

BACKGROUND

- Identifying Critical Congenital Heart Disease (CCHD) before life-threatening symptoms remains a diagnostic challenge and public health priority.
- Newborn pulse oximetry screening (POS) to detect asymptomatic CCHD has been the national standard of care since 2011.
- Protocol changes proposed in 2020¹
 - Eliminating the third screen
 - Requiring that both pre- and post-ductal saturations ≥95% with a ≤3% difference
- We describe a large contemporary cohort of asymptomatic infants born with CCHD in the Northwest United States whose diagnosis was unknown prior to POS.

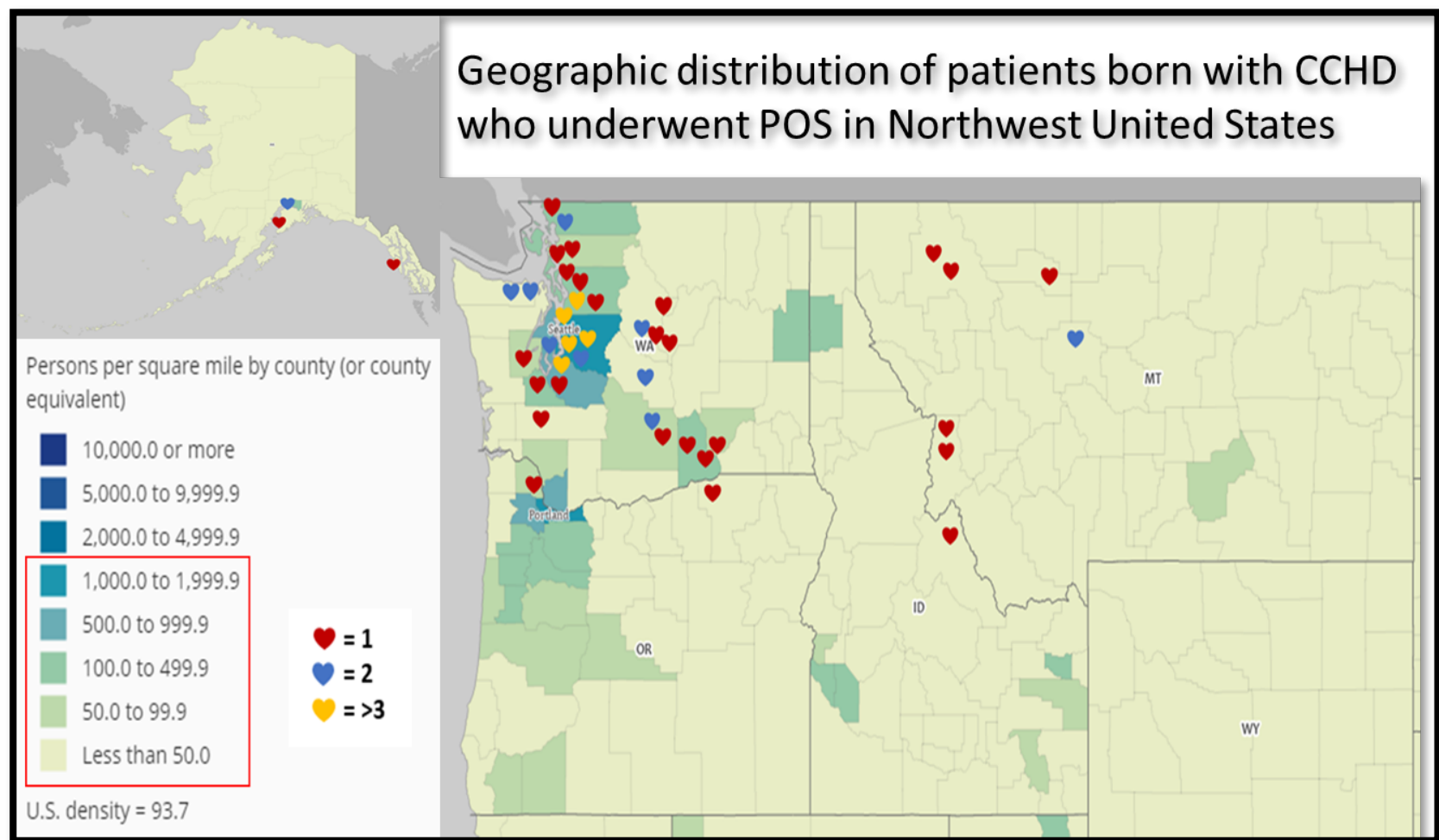
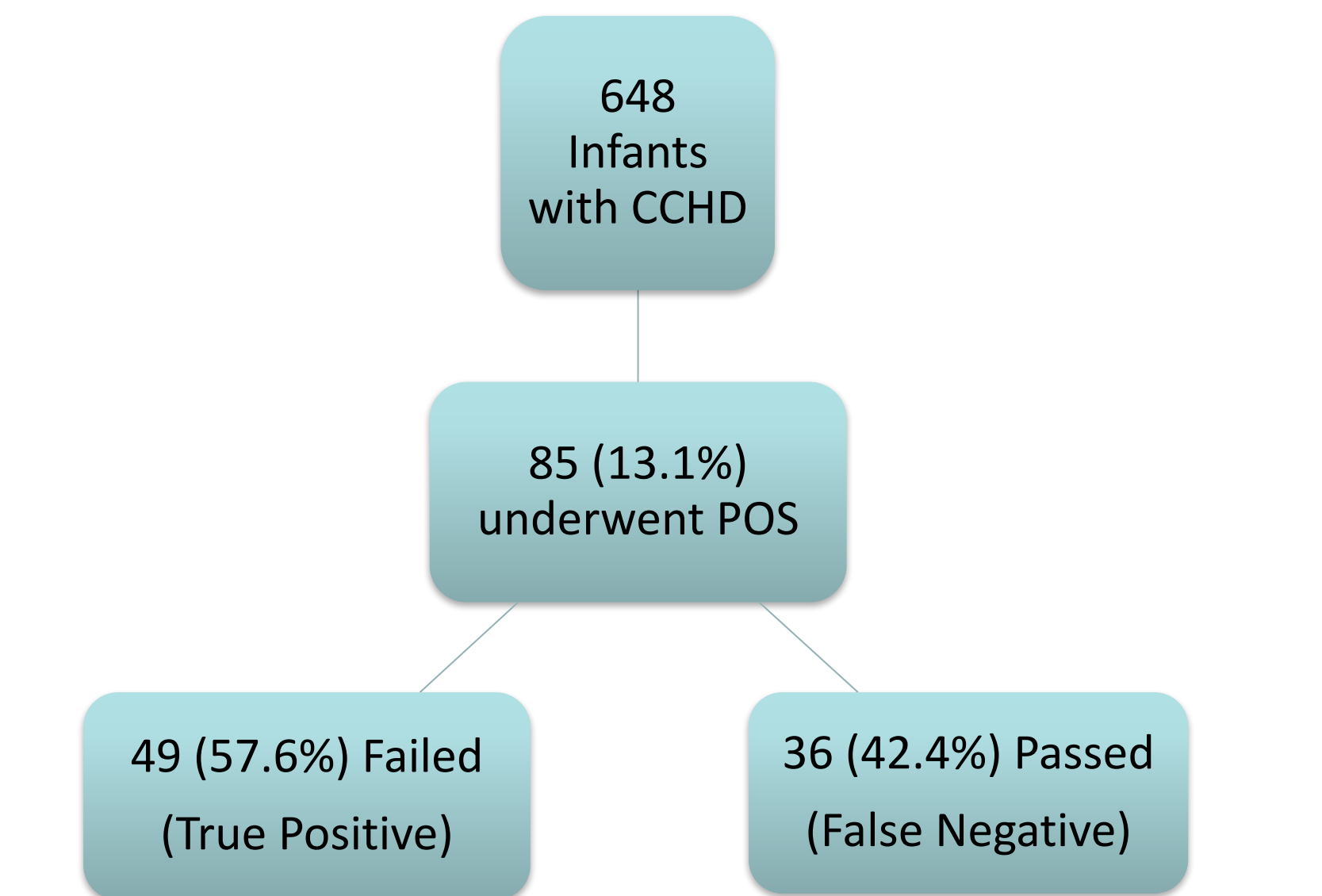
METHODS

- Retrospective, multi-center review of our registry of infants born with CCHD between July 2015 – May 2022.
- Inclusion Criteria
 - Children postnatally diagnosed with CCHD by POS or manifesting signs/symptoms AFTER POS
 - Treated at one of two congenital cardiac surgical programs in Washington State
- Medical records were reviewed for details about POS, CCHD diagnosis, medical transport to surgical center, and outcomes.
- Differences between groups were compared using Fisher's Exact Test where applicable.

REFERENCES

- Martin, GR, et al. Updated Strategies for Pulse Oximetry Screening for Critical Congenital Heart Disease. *Pediatrics* (2020) 1469(1): e20191650

RESULTS



US Census Bureau

Pulse Oximetry Screening Details

Total Patients	85
1 screening test	68 (80%)
2 screening tests	9 (10.6%)
3 screening tests	8 (9.4%)
Patients requiring >1 POS screens who passed	3/17 (17.6%)
Patients requiring 3 rd screen who had prolonged time between 1 st and 3 rd screen	5/8 (62.5%) Time Range: 2:45 -- 9:12 Hrs

	Failed POS (True Positive) Cohort	Passed POS (False Negative) Cohort
Diagnoses	49	36
Tot Anom Pulm Venous Return*	12 (24.5%)	1 (2.8%)
Coarctation of the Aorta*	6 (12.2%)	23 (63.9%)
Interrupted Aortic Arch	6 (12.2%)	3 (8.3%)
Transposition of GA	6 (12.2%)	2 (5.6%)
Other	5 (10.2%)	--
Tetralogy of Fallot	3 (6.1%)	--
Single Ventricle	3 (6.1%)	--
DORV	2 (4.1%)	--
Pulmonary Stenosis	2 (4.1%)	1 (2.8%)
Hemi Truncus and Truncus arteriosus	2 (4.1%)	3 (8.3%)
Aortic Stenosis	1 (2%)	2 (5.6%)
HLHS	1 (2%)	1 (2.8%)

* Denotes p <0.05

	Failed POS (True Positive) Cohort	Passed POS (False Negative) Cohort
Echocardiogram prior to transfer	41 (83.7%)	N/A
Prostaglandin E1 prior to transfer	33 (67.3%)	N/A
Intubation prior to transfer	12 (24.5%)	N/A
Transfer Complications	0	N/A
Discharged Home Prior to Dx	N/A	26 (72.2%)
Pre-operative Shock*	2 (4.1%)	9 (25%)
POS Values Available for Review	--	31 (86.1%)

* Denotes p <0.05

Sensitivity Calculations

Guideline used	Sensitivity	# Pts Reclassified As Failed
Baseline/Current guideline	57.6%	--
<95% and/or 1 repeat test	62.4%	4
Above changes AND ≤ 2% difference	67.1%	8

CONCLUSIONS

- In our CCHD registry, 7.6%, or approximately 7 infants/year, were identified and transferred to a higher level of care as a direct result of POS.
- Few infants required multiple screens, and of those, most failed. Adherence to the standard of repeat testing 1 hour after an indeterminate test was poor, delaying definitive disposition.
- Most infants with CCHD identified by POS were born in a regional hospital with echocardiography capability prior to transfer, transferred without complications, and remained asymptomatic.
- False negative POS remains a challenge, specifically for coarctation of the aorta, resulting in a delayed diagnosis and raising the risk for preoperative shock.
- POS protocol changes raised the sensitivity of test, though the impact on false positive results cannot be determined from this cohort.
- This study further corroborates the value of POS and supports modifications to the screening protocol to increase its efficiency and sensitivity.