

# Improving Pediatric Vascular Access

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**Project Sponsors: Lindsay Chase MD, Lane Donnelly MD**

**Project Coach: Cristina Collins, MBA**

**Faculty Coach: Casey Olm-Shipman MD**



# Introduction

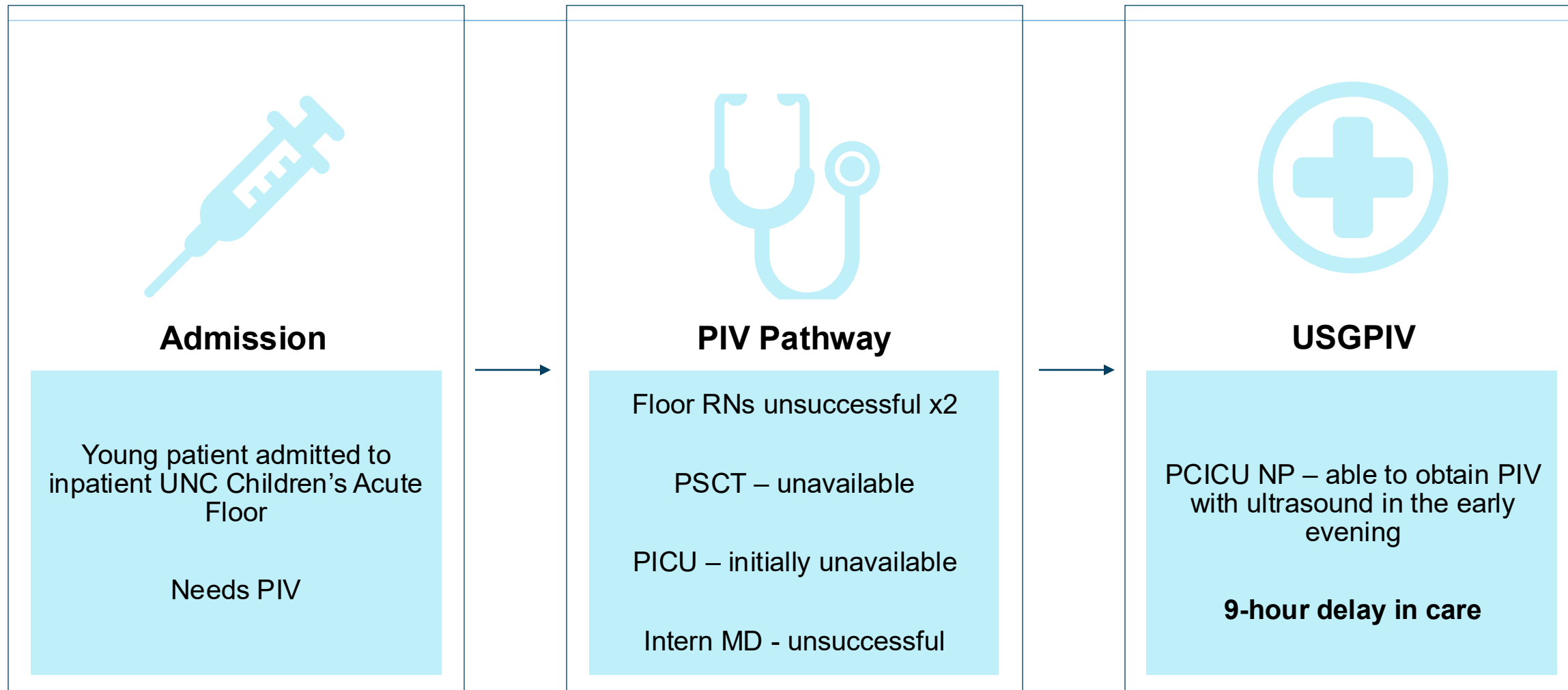
**DIVA Score**  
Difficult Intravenous  
Access Score

**USGPIV**  
Ultrasound-guided  
Peripheral IV

**Long PIV**  
Longer peripheral  
intravenous catheter  
placed w/ ultrasound  
(usually 6-10 cm)

Predictor	0 Points	1 Point	2 Points	3 Points
Visible Vein	Visible		Not Visible	
Palpable Vein	Palpable		Not Palpable	
Age	>= 3 years old (older)	1-2 years old (toddler)		< 1 year old (infant)
History of prematurity	No			Yes

# Patient Story



## Patient Story

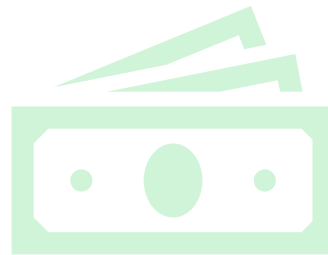
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This is an example of a patient with **Difficult Intravenous Access = DIVA**

## Negative Impacts of Difficult IV Access



**Delays in patient care  
for life saving IV fluids  
and medications**



**Inefficient use of staff  
resources**



**Patient pain, distress,  
and frustration**

# New Standard of Care

## JAMA Pediatrics

### RCT: First-Attempt Success in Ultrasound-Guided vs Standard Peripheral Intravenous Catheter Insertion

#### POPULATION

**93 Males, 71 Females**



Hospitalized children requiring insertion of a peripheral intravenous catheter (PIVC)

**Mean (range), 24 (10-120) mo**

#### SETTINGS / LOCATIONS



**1 Australian pediatric hospital**

#### INTERVENTION

**164 Children randomized**



#### **84 Ultrasound-guided (USG) PIVC insertion**

PIVC insertion guided by ultrasonography



#### **80 Standard PIVC insertion**

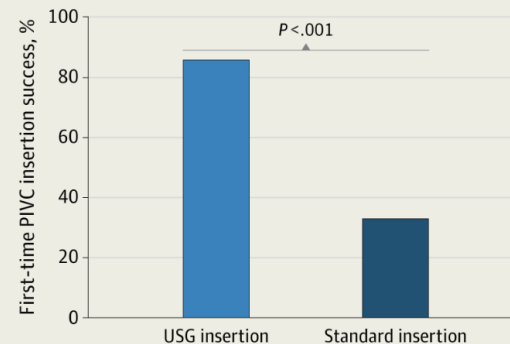
PIVC insertion using standard technique (palpation and visualization)

#### PRIMARY OUTCOME

First-time insertion success, defined as successful PIVC insertion with 1 skin puncture as verified at the time of PIVC insertion by a research nurse or bedside nurse assisting with PIVC insertion

#### FINDINGS

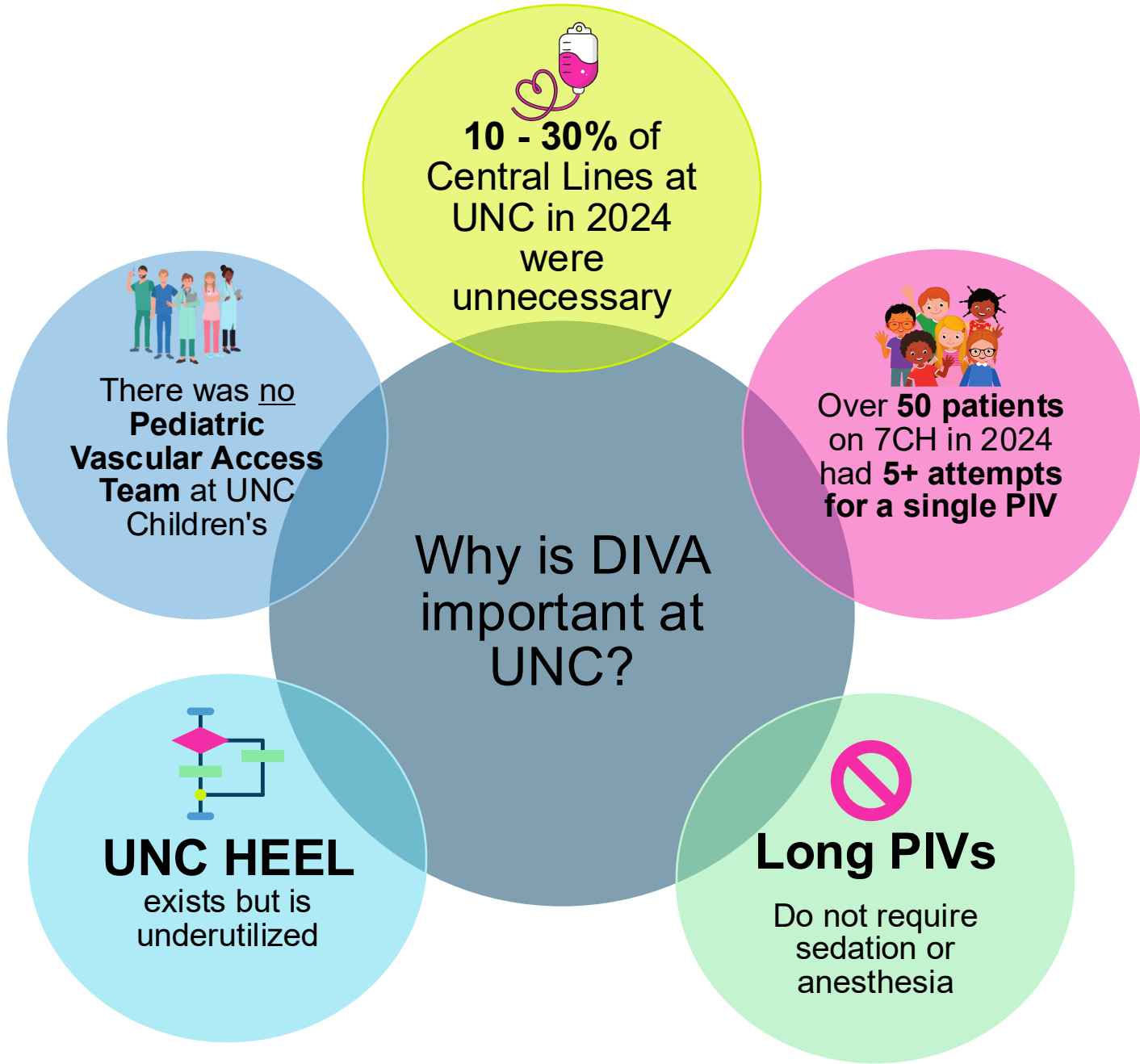
First-time PIVC insertion success was significantly increased with USG PIVC insertion compared with standard PIVC insertion



**USG PIVC first-time insertion success: 72 children (85.7%)**

**Standard PIVC first-time insertion success: 26 children (32.5%)**

**Risk difference: 53.6% (95% CI, 41.7%-65.4%;  $P < .001$ )**



## SMART Aim

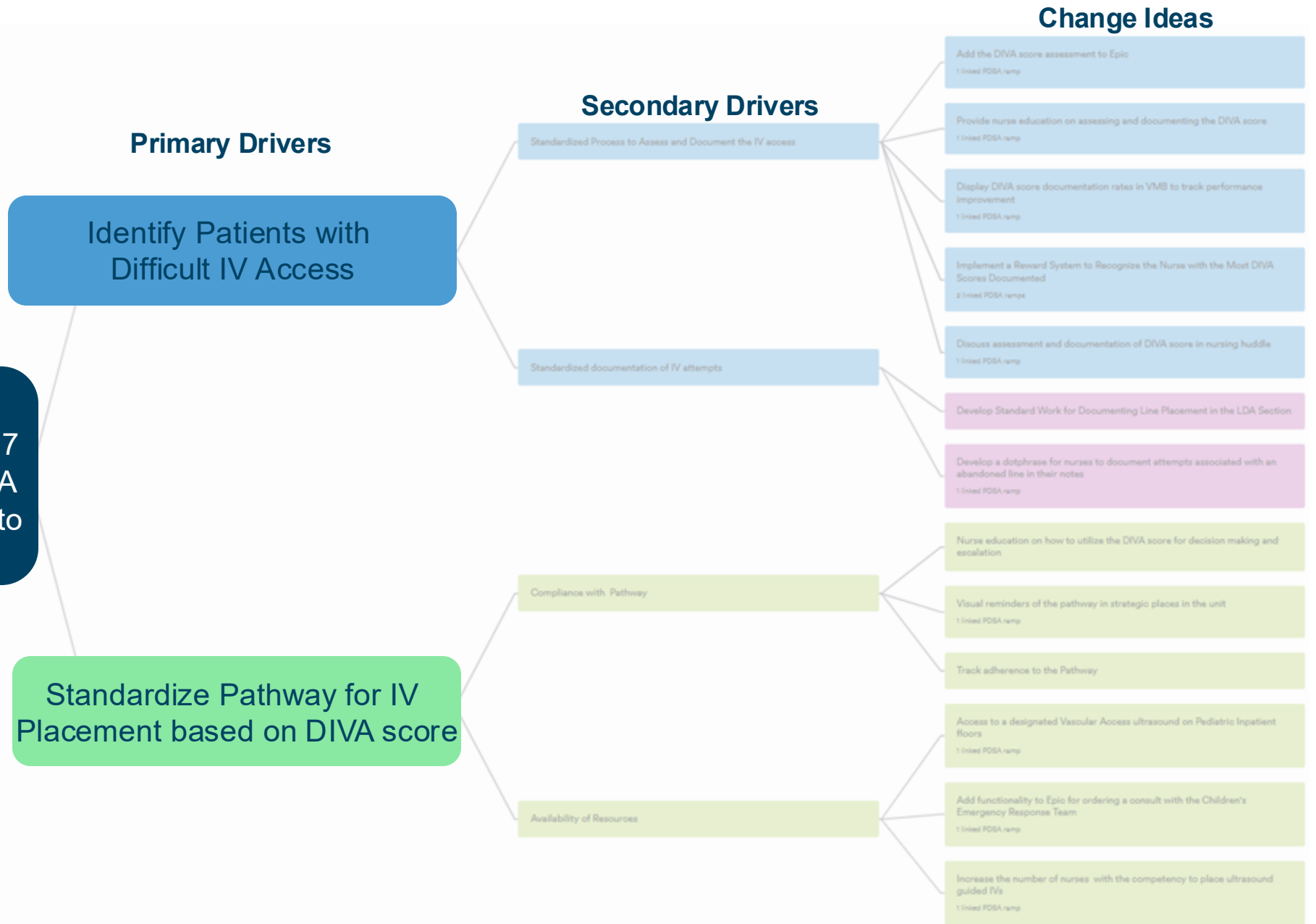
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Increase the percentage of USGPiVs in 7 Children's for patients with **DIVA Score  $\geq 4$**  from **33.3%** to **75%** by September 30, 2025

# Driver Diagram

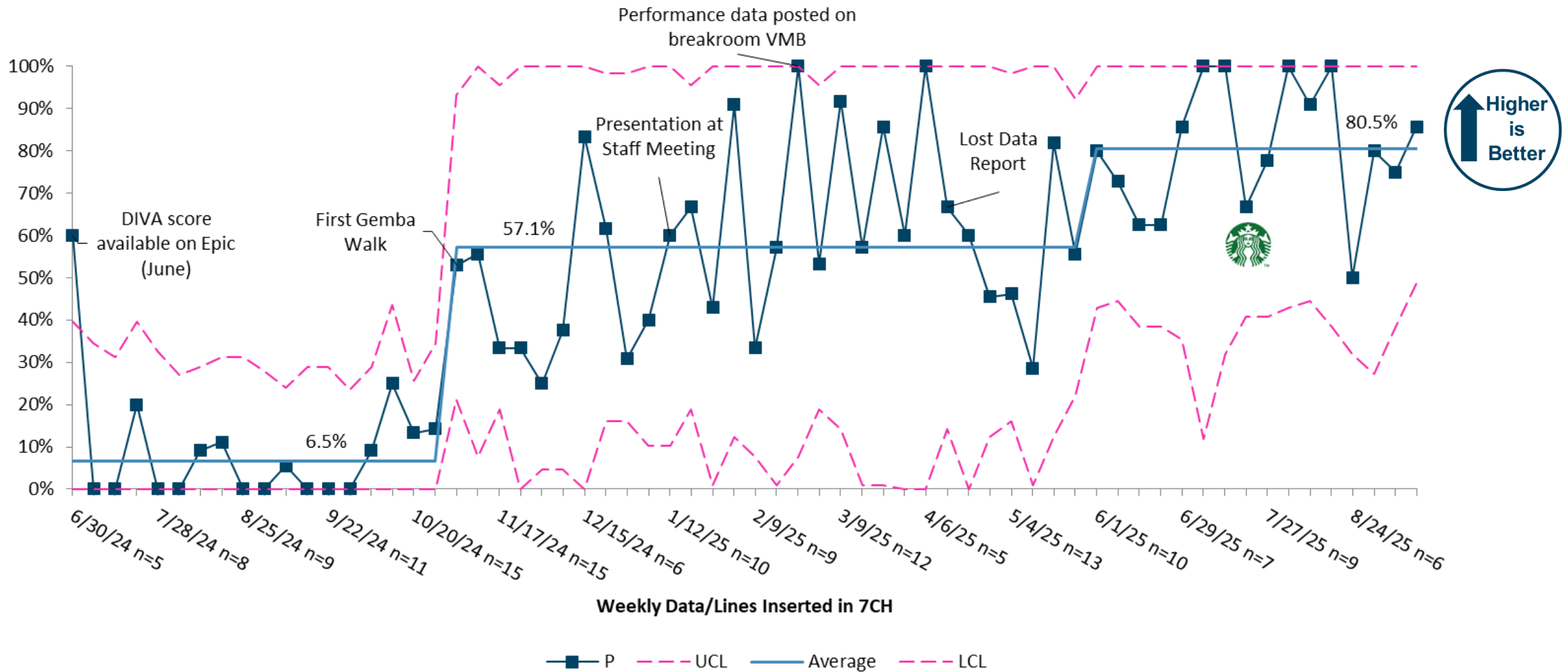
## Aim

Increase the percentage of ultrasound-guided IVs placed in 7 Children's for patient with a DIVA score of 4 or higher from 33.3% to 75% by September 30, 2025



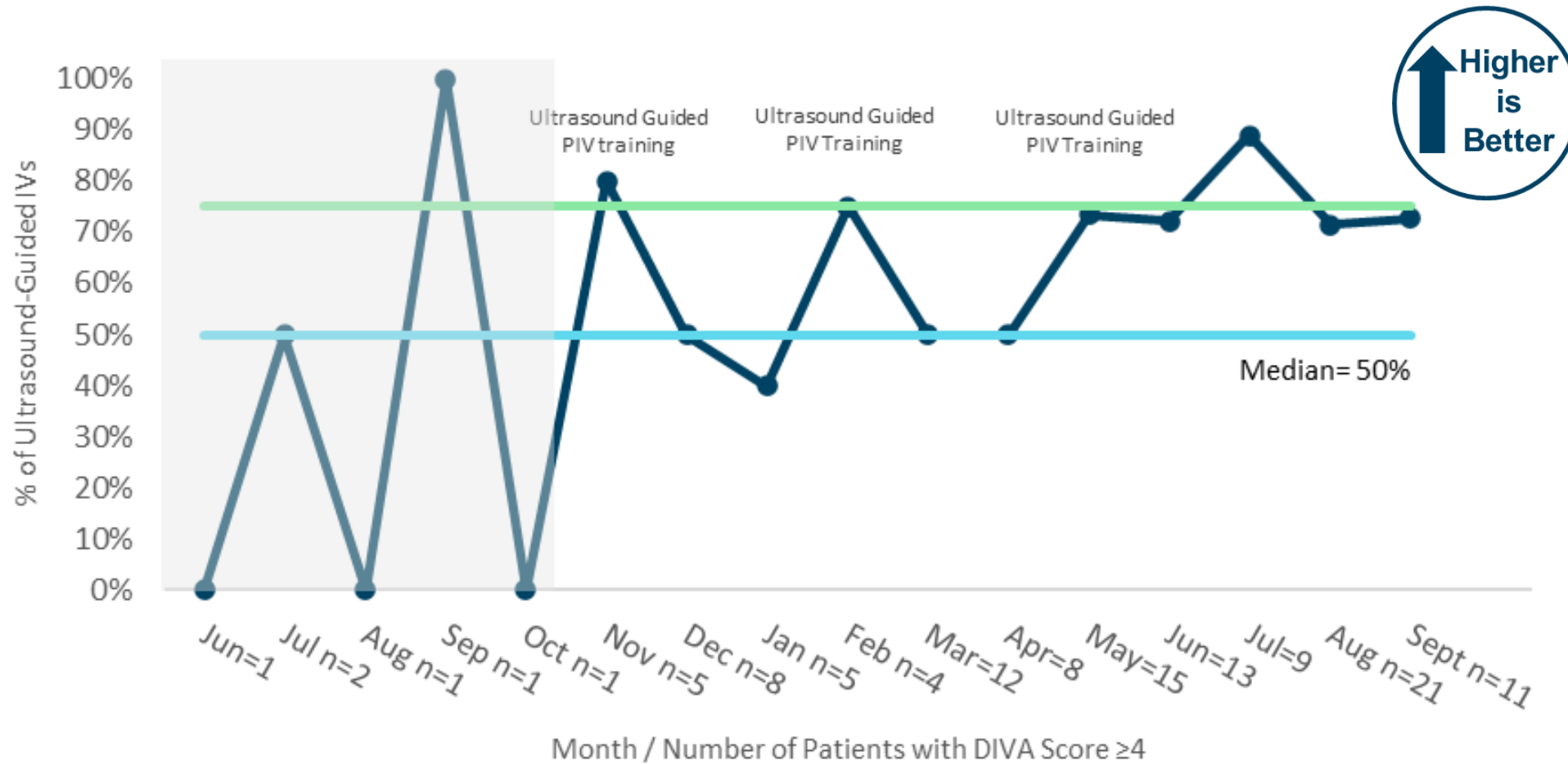
# Percentage of IV Lines with Documented DIVA Score, p Chart

## Process Measure



# Percentage of Ultrasound-Guided IVs Placed on 7CH for Patients with a DIVA Score $\geq 4$

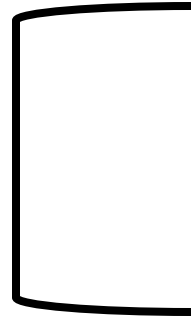
Outcome Measure



# Steps Toward Better Pediatric Vascular Access

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**Next Steps**

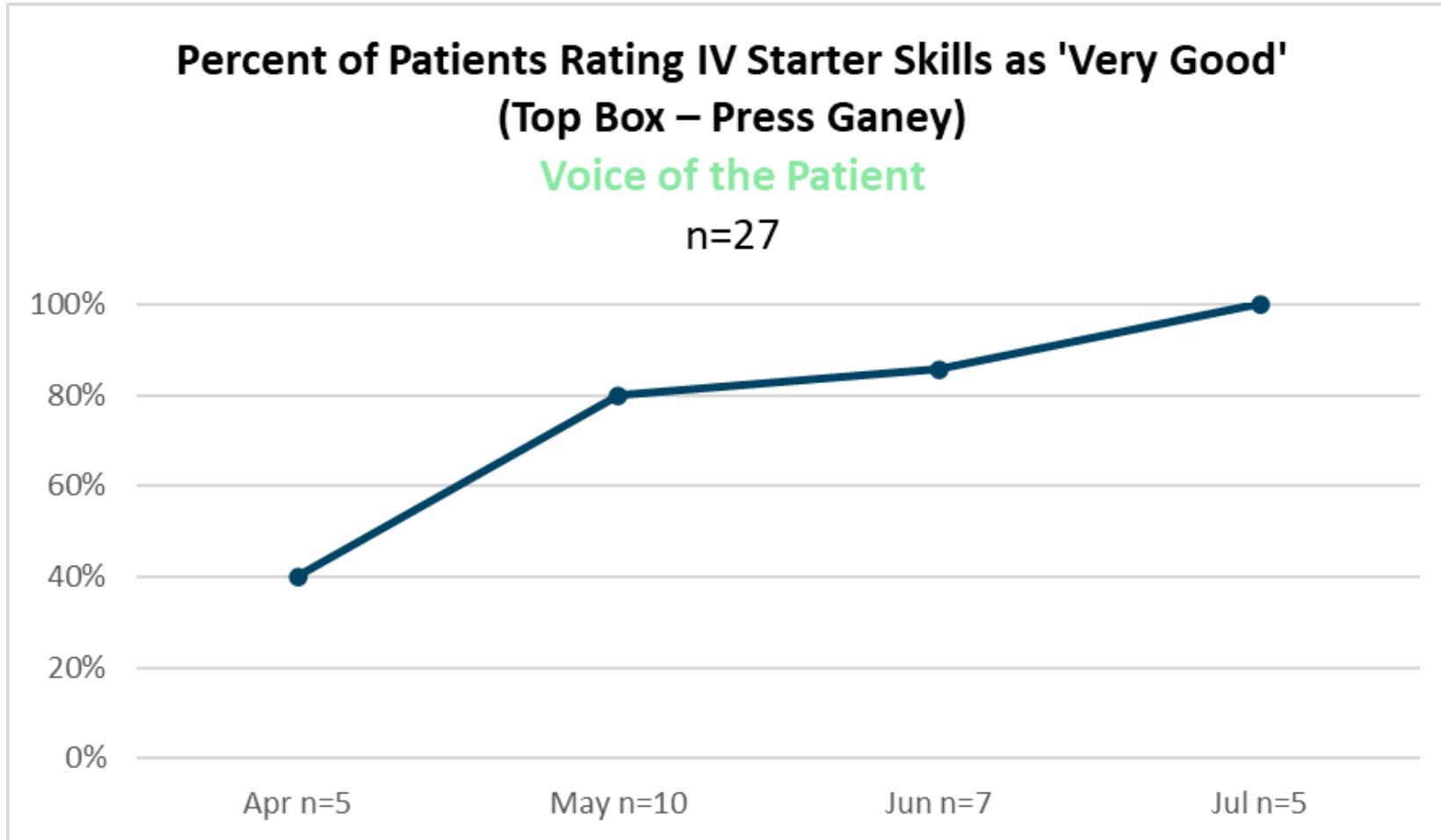


# Patient and Family Experience

**Percent of Patients Rating IV Starter Skills as 'Very Good'  
(Top Box – Press Ganey)**

Voice of the Patient

n=27



“Dylan and team did an amazing job with the ultrasound to find the veins. They sang to her & kept her the most calm she's ever been, while receiving a catheter”

Source: Press Ganey



Picture from Google  
-Not real patient

## The Difference We Made

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The DIVA project expanded identification of patients with Difficult Venous Access and increased ultrasound-guided IV access, allowing us to direct resources where they are most needed, prevent unnecessary central lines, and elevate evidence-based pediatric care

THANK  
you

We would like to thank our **sponsors**, the **IHQI team**, and our **nursing champions!**

### **Nursing Champions**

- Crystal Wagner (7CH Nurse Manager)
- Amber Kirkley (Children's Nursing Quality Coordinator)
- William Hester (7CH/Children's Emergency Response Team - CERT)
  - Ashley Tate (7CH RN)
  - Gina Thompson (7CH RN)

And a special thank you to all 7CH nurses for piloting this project and for your incredible feedback, engagement, and participation. Your support made this work possible!

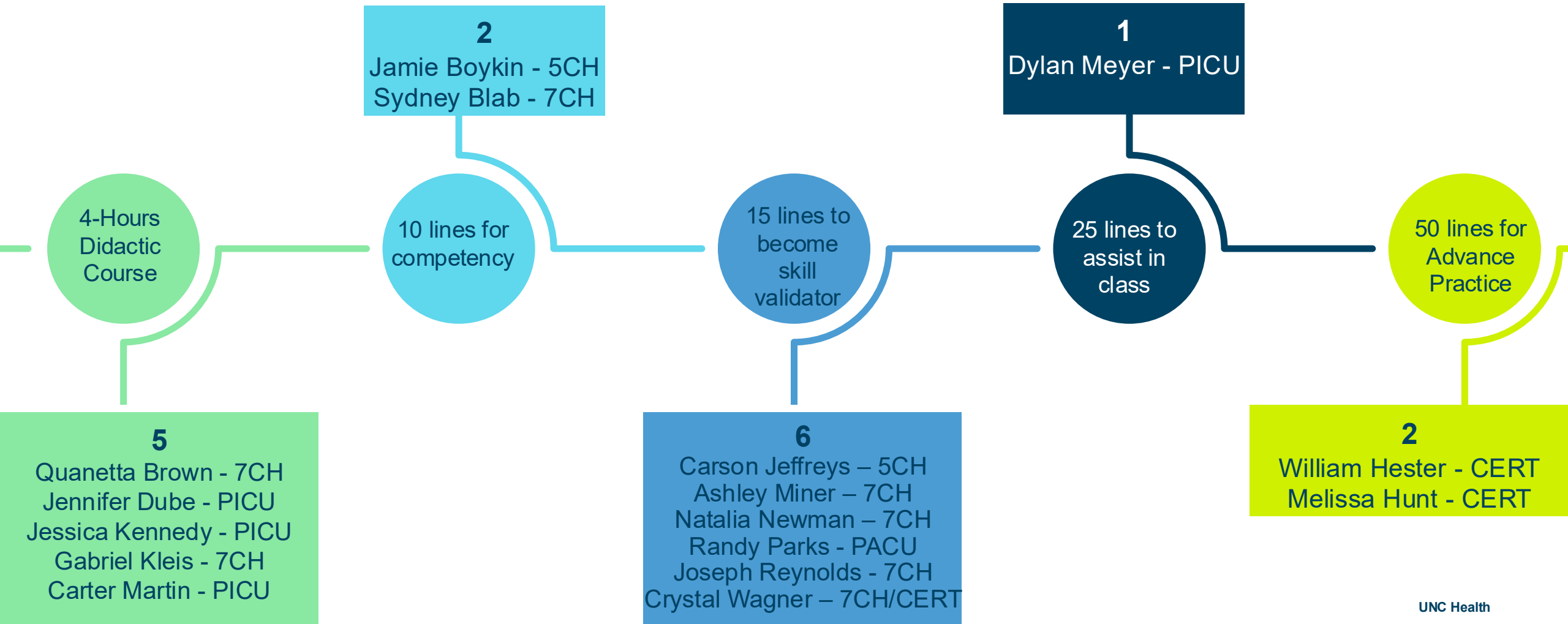


**UNC**  
HEALTH<sup>SM</sup>





# Ultrasound Training Pathway





# CERT Team Impact

Since February 2025,  
the CERT team

Received over  
**290 Consults**  
for USGPV

Received over  
**261 Consults**  
for Standard  
PIVs

