Developing Equity Data Dashboards to Focus Improvement Efforts

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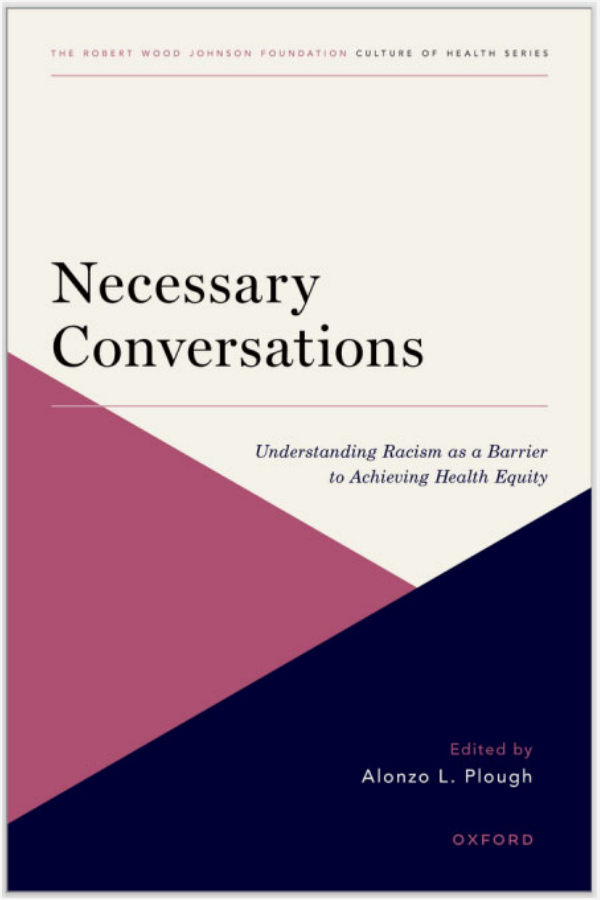
Seattle Children's

Audience Participation (1-7 Likert scale)

1. My institution wants to work on health equity.
2. My institution collects patient level data stratified by REaL categories.
3. We use equity dashboards to identify disparities.
4. We have meaningful discussions about inequity.
5. My organization is actively working to reverse inequities.



Necessary Conversations, Robert Wood Johnson Foundation, Oxford University Press, 2022, ISBN 978–0–19–764147–7 DOI: 10.1093/oso/9780197641477.001.0001

SUMMARY OF FINDINGS EXCERPTED FROM:

Report to the Board of Trustees of Seattle Children's Hospital

Eric H. Holder, Jr.
Aaron M. Lewis
Lindsay B. Burke
Covington & Burling LLP

Joseph L. Wright, MD, MPH
Immediate Past Chair, American Academy of Pediatrics Task Force
on Addressing Bias and Discrimination
Physician Consultative and Education Services, LLC

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Health Equity

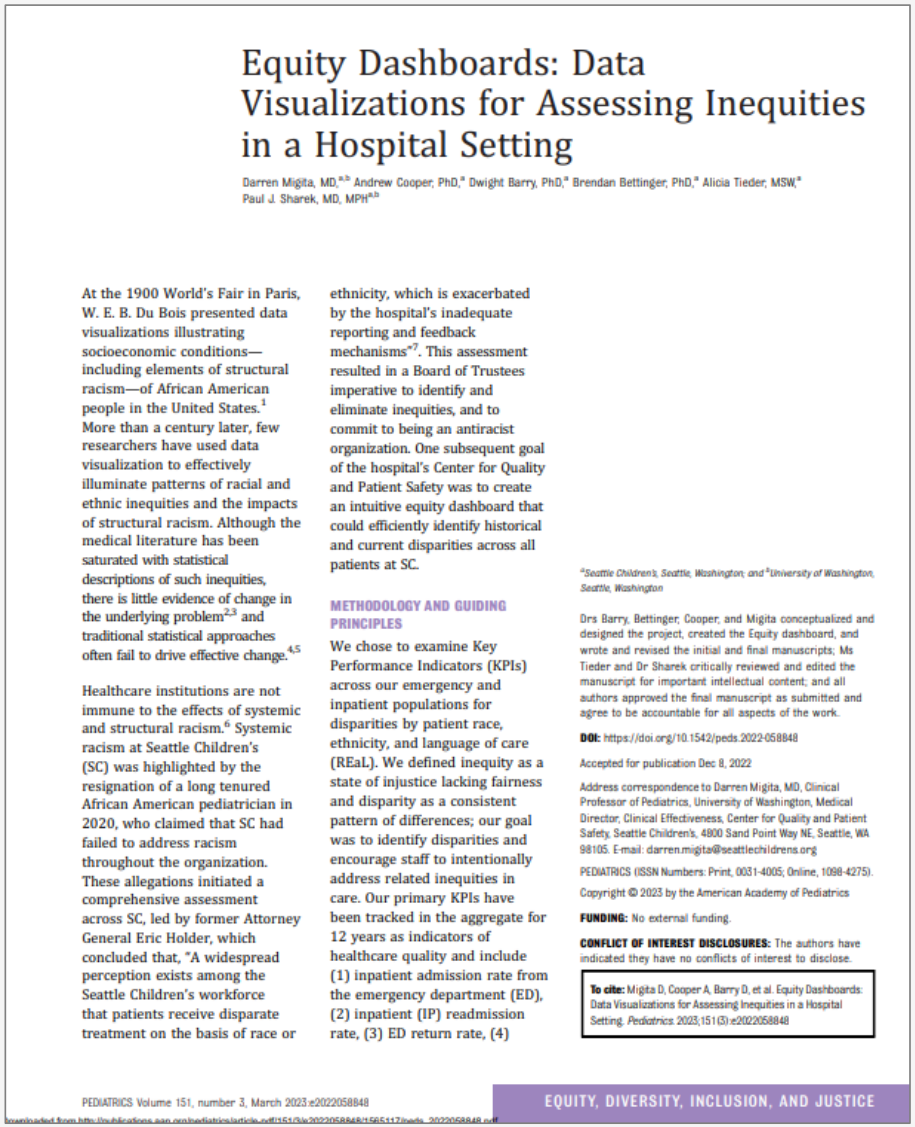
1. Seattle Children's has known about significant racial disparities in Code Purple calls since at least 2013, but senior leadership did not meaningfully act to mitigate these disparities until 2020.
2. Seattle Children's falls short of its stated policies and goals with respect to interpretation and translation services.
3. While Seattle Children's is an industry leader in tracking health equity metrics, it lacks the accountability, infrastructure, and culture to successfully mitigate identified racial disparities in patient treatment.
4. A widespread perception exists among the Seattle Children's workforce that patients receive disparate treatment on the basis of race or ethnicity, which is exacerbated by the hospital's inadequate reporting and feedback mechanisms.

Covington & Burling's Findings & Recommendations Released (seattlechildrens.org)

Equity Dashboard

- Tracks KPIs with REaL filters from 2010 to present, automatically updates quarterly.
- 5,000 metrics within 663 KPIs covering more than 190,000 IP stays and 525,000 ED visits
- Allows teams to quickly identify and prioritize where further investigation is needed

[Equity Dashboards: Data Visualizations for Assessing Inequities in a Hospital Setting | Pediatrics | American Academy of Pediatrics (aap.org)]



Equity Dashboards: Data Visualizations for Assessing Inequities in a Hospital Setting

Darren Migita, MD,[a,b] Andrew Cooper, PhD,[a] Dwight Barry, PhD,[a] Brendan Bettinger, PhD,[a] Alicia Tieder, MSW,[a] Paul J. Sharek, MD, MPH[a,b]

At the 1900 World's Fair in Paris, W. E. B. Du Bois presented data visualizations illustrating socioeconomic conditions—including elements of structural racism—of African American people in the United States.[1] More than a century later, few researchers have used data visualization to effectively illuminate patterns of racial and ethnic inequities and the impacts of structural racism. Although the medical literature has been saturated with statistical descriptions of such inequities, there is little evidence of change in the underlying problem[2,3] and traditional statistical approaches often fail to drive effective change.[4,5]

Healthcare institutions are not immune to the effects of systemic and structural racism.[6] Systemic racism at Seattle Children's (SC) was highlighted by the resignation of a long tenured African American pediatrician in 2020, who claimed that SC had failed to address racism throughout the organization. These allegations initiated a comprehensive assessment across SC, led by former Attorney General Eric Holder, which concluded that, "A widespread perception exists among the Seattle Children's workforce that patients receive disparate treatment on the basis of race or ethnicity, which is exacerbated by the hospital's inadequate reporting and feedback mechanisms"[7]. This assessment resulted in a Board of Trustees imperative to identify and eliminate inequities, and to commit to being an antiracist organization. One subsequent goal of the hospital's Center for Quality and Patient Safety was to create an intuitive equity dashboard that could efficiently identify historical and current disparities across all patients at SC.

METHODOLOGY AND GUIDING PRINCIPLES

We chose to examine Key Performance Indicators (KPIs) across our emergency and inpatient populations for disparities by patient race, ethnicity, and language of care (REaL). We defined inequity as a state of injustice lacking fairness and disparity as a consistent pattern of differences; our goal was to identify disparities and encourage staff to intentionally address related inequities in care. Our primary KPIs have been tracked in the aggregate for 12 years as indicators of healthcare quality and include (1) inpatient admission rate from the emergency department (ED), (2) inpatient (IP) readmission rate, (3) ED return rate, (4)

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Drs Barry, Bettinger, Cooper, and Migita conceptualized and designed the project, created the Equity dashboard, and wrote and revised the initial and final manuscripts; Ms Tieder and Dr Sharek critically reviewed and edited the manuscript for important intellectual content; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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Data Scientist, Principal

Brendan Bettinger PhD
Data Scientist, Lead

Andrew Cooper PhD
Data Scientist, Principal

Reading the Heatmap

This cell tells us that the total charges for Asian patients is *higher* than the total population in 75-90% of all fiscal Quarters that were measured.

Groups that do not have at least 5 patients in at least 8 quarters will appear as a grey row.

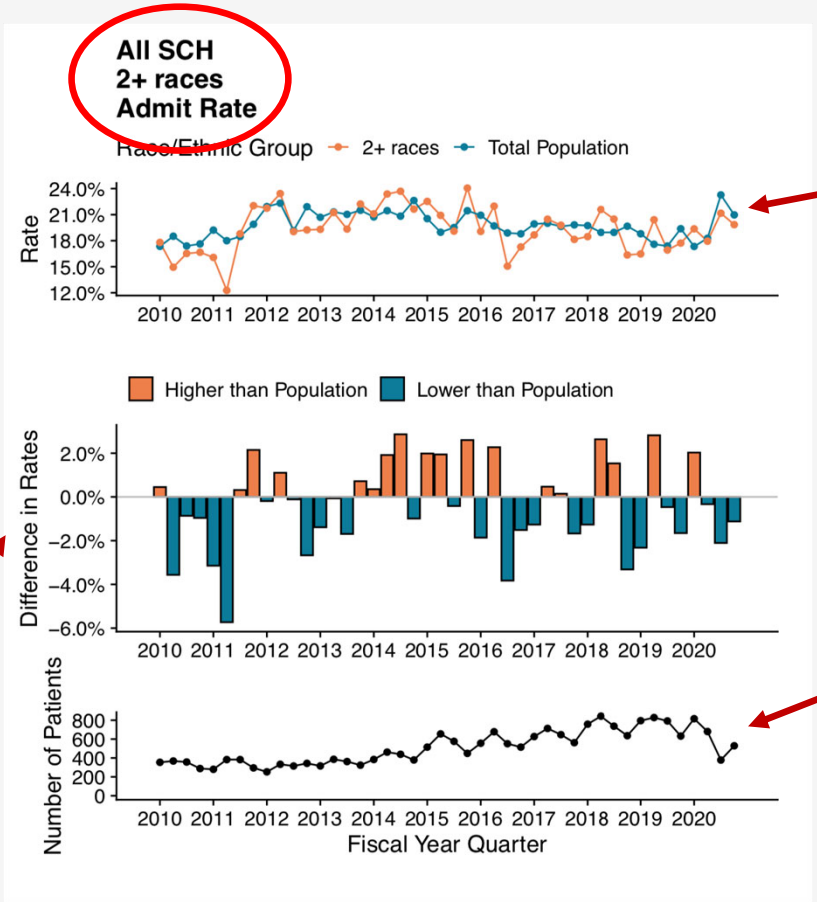
These cells tells us that the admit rate for Black or African American and Hispanic patients is *lower* than the total population in 75-90% of all fiscal Quarters that were measured.

This cell tells us that the admit rate for Non-Hispanic White patients is similar to the total population in all fiscal quarters that were measured.

Pediatrics (2023) 151 (3): e2022058848. https://doi.org/10.1542/peds.2022-058848

Reading the Comparative Time Series Plots

This collection of plots shows trends over time by quarter (top), differences between each group and the total population (middle), and the number of patients for that group (bottom).



Compare the relative position of the lines; does the orange line vary randomly around the blue line or are there clear patterns or differences between the lines?

Are there clear patterns in the direction and proximity of the bars? Or do the bars vary randomly above and below the midline and through time? In addition, what is the magnitude of difference between the group and the total population: large or small?

Are the numbers of patients large or small? More patients provide more stable results.

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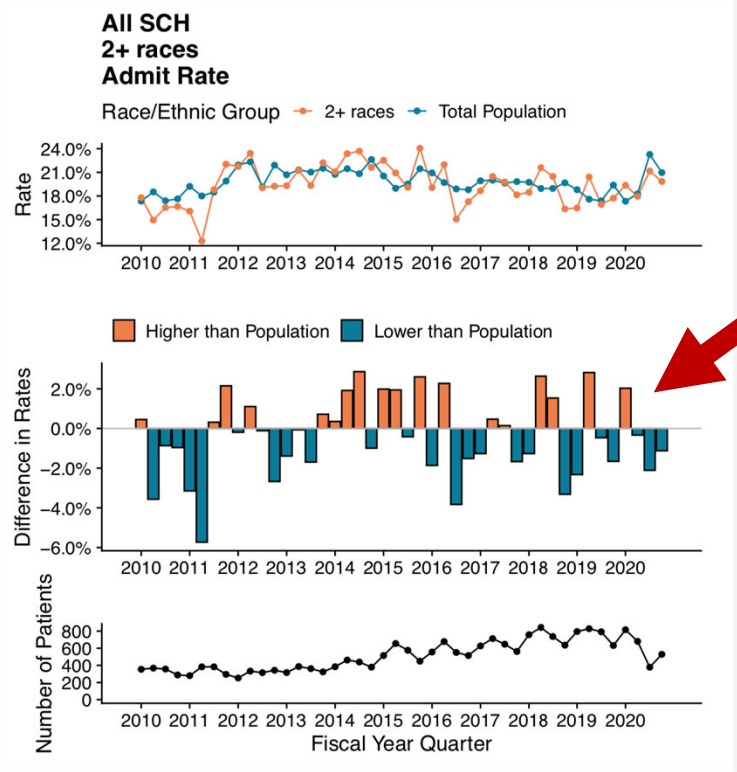
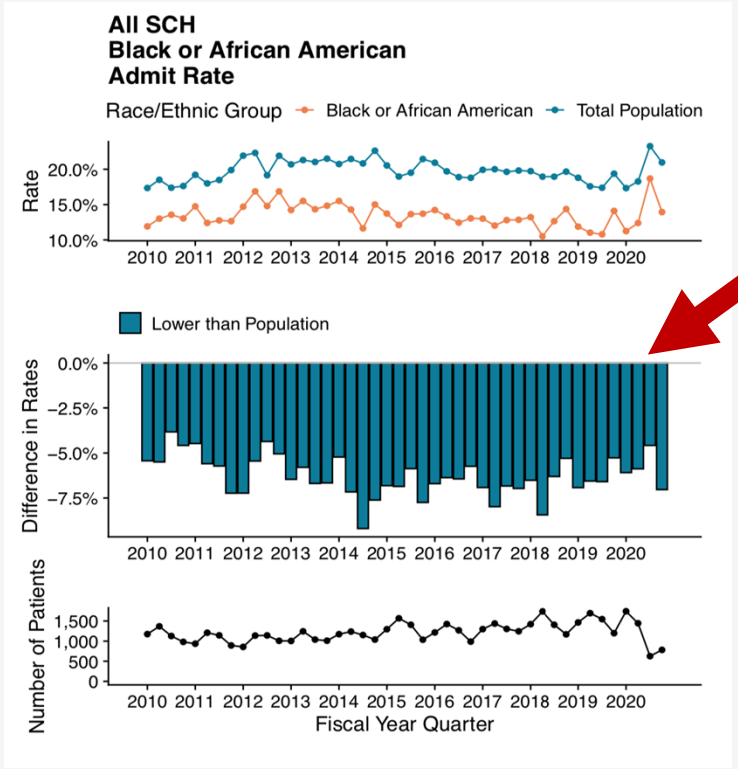
What you might see if there is no difference from the total population:

- The group line fluctuates back and forth across the total population line in the Time Series plot.
- There is *no* obvious pattern in the Difference in Rates plot.
- These patterns suggest natural variation.



What you might see if there is a difference from the total population:

- The group line is partially or completely distinct from total population line in the Time Series plot.
- There is an obvious pattern in the Difference in Rates plot.
- These patterns suggest non-random differences.

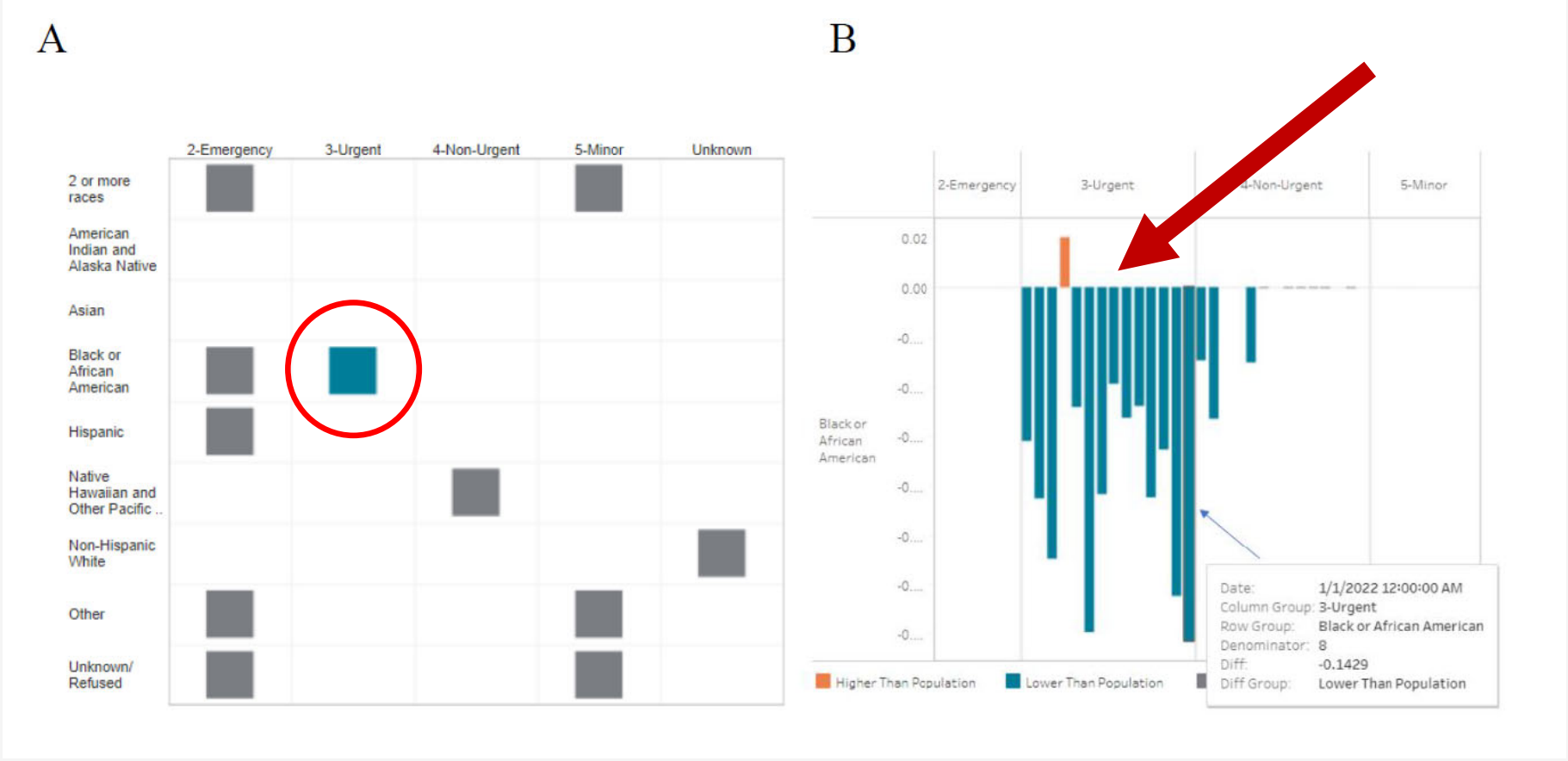


Pediatrics (2023) 151 (3): e2022058848. https://doi.org/10.1542/peds.2022-058848

The focus of these graphs is on the consistency of these differences over time, not on the magnitude of these differences at any one timepoint.

Addressing Confounders

All patients presenting to the ED with cellulitis who identify as Black or African American, adjusted for a triage ESI score of '3-Urgent'. Upon selection of a cell, the differences in rates graph appears with a score of 3 held constant.



Formal Regression Analysis: ED Admission Rate Bronchiolitis

Are these disparities driven by confounding variables such as language, age group, PMCA category, Payor Mix, or ESI rather than the Race/Ethnicity variable itself?

All potential confounders

	Admitted?		
Predictors	*Odds Ratios*	*CI*	*p*
(Intercept)	60.18	8.10 – 447.09	**<0.001**
Patient Race/Ethnic Group: 2 or more races	0.76	0.62 – 0.92	**0.005**
Patient Race/Ethnic Group: American Indian and Alaska Native	1.49	0.90 – 2.48	0.122
Patient Race/Ethnic Group: Asian	0.85	0.71 – 1.01	0.071
Patient Race/Ethnic Group: Black or African American	0.60	0.50 – 0.70	**<0.001**
Patient Race/Ethnic Group: Hispanic	0.76	0.66 – 0.88	**<0.001**
Patient Race/Ethnic Group: Native Hawaiian and Other Pacific Islander	0.65	0.47 – 0.89	**0.008**
Patient Race/Ethnic Group: Other	0.83	0.67 – 1.02	0.073
Patient Race/Ethnic Group: Unknown/Refused	1.06	0.84 – 1.33	0.634

Unpublished analysis performed by Andrew Cooper PhD

Regression Analysis: ED Admission Rate Bronchiolitis

Results of adding a patient's Race/Ethnic group to each confounding variable model. In **every** case, adding a patient's Race/Ethnic group significantly improved the model fit.

	Addition of Race/Ethnic Group		
Base Model	**Deviance**	**DF**	**p-value**
Language Group	208.4	8.06	< 0.0001
PMCA Category	251.8	7.63	< 0.0001
Payor Mix	146.3	8.21	< 0.0001
ESI	61.6	7.98	< 0.0001
All potential confounders	54.1	8.06	< 0.0001
All potential confounders and confounder-level-specific trends	64.9	17.11	< 0.0001

Unpublished analysis performed by Andrew Cooper PhD

The dashboard does not produce ‘yes’ or ‘no’ answers. It is a platform to begin necessary conversations:

- Do you believe what you are seeing is real?
- Is the difference seen clinically meaningful?
- Does ‘clinically meaningful’ even matter?
- Does ‘statistically significant’ matter?

Believe that what you are seeing is real and generate hypotheses for the potential drivers of disparity

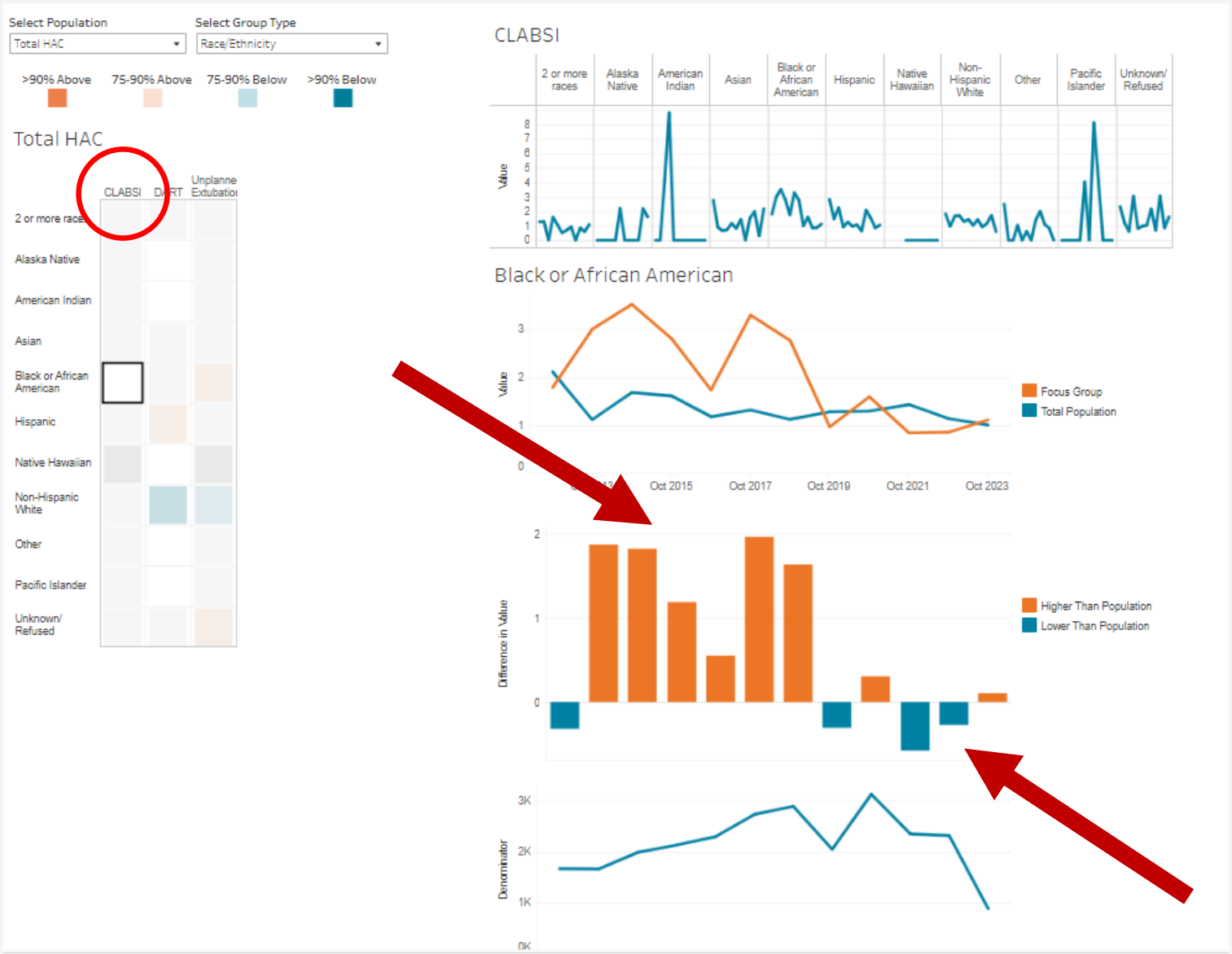
Implementation Timeline

Reversals of Inequities

Example of change in non-random to random pattern for CLABSI

TEAM

Paul Sharek MD, MPH
Danielle Zerr MD, MPH
Megan Stimpson RN
Caitlin McGrath MD
Brendan Bettinger, PhD
Shaquita Bell MD
Tumaini Coker MD, MBA
Matthew Kronman MD, MSCE

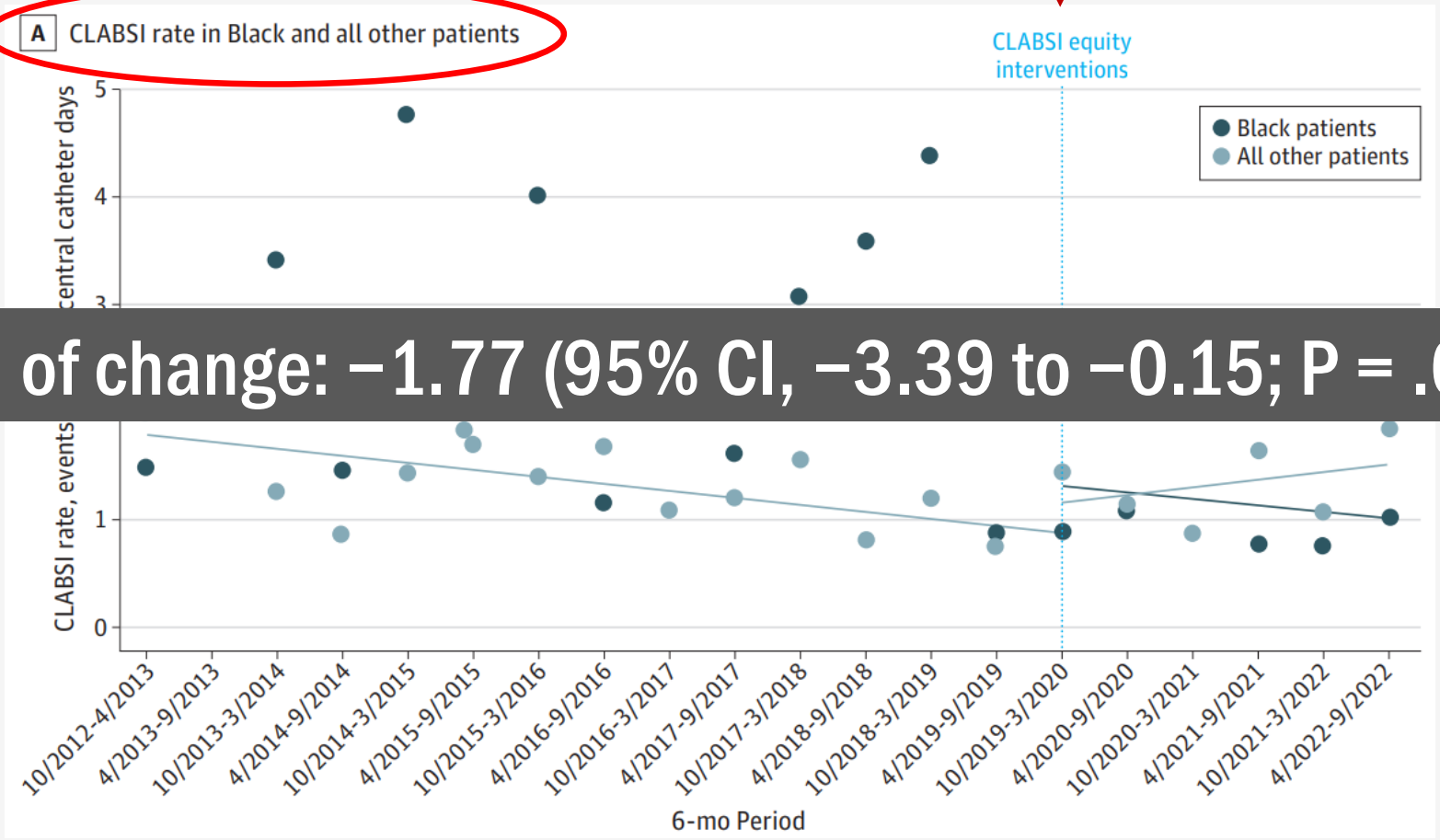


Key Interventions for CLABSI Reduction:

(1) Improve access to and use of certified interpreter services.
(2) Maintenance bundle observations: Ensure that patients from minoritized groups received as many observations as would be expected based on hospital demographic characteristics.
(3) Questions were added to the CLABSI event review process so that the care team and family members could reflect on how issues of equity may have contributed to a CLABSI.

JAMA Pediatr. 2023;177(7):700-709. doi:10.1001/jamapediatrics.2023.1379

Statistical Analysis – CLABSI rate

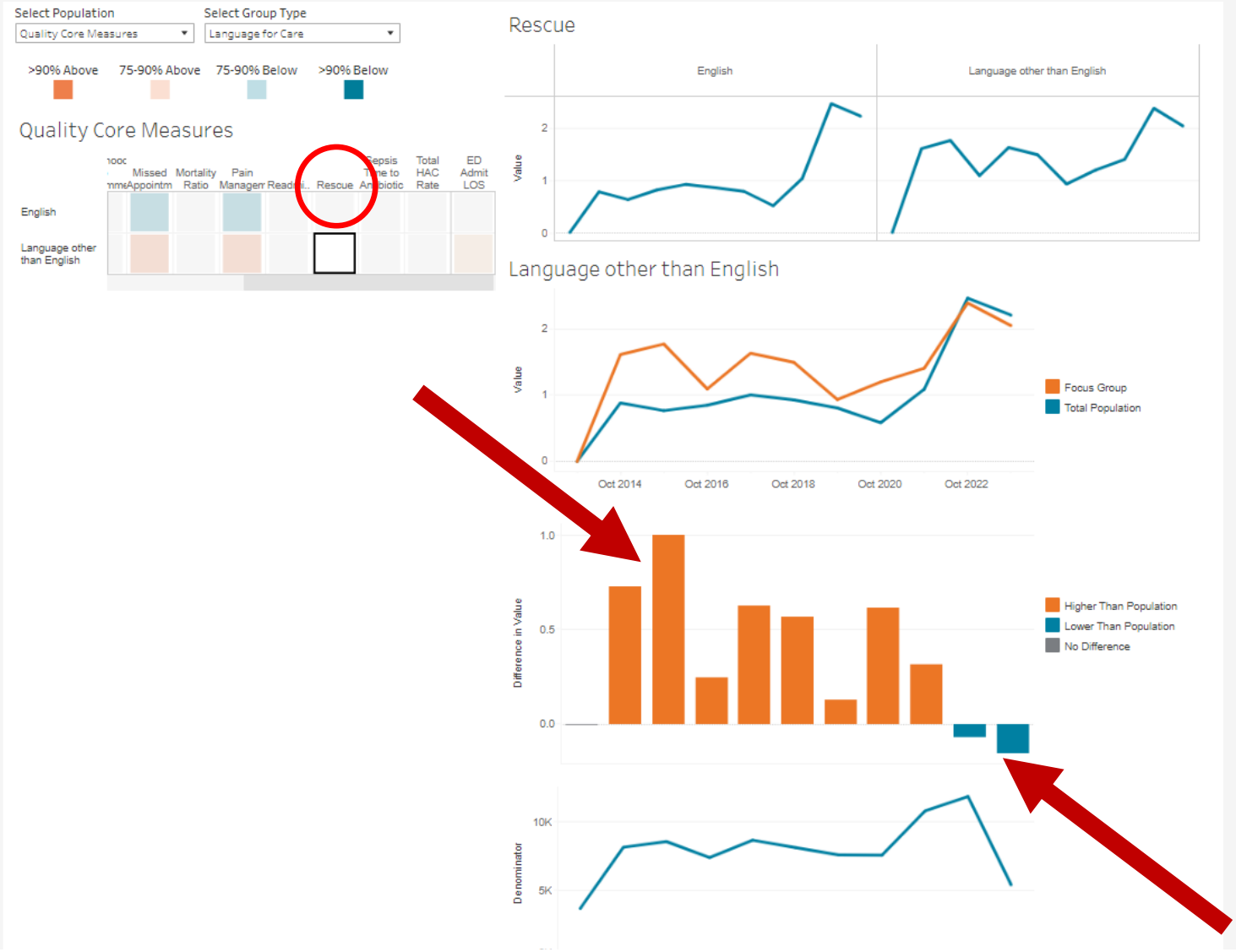


Level of change: −1.77 (95% CI, −3.39 to −0.15; P = .03)

JAMA Pediatr. 2023;177(7):700-709. doi:10.1001/jamapediatrics.2023.1379

Example of change in non-random to random pattern for rescue events

Joan S Roberts, MD

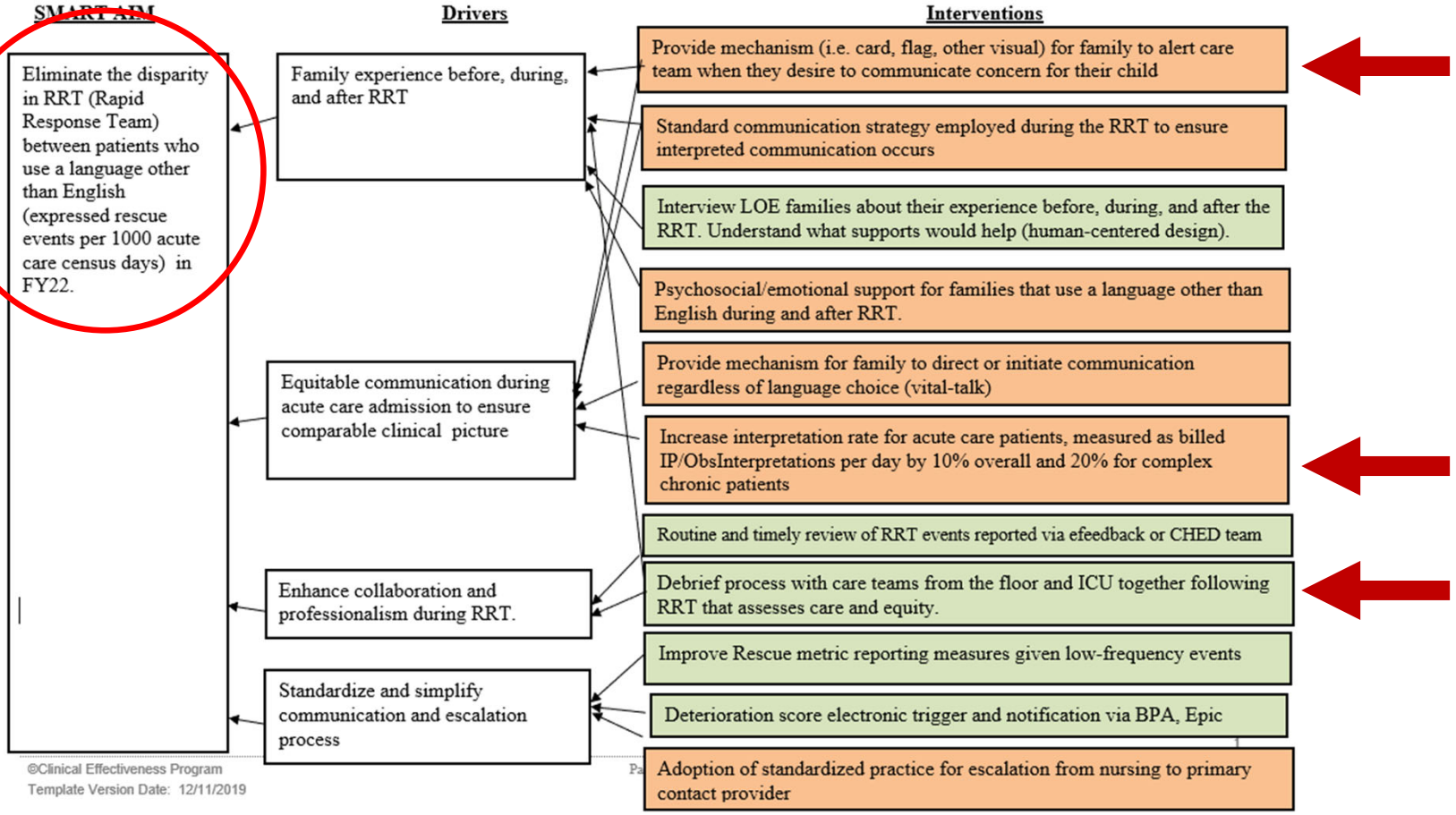


Key Driver Diagram

First Developed: 02/08/2022
Last Reviewed: 09/30/2022

Global AIM

Move Seattle Children's towards health equity by identifying and addressing determinants of inequities in health and healthcare within our own system.



Template Version Date: 12/11/2019

Communication Picture Tool

I need to see:

An Interpreter

A doctor or nurse

A Chaplain

I am:

In pain

Short of breath

Dizzy

Too hot

Too cold

Nauseous

I need:

Food

A drink

To go to the bathroom

A bath

A shower

Pen and paper

Yes

No

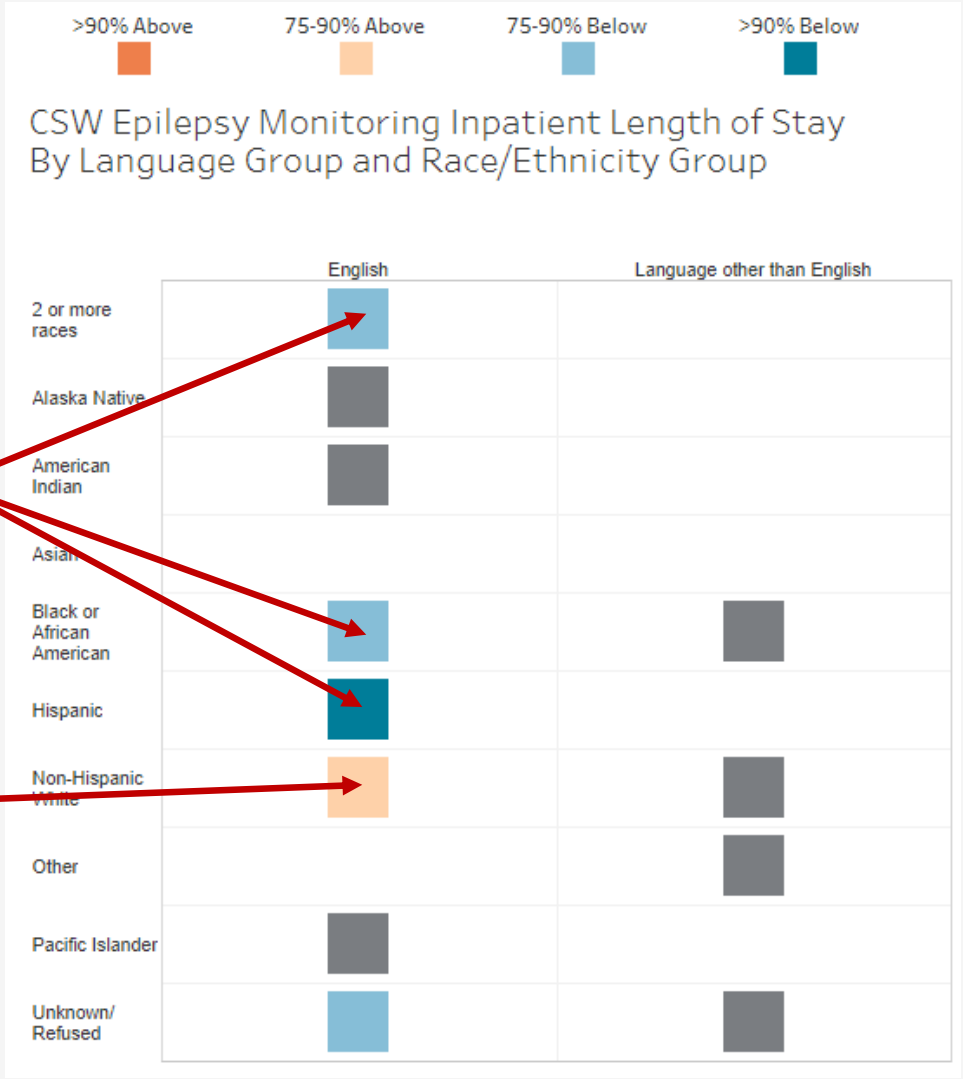
Stop

Certain Epilepsy Monitoring Unit patients have shorter or longer stays – why?

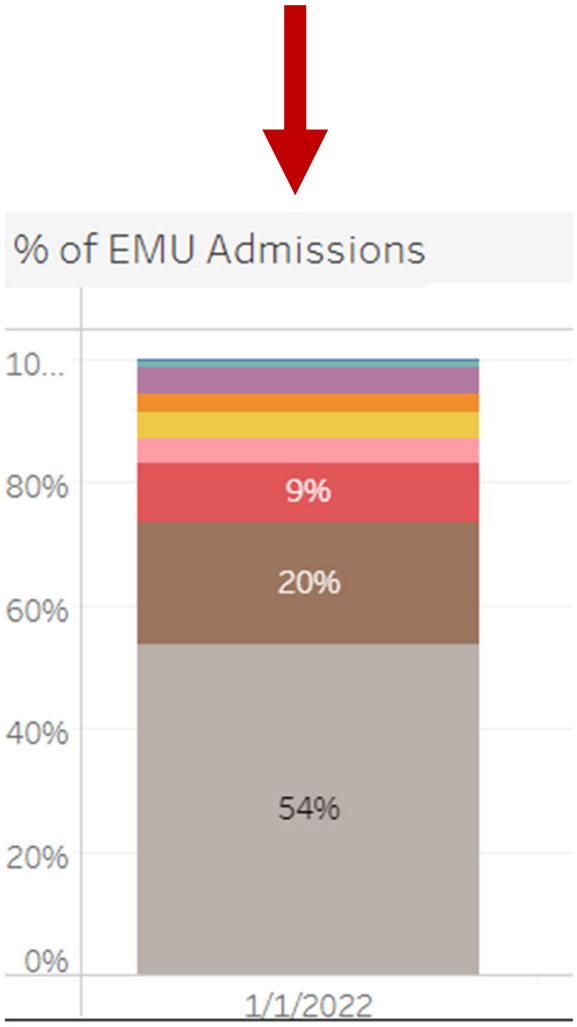
Priya A Monrad, MD

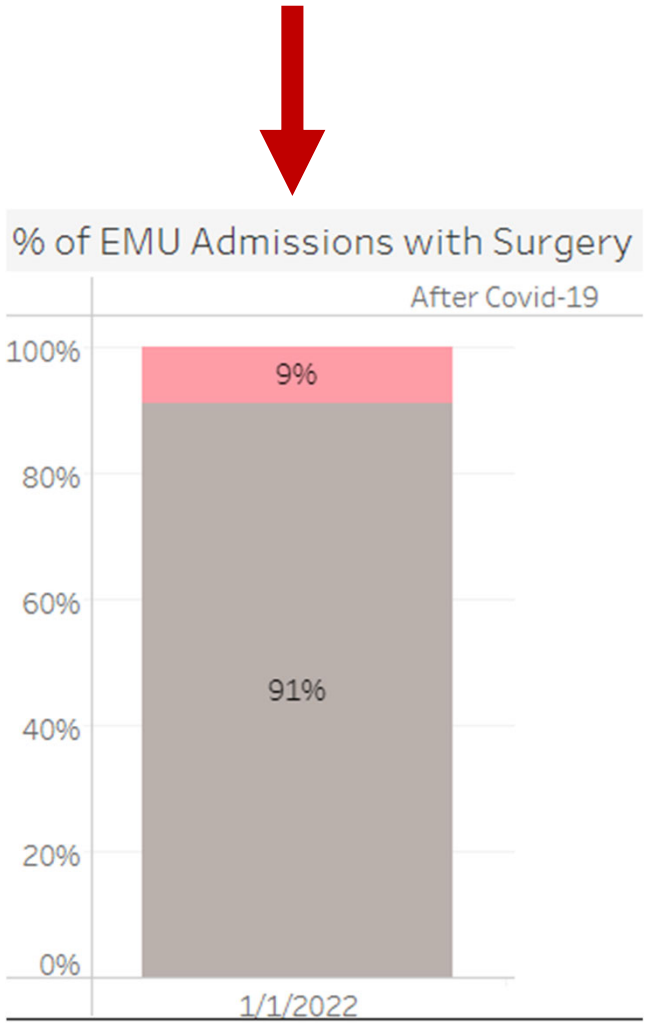
Patients who are Multiracial, Black or African American, or Hispanic had median LOS that were below the pathway median in >75% of measured quarters

Non-Hispanic White patients who spoke English had LOS that were above median in 75-90% of measured quarters



Disparity Identified





Countermeasures

Scheduling/deployment level:

Increased follow-up visit access with Epileptologists.

Patient Education level:

Epilepsy Surgery materials translated into more languages

Smartphone app tracks patient preparation and education prior to admission; targets families who need one-on-one support from the team.

Epilepsy Care Coordination level:

Epilepsy Care Coordination team and Program Coordinator changed processes for closer tracking of each patient.

Countermeasures

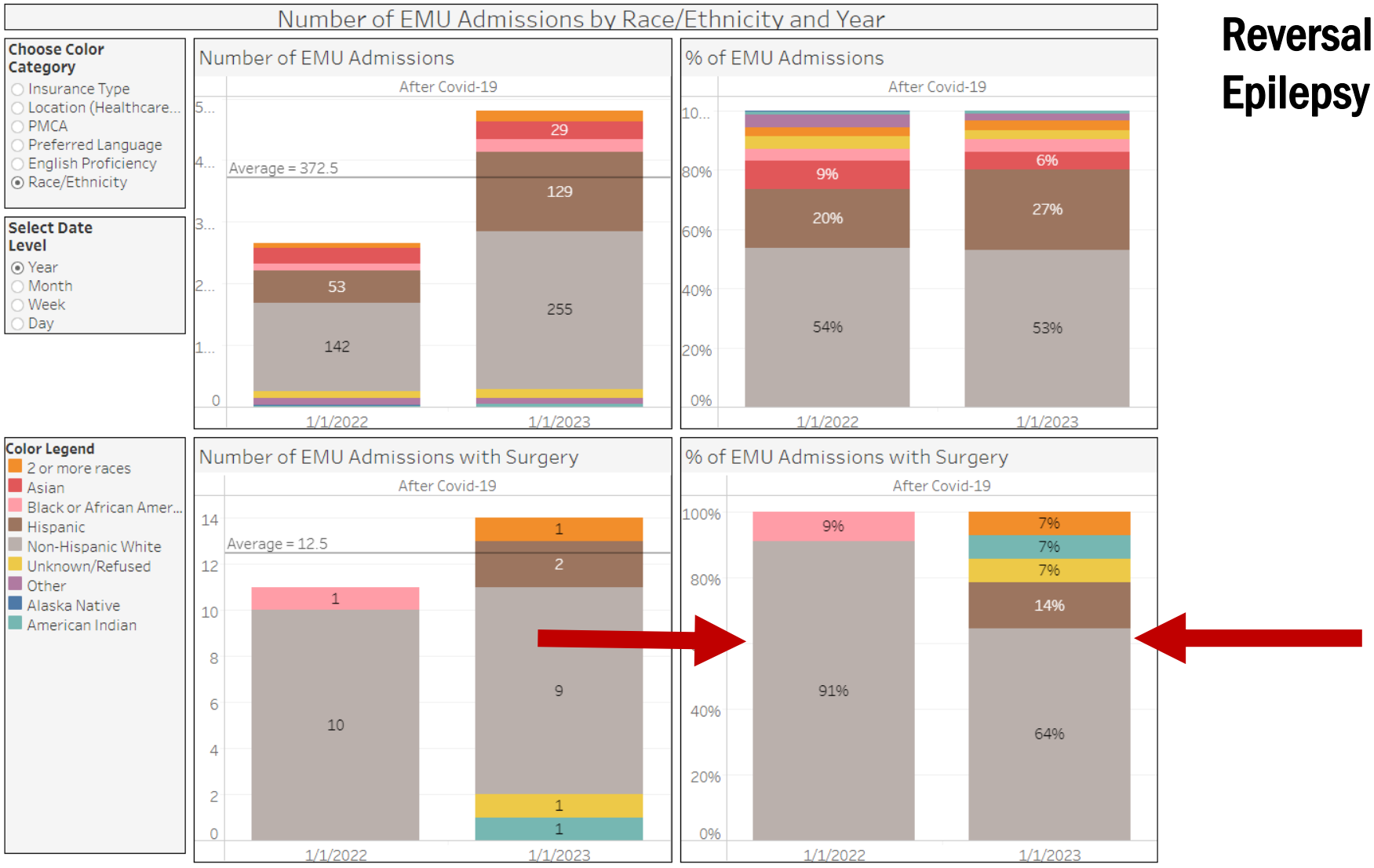
MD level:

New Epic Smartsets to order presurgical testing (easier to track progress).

Data collection level:

Tracking /demographics dashboard being built using patient registries.

Reversal of Inequity Epilepsy Surgery



Code for Dashboard is Open Source

- The code for the equity dashboard is available in 3 formats: R, Tableau and Power BI.
- It is free.
- Downloads are hosted on Seattle Children's Center for Diversity and Health Equity website.

Summary

- Eliminating inequities begins with data visualizations that allow you to see disparities.
- Engage your patients, C-suite, legal and marketing teams early.
- When introducing disparity data, be prepared for queries about validity, then transform that energy into progress towards equity.
- You do not need a multivariate analysis of data to move forward.
- Assemble teams who have authentic knowledge of the problem – “participation of those who know”.
- Countermeasures to reverse institutional racism are within reach of all.


Any Questions?
Olivia