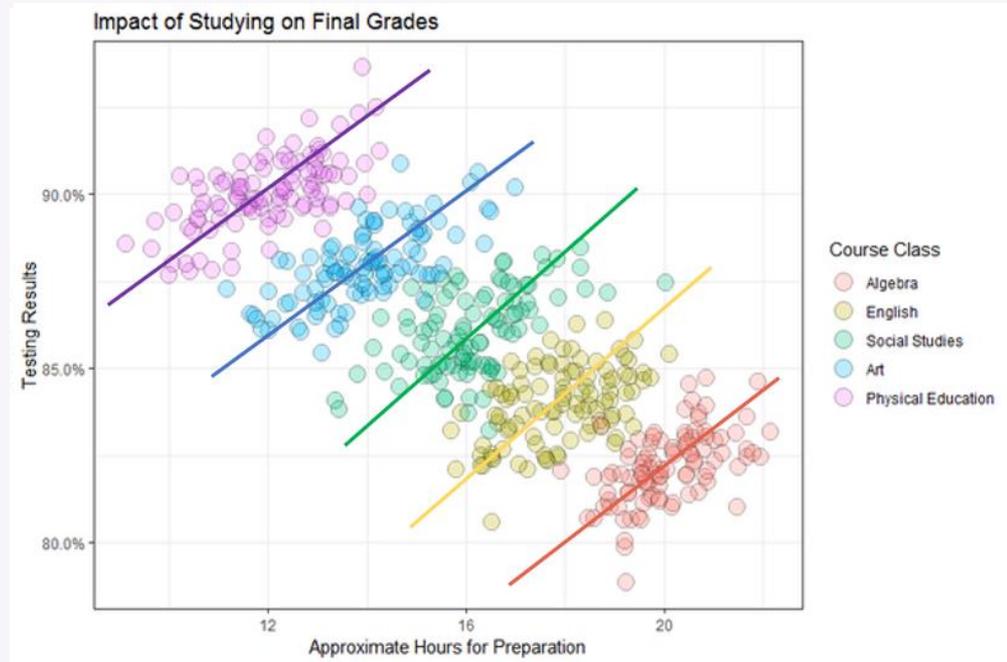
# Account for **Variation** in the Data

- **Common aggregations do not accurately describe data**
- **Outliers**
- Statistical methods are used incorrectly; model assumptions aren't valid.
- **Confounding Variables**
- **Correlation  $\neq$  Causation**

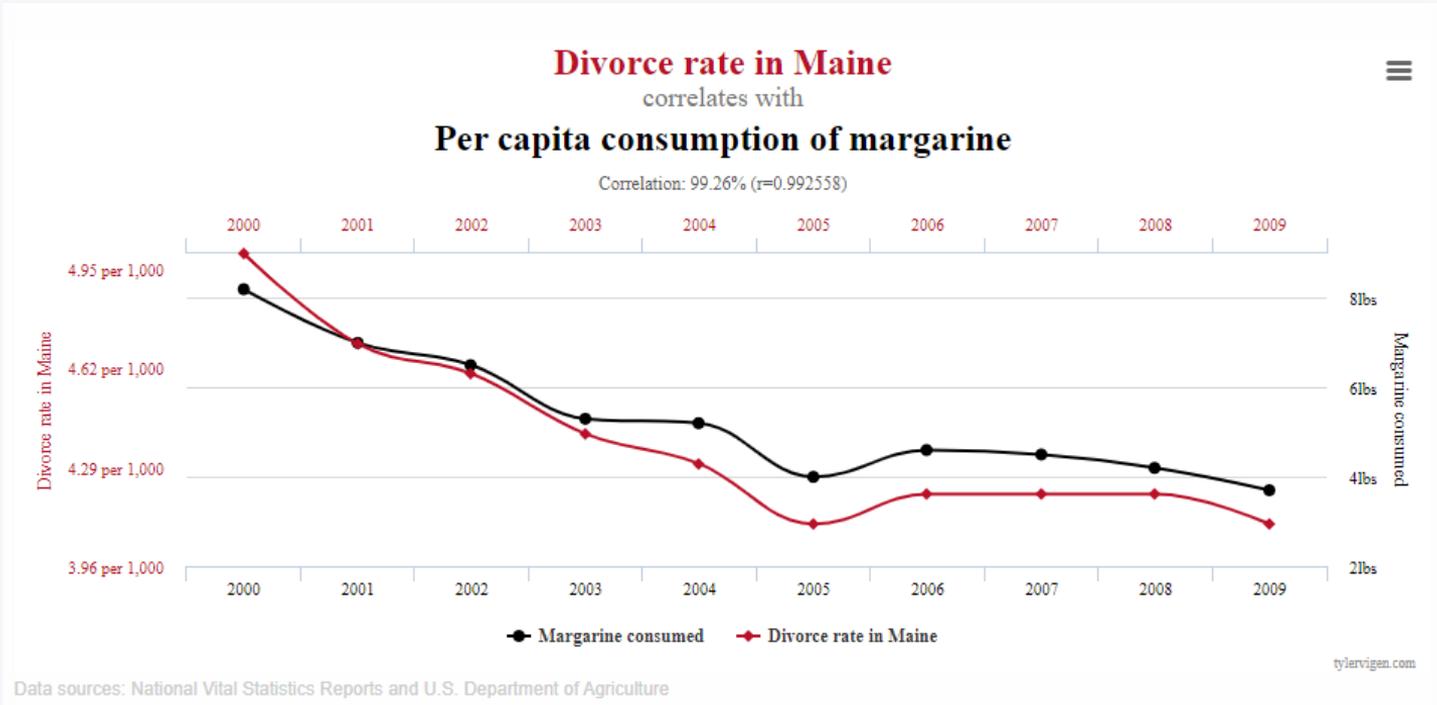


# Account for **Variation** in the Data

- Common aggregations do not accurately describe data
- Outliers
- **Statistical methods are used incorrectly; model assumptions aren't valid.**
- **Confounding Variables**
- **Correlation  $\neq$  Causation**



# Account for **Variation** in the Data



# Why?

We'll get to this one at the end...

# Building Dashboards that Drive Change

# Keys to Dashboard Design

- *Define Target Audience*
- *Define the Question/Problem*
- *Keep it Simple*
- *Choose the Right Visualization*
- *Tell a Story*
- *Allow Data Exploration*

# Define Target Audience – Available Eval Slots

- Audience: Rehab Leadership, Schedulers, Therapists

Therapist Calendar

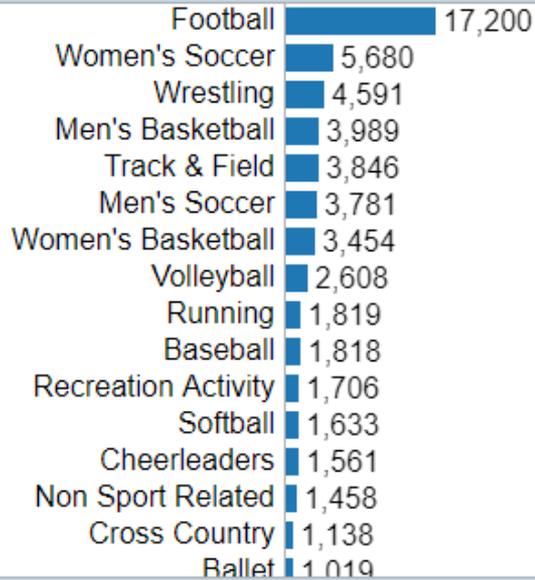
	Mon	Tue	Wed	Thu	Fri
Sept 2022					23
					0
	26	27	28	29	30
	0	0	1	0	0
	Available Eval Slots				
Oct 2022	3	4	5	6	7
	5	1	4	1	1
	Available Eval Slots				
	10	11	12	13	14
	9	6	8	6	3
	Available Eval Slots				
	17	18	19	20	21
9	6	10	7	3	
Available Eval Slots					
24	25	26	27	28	

# Define Target Audience – Athlete Injuries

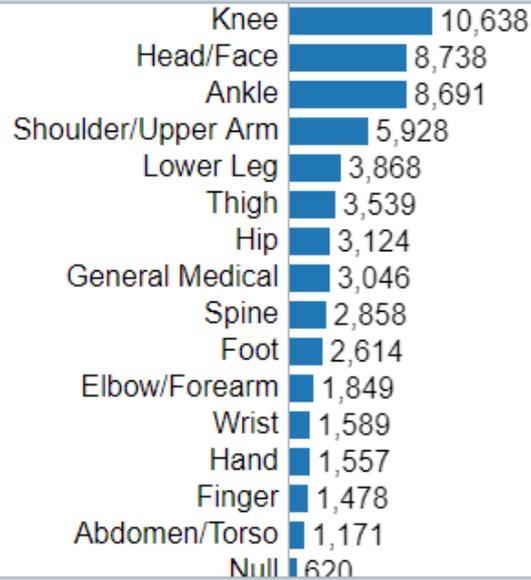
- Audience: Coaches and Athletic Trainers

Total Injuries: 62,739

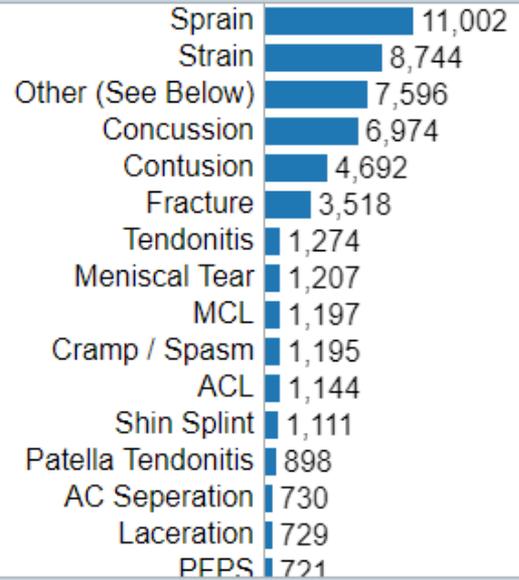
Injury Count by Sport



Injury Count by Body Part

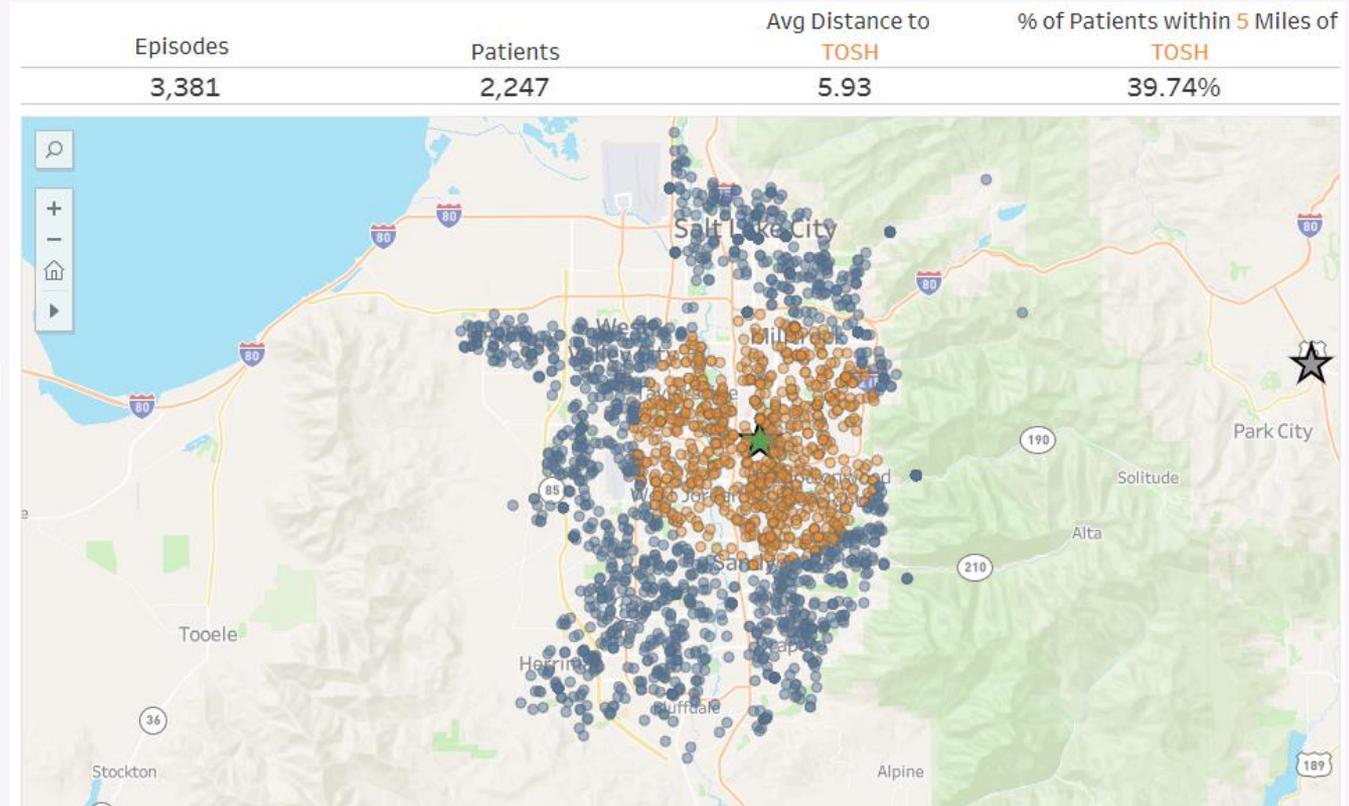


Injuries by Type

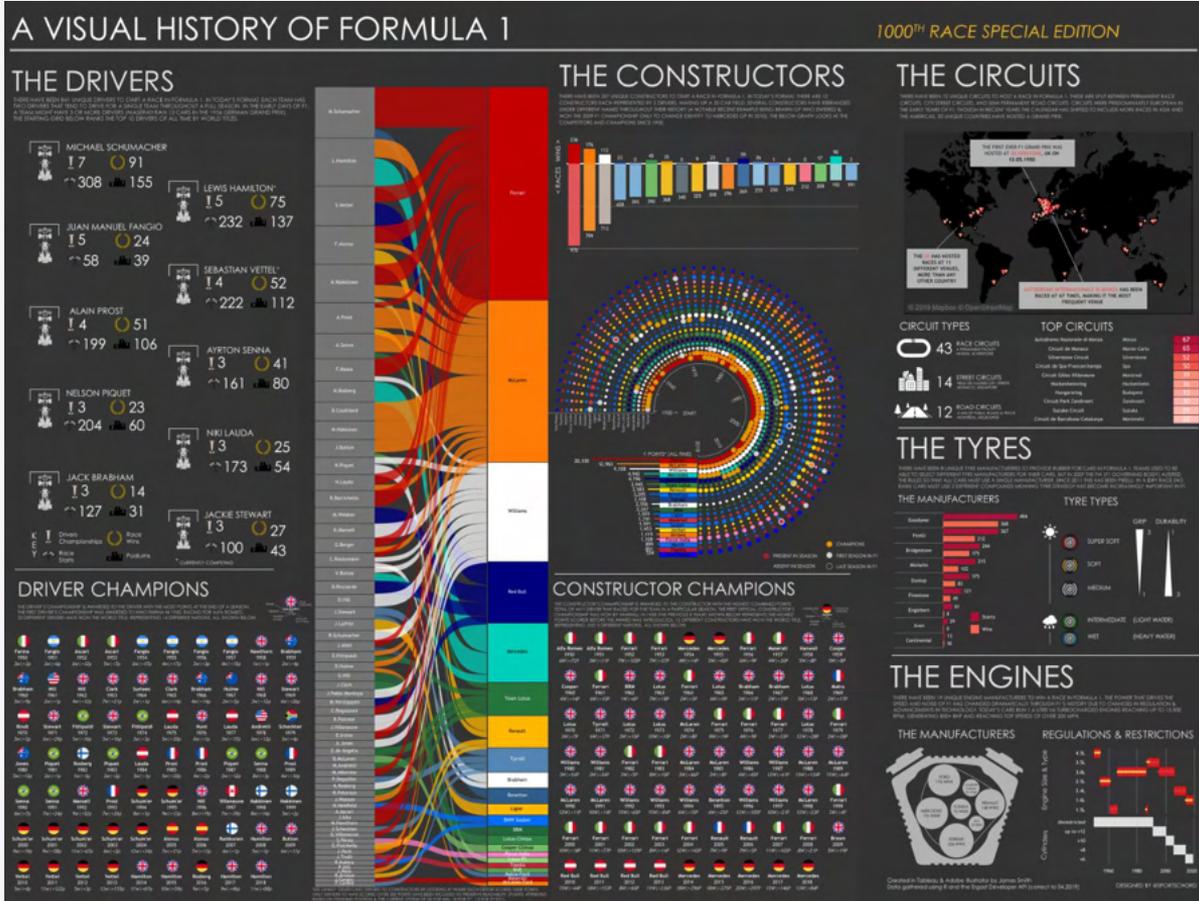


# Define the Question/Problem

- How far are our patients traveling?
- Where should we build a new clinic?
- What is the Metric?
  - Patient Travel Time/Distance

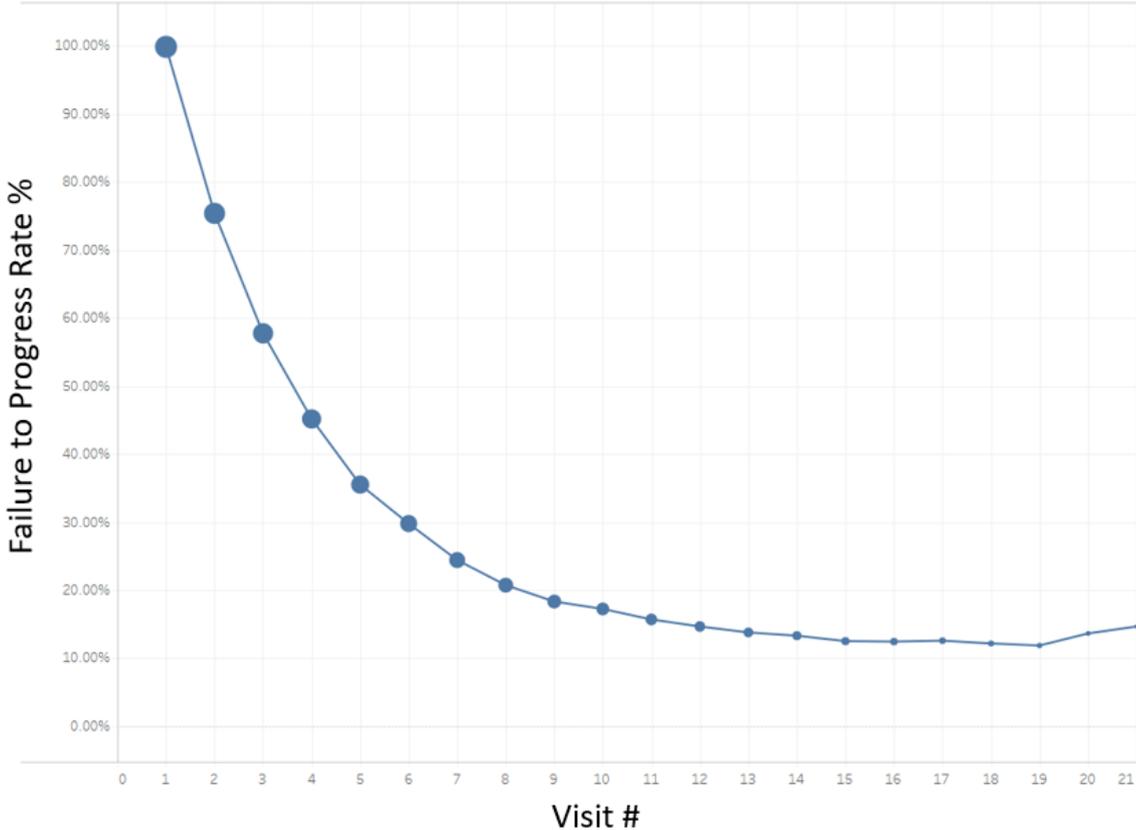


# Keep it Simple – Which is Better?



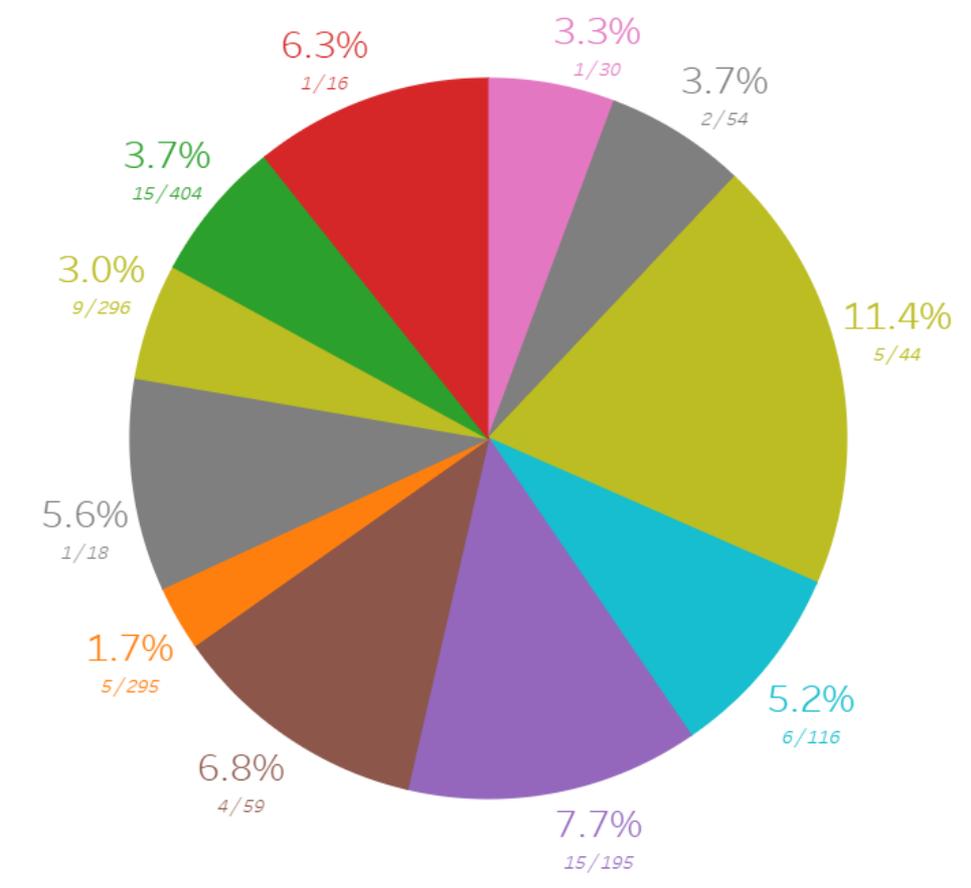
# Keep it Simple – Which is Better?

Total Knee Arthroplasty (TKA) Failure to Progress Rate by Visit #



# Choose the Right Visualization

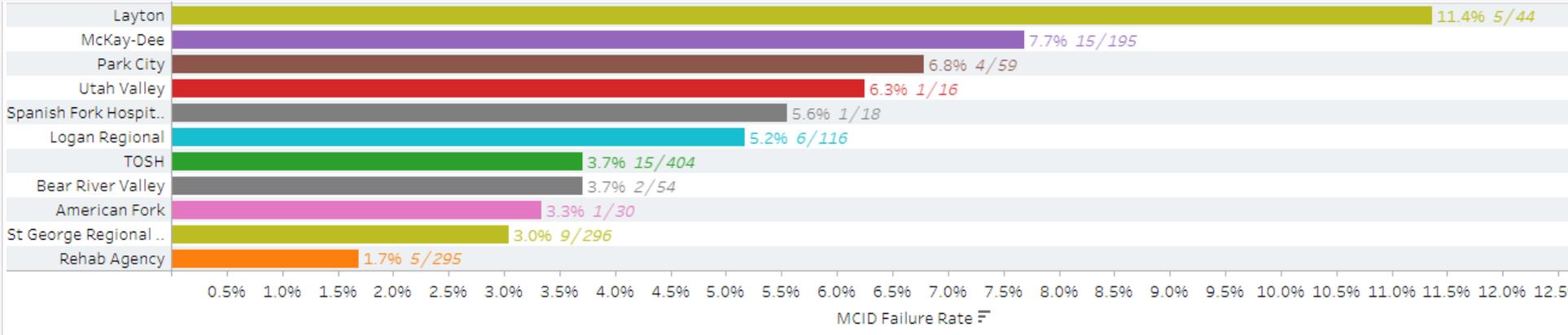
Which Clinic had the 2<sup>nd</sup> Highest Failure Rate?



- Facility
- American Fork
  - Bear River Valley
  - Layton
  - Logan Regional
  - McKay-Dee
  - Park City
  - Rehab Agency
  - Spanish Fork Hospital
  - St George Regional H...
  - TOSH
  - Utah Valley
  - Grand Total

# Choose the Right Visualization

*Which Clinic had the 2<sup>nd</sup> Highest Failure Rate?*



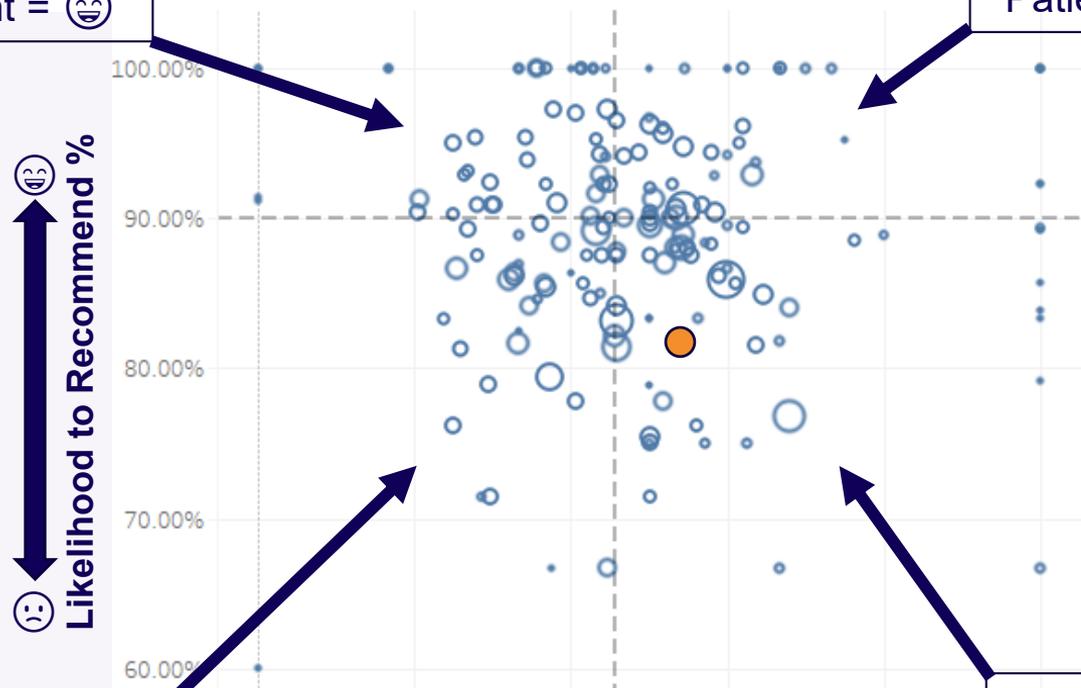
# Tell a Story with Your Data

Therapist Name	Failure to Progress Rate	Likelihood to Recommend %
Therapist A	23%	86%
Therapist B	45%	42%
Therapist C	65%	72%
Therapist D	12%	81%
Therapist E	19%	32%
Therapist F	27%	30%
Therapist G	33%	74%
Therapist H	25%	92%
...	...	...

# Tell a Story with Your Data

Patient Perception = 😊  
Patient Improvement = 😊

Patient Perception = 😊  
Patient Improvement = 😞



- Each Dot is a Therapist
- The size of the dot indicates patient volumes

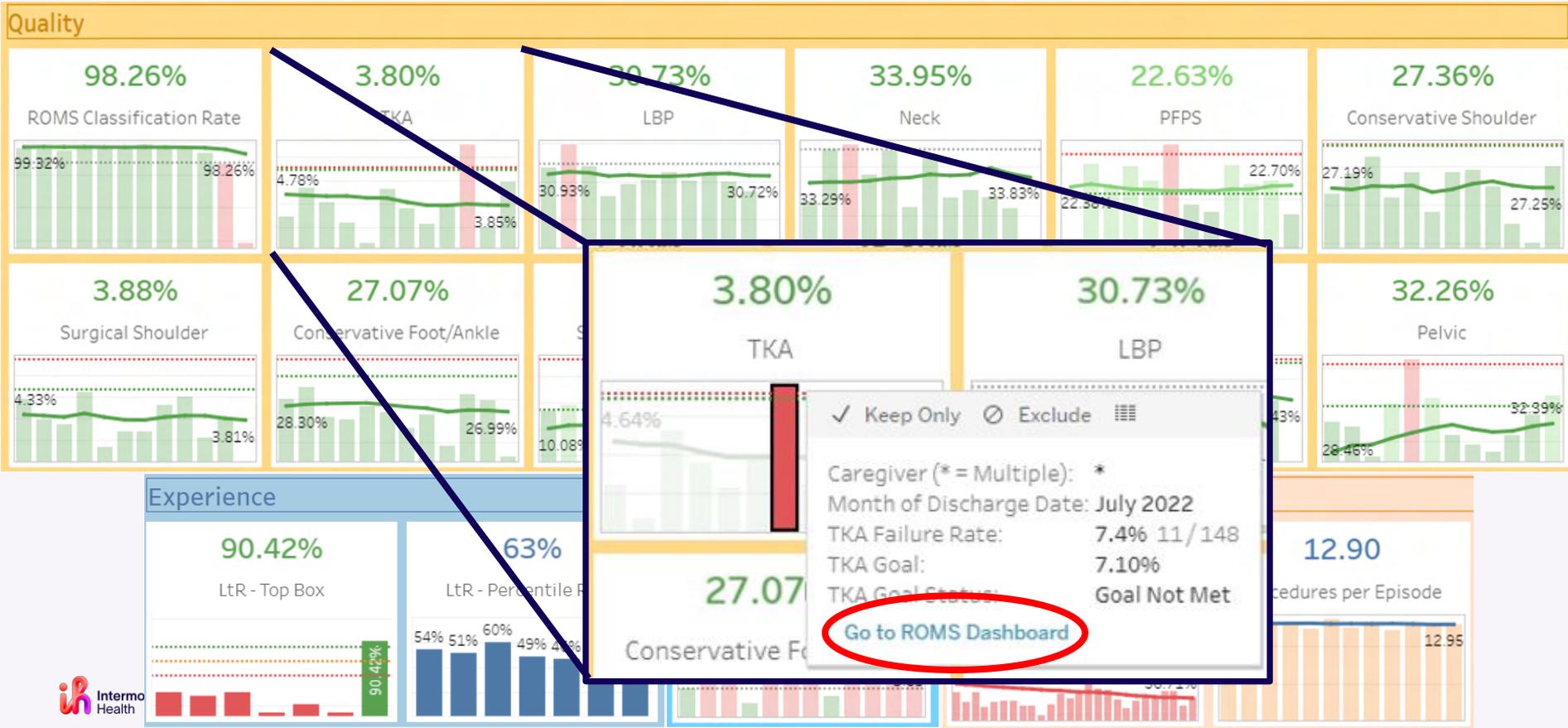
↑ Likelihood to Recommend % ↑  
😊 😊  
↓ 😞 😞

Failure to Progress Rate %  
😊 ← → 😞

Patient Perception = 😞  
Patient Improvement = 😊

Patient Perception = 😞  
Patient Improvement = 😞

# Allow for Data Exploration/Validation

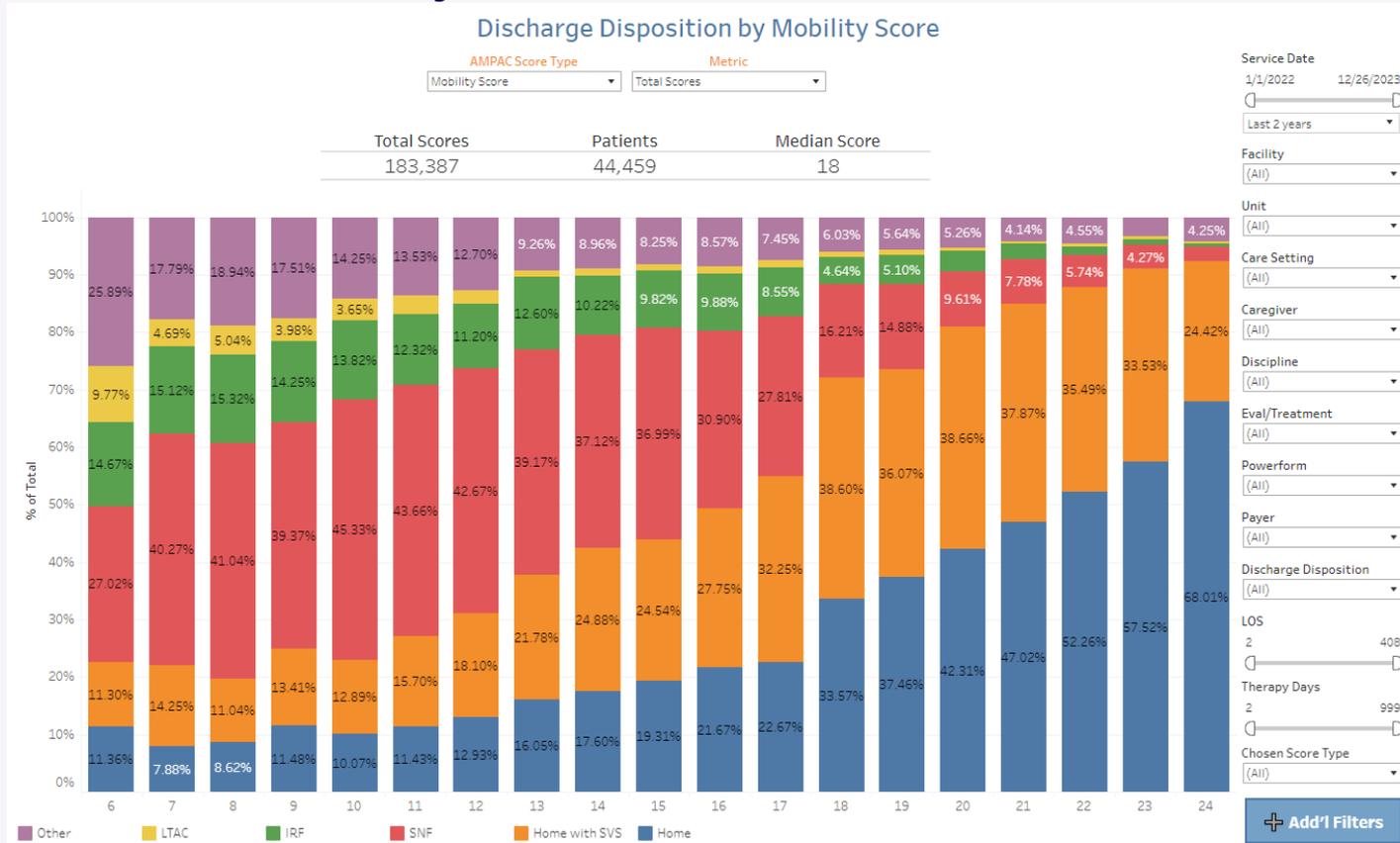


# Keys to Dashboard Design

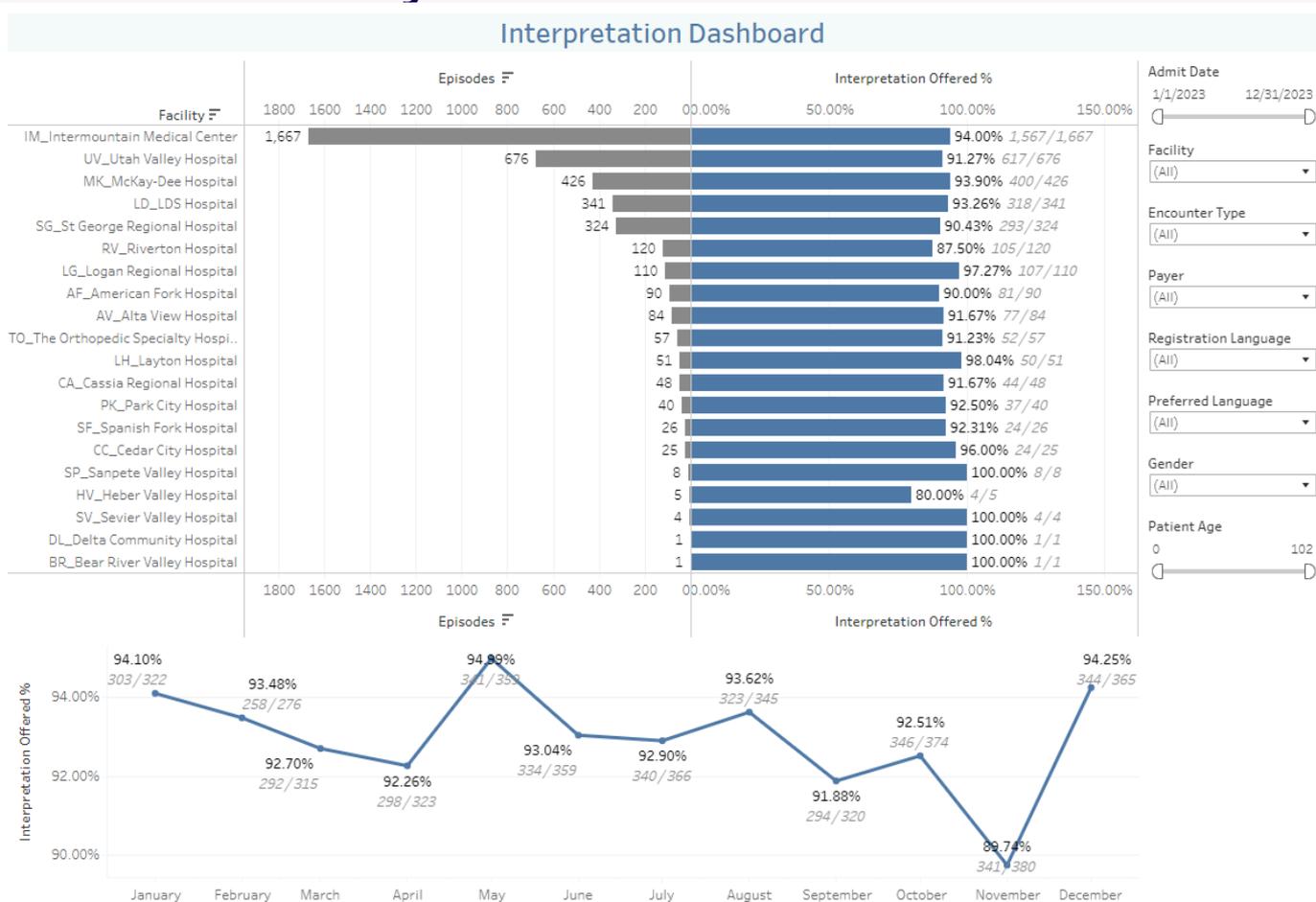
- *Define Target Audience*
- *Define the Question/Problem*
- *Keep it Simple*
- *Choose the Right Visualization*
- *Tell a Story*
- *Allow Data Exploration*

# Dashboard Examples

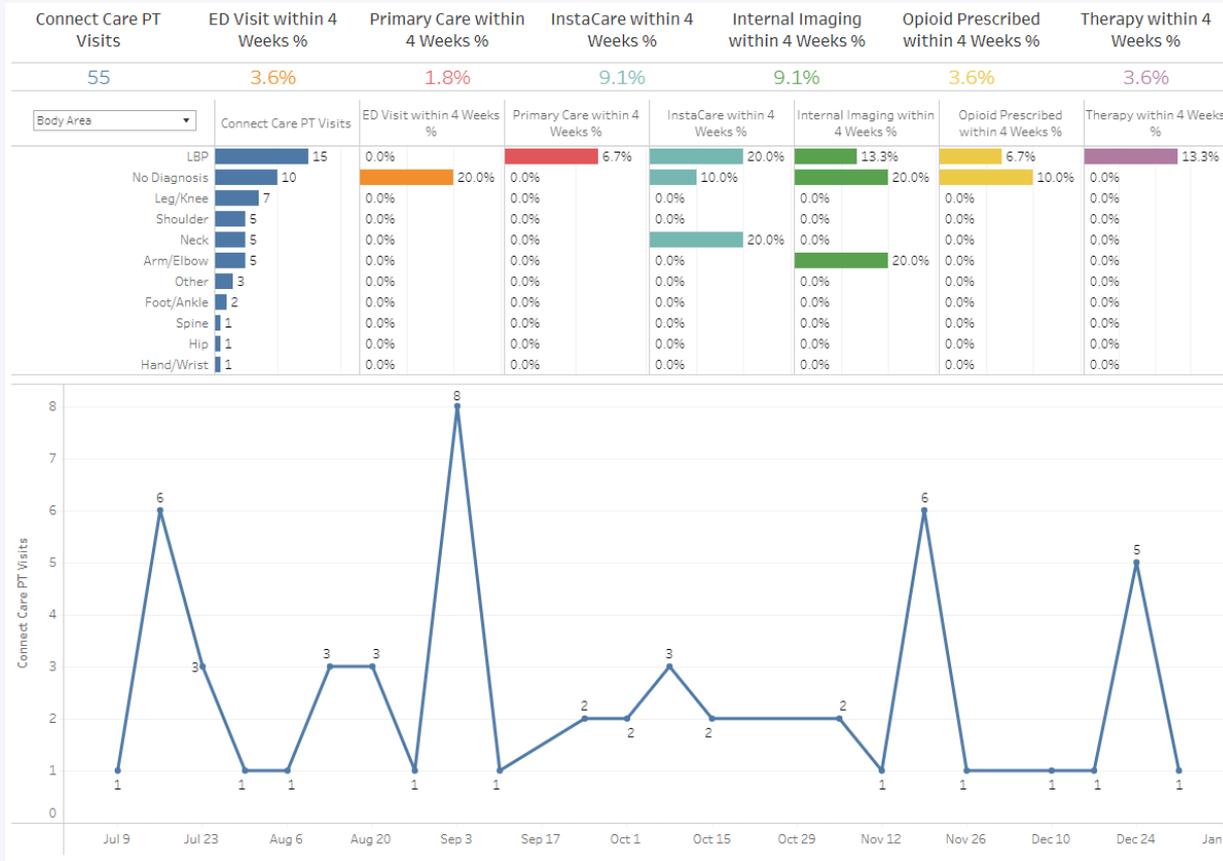
# Acute Rehab Analytics



# Acute Rehab Analytics



# Connect Care PT



# Intermountain Health Rehab Equity Dashboard

Rehab Equity Definitions

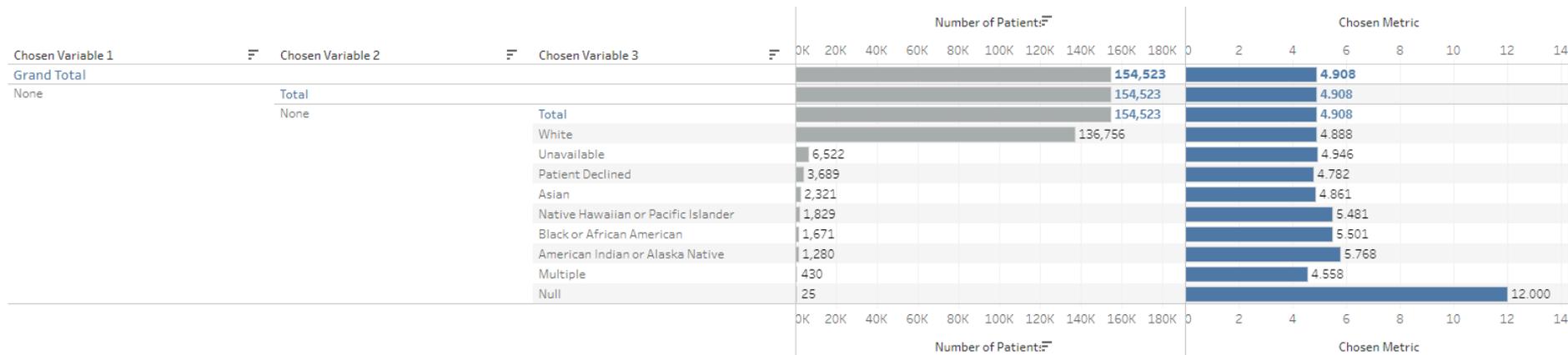
## Intermountain Rehabilitation Services Equity Dashboard



Patient Demographic Filters			Facility Filters	Encounter Filters			Diagnosis Filters		Outpatient Filters	Additional Filters
Patient Age 0 123 Gender (All)	Race (All)	ADI Quintile/Value (All) -40.0 139.4 City County (All) (All) Zipcode	Facility (All)	Admit Date 1/1/2022 3/1/2023	Admit Source (All)	LOS in Days (Admit to Discharge) 0.00 450.71	Diagnosis Category (All)	ROMS Class. Group (All)	ROMS Outcome (All)	+ Billing Filters + AMPAC Filters
+ Language Filters	Ethnicity (All)	Religion (All)	Unit (All)	Rehab Setting (All)	Admit Type (All)	LOS in Days (First to Last Charge) 0.00 738.96	Primary Diagnosis (All)	ROMS Classification (All)	Successful Outcome? (All)	
	Marital Status (All)		Dist. to Facility (mi.) 0.03 6,301.04	Encounter Type (All)	Admitted Through ED (All)	Discharge Disposition (All)	IRF RIC (All)	ROMS Body Area (All)	FTP (MCID)? (All)	
				Payer (All)	Telehealth? (All)	Disciplines Involved (All)	IRF PIC (All)	ROMS Treatment Type (All)	FTP (30%)? (All)	
									Chronic? (All)	

Choose Variable 1 None	Choose Variable 2 None	Choose Variable 3 Race	Choose Metric Avg Billed Patient Days
---------------------------	---------------------------	---------------------------	--

Avg Billed Patient Days Broken Down by Race



# Rehab Equity Dashboard - Filters

### Patient Demographic Filters

**Patient Age**  
0 123

**Race**  
(All) ▼

**ADI Quintile/Value**  
(All) ▼

**Ethnicity**  
(All) ▼

**Religion**  
(All) ▼

**Marital Status**  
(All) ▼

**Gender**  
(All) ▼

**+ Language Filters**

### Encounter Filters

**Admit Date**  
1/1/2022 3/1/2023

**Admit Source**  
(All) ▼

**Admit Type**  
(All) ▼

**Admitted Through ED**  
(All) ▼

**Discharge Disposition**  
(All) ▼

**Telehealth?**  
(All) ▼

**Rehab Setting**  
(All) ▼

**Encounter Type**  
(All) ▼

**Payer**  
(All) ▼

**LOS in Days (Admit to Discharge)**  
0.00 450.71

**LOS in Days (First to Last Charge)**  
0.00 738.96

**Disciplines Involved**  
(All) ▼



# Rehab Equity Dashboard - Filters

Facility Filters	Diagnosis Filters	Outpatient Filters	Additional Filters
<p>Facility</p> <input type="text" value="(All)"/>	<p>Diagnosis Category</p> <input type="text" value="(All)"/>	<p>ROMS Outcome</p> <input type="text" value="(All)"/>	<p><b>+ Billing Filters</b></p> <p><b>+ AMPAC Filters</b></p>
<p>Unit</p> <input type="text" value="(All)"/>	<p>ROMS Class. Group</p> <input type="text" value="(All)"/>	<p>Successful Outcome?</p> <input type="text" value="(All)"/>	
<p>Dist. to Facility (mi.)</p> <p>0.03      6,301.04</p> 	<p>Primary Diagnosis</p> <input type="text" value="(All)"/>	<p>FTP (MCID)?</p> <input type="text" value="(All)"/>	
	<p>IRF RIC</p> <input type="text" value="(All)"/>	<p>ROMS Classification</p> <input type="text" value="(All)"/>	<p>FTP (30%)?</p> <input type="text" value="(All)"/>
	<p>IRF PIC</p> <input type="text" value="(All)"/>	<p>ROMS Body Area</p> <input type="text" value="(All)"/>	<p>Chronic?</p> <input type="text" value="(All)"/>
	<p>ROMS Treatment Type</p> <input type="text" value="(All)"/>		

# Rehab Equity Dashboard - Variables

38 Variables  
Total

- Admit Year
- Admit Month
- ADI Quintile
- Admit Source
- Admit Type
- Admitted Through ED
- Age
- Chronic
- City
- County
- Diagnosis Category
- Discharge Disposition
- Discipline
- Encounter Type
- Ethnicity
- Facility
- Gender
- Interpretation Needed
- Interpretation Offered
- Interpretation Missed
- Language
- Marital Status
- Payer
- IRF Impairment Codes
- Preferred Language
- ICD-10 Diagnosis
- Race
- Rehab Setting
- Religion
- PRO Survey
- PRO Classification
- PRO Class. Group
- PRO Body Area
- PRO Treatment Type
- Telehealth Present
- Unit
- Zipcode

# Rehab Equity Dashboard - Metrics

55 Metrics  
Total

- Number of Patients
- Number of Episodes
- Total Visits/Patient Days
- Avg ADI Value
- Avg Age
- Avg Billed Amount
- Avg Billed Patient Days
- Avg Insurance Payment
- Avg LOS (Admit to DC)
- Avg LOS (First Charge to Last Charge)
- Avg Outpatient Visits
- Avg Patient Payment
- Avg Procedures per Episode
- Avg Admit PRO
- Avg Admit Pain
- Avg Discharge PRO
- Avg Discharge Pain
- Avg PRO Change
- Avg Pain Change
- Avg Travel Distance
- Failure to Progress (MCID)
- Failure to Progress (30%)
- Median ADI
- Median Billed Amount
- Median Billed Patient Days
- Median Insurance Payment
- Median LOS (Admit to DC)
- Median LOS (First Charge to Last Charge)
- Median Outpatient Visits
- Median Patient Payment
- Median Procedures per Episode
- Median Travel Distance
- Median Admit PRO
- Median Admit Pain
- Median Discharge PRO
- Median Discharge Pain
- Median PRO Change
- Median Pain Change
- Successful Outcome %
- AMPAC Mobility Scores
- Avg First Mobility Score
- Avg Last Mobility Score
- Avg Mobility Score Change
- AMPAC Activity Scores
- Avg First Activity Score
- Avg Last Activity Score
- Avg Activity Score Change
- AMPAC Cognitive Scores
- Avg First Cognitive Score
- Avg Last Cognitive Score
- Avg Cognitive Score Change
- JHHLM Scores
- Avg First JHHLM Score
- Avg Last JHHLM Score
- Avg JHHLM Score Change

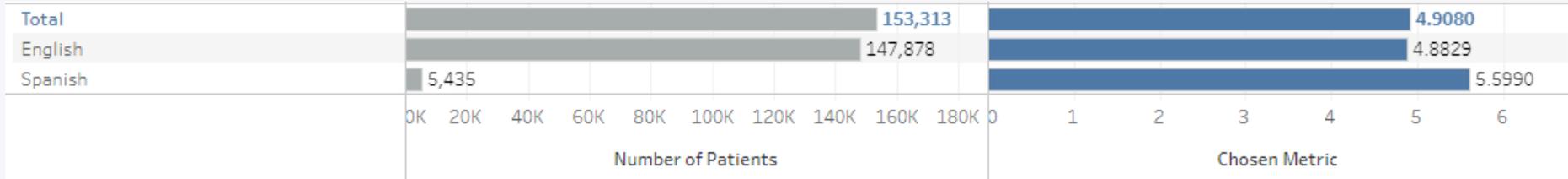
# Rehab Equity Dashboard

Choose Variable 3

Language

Choose Metric

Avg Billed Patient Days



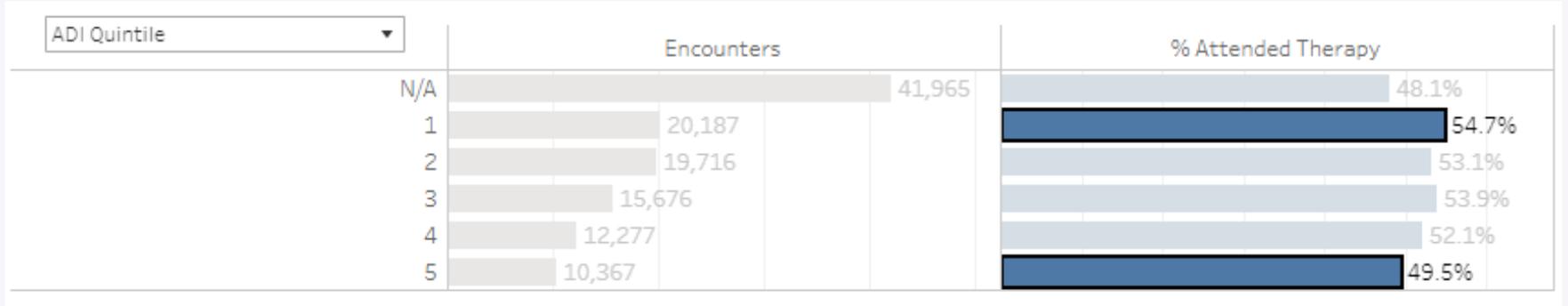
- 38 Possible Variables for Variable 1
- 38 Possible Variables for Variable 2
- 38 Possible Variables for Variable 3
- 55 Possible Metrics



$$38 \times 38 \times 38 \times 55 \approx 3 \text{ Million}$$

Possible Combinations

# Rehab Equity – Next Steps



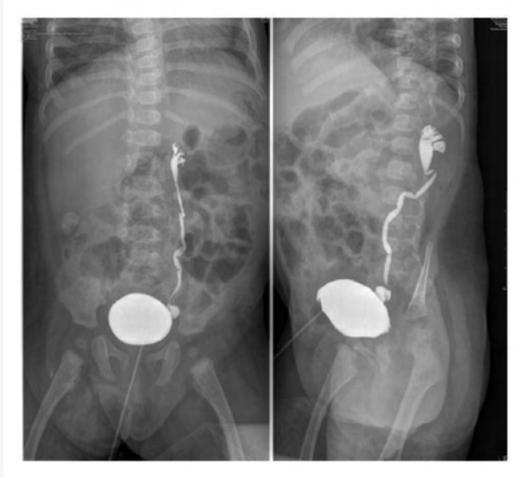
# Rehab Reports at Intermountain Health

Acute Rehab Caregiver Scorecard	Inpatient Rehab Readmissions	Rehab Con Ed Requests
Acute Rehab NICU Orders	Insurance Utilization	Rehab ED Dashboard
Acute Rehab NICU Visits	IRF Audit Dashboard	Rehab Efficiency Dashboard
Acute Rehab Orders	IRF CI Portal Thumbnails	Rehab Equity Dashboard
Acute Rehab Payer Mix	IRF Discharge Orders	Rehab Evals Dashboard
Acute Rehab Volumes	IRF Falls with Injury	Rehab Likelihood to Recommend
AMPAC Dashboard	IRF Family Education	Rehab Missing Charge Report
AMPAC Nursing Dashboard	IRF Heatmap	Rehab Outpatient No Shows/Cancellations
Arthritis Dashboard	IRF Outcomes Dashboard	Rehab Outpatient Payer Mix
Athletic Trainer Dashboard	IRF Readmissions	Rehab Previous 3 Days Low Glucose
Athletic Training Cost Avoidance	IRF Therapy Times	Rehab Progress Note Dashboard
Authorization Tracker	IRF Wound Dashboard	Rehab Readmissions
CBC Rehab Billing Review	MedBridge Utilization	Rehab SafetyNet Dashboard
CBC Rehab Caregiver Dashboard	Medicare Cert Letter Audit	Rehab Services Daily Charging Report
CBC Rehab Eval Calendar	Missed Therapy Dashboard	Rehab Services Outcomes
CBC Rehab Likelihood to Recommend	Modified Barium Swallow Dashboard	Rehab Services PMPM
CBC Rehab Procedures Dashboard	Newborn Hearing Screens	Rehab Services Productivity Stats
CBC Rehab Scheduling Dashboard	NOMS Dashboard	Rehab Services Referring Physician Report
CBC Rehab Third Next Available	NSRU Social Determinants of Health	Rehab Telehealth Dashboard
CBC Rehab Time Analysis	Optimize Fidelity Report	ROMS Data Cleanup Report
CI Portal Ideas	Optimize Patient List	ROMS Data Export
Clinical Services Caregiver Injuries	OPTIMIZE Patient Schedule	ROMS Discharge Call List
Concussion Dashboard	Patient Centered Dashboard	ROMS ED Referral Patient List
Custom ROMS Patient List	PCH Inpatient Rehab Dashboard	ROMS Eval Audit
Dashboard Instructions and Troubleshooting	PCH IRF Therapy Times	ROMS Patient Heatmap
Dry Needling Report	PCH Rehab Patient List	ROMS Patient Heatmap Test
Falls Dashboard	PCH Rehab Patient List Custom	ROMS Provider Lookup Report
Glucose Management Dashboard	PCH Rehab Patients	ROMS SelectHealth Paneling
Hearing Aid Volumes	Pelvic Health Dashboard	ROMS TKA Admissions
High Value Provider Network	Previous 3 Days Low Glucose	Sports Medicine Downstream Encounters
iCentra Discharge Call List	Provider Patient Management Report	Therapy Referrals
iCentra Document Search	PT/OT Eval Complexity	TOTR - Missing EMPI
iCentra Outcome Measures Utilization	Rehab Agency Encounters	Stroke Study Patient List
IMC Stroke Patient List	Rehab Agency Encounters with GL Adjustments	WorkMed Post Offers
Inpatient Rehab Dashboard	Rehab Agency Medicare Encounters	

100+  
Analytic  
Reports  
for Rehab!

# Why?

## Helping People Live the Healthiest Lives Possible



# Questions?

# Thank you!

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