Assessing Hidden Inequity in Two Year Old Immunization Measures

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AIRA 2024 Annual Conference

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Summary

- The differences in immunization delivery across populations, regions, and clinics is normally assessed by comparing up-to-date rates(UTD).
- For young children, the most common UTD assessment is the agglutinated 4:3:1:3:3:1:4 series by age two.
- UTD assessment compares the endpoints of the child's immunization experience, not their true path through the health care system.
- For assessing equity, more information about children's path from start to finish is needed.
- Milestone analysis is one potential tool for examining equity and UTD-hidden barriers.

Two Year Old UTD Measures

To date, major disagreements about early childhood immunization measurements have focused on the assessment point or on the components of the series.

HEDIS assessment is by the 2nd birthday; classic National Immunization Survey was within a 19-35 month age range.

Series components have also grown over time, from a 4:3:1 standard to the common use of a 4:3:1:3:3:1:4 series today

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Concerns with End-Point UTD Measures

Immunization rates have long been taken as proxy measures for the quality of early childhood care.

Recommended immunization and well-baby visit (WBV) schedules have a substantial overlap.

An endpoint measure as UTD by age two can potentially break this overlap- as any endpoint may not correctly convey how a child got there.

Depending on provider catch-up efforts, children with the same UTD status at age two can have very different access or barriers to care in their first year of life.

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Equity and UTD Measures

For individual children, there are a multitude of reasons why they may miss early WBV and/or fall behind on immunizations.

Having sick kids, lack of transportation, difficulty in scheduling, or even lack of a provider are some common reasons for missing a WBV.

But on a population level, when one population falls behind more than another, that is evidence of barriers to timely care and potential inequity.

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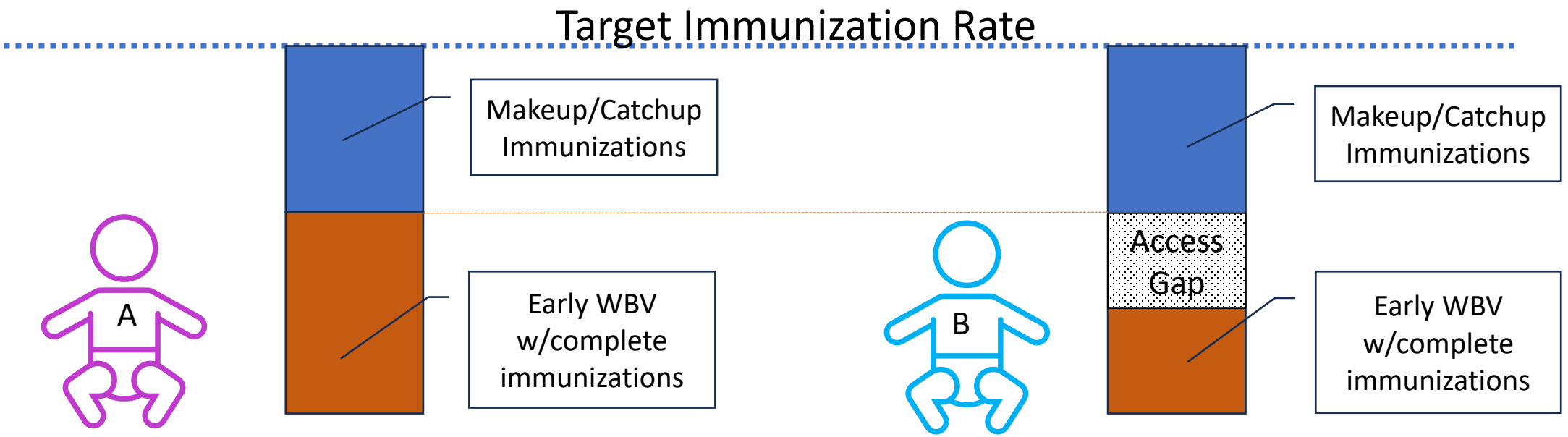
Example- Meeting Equity Goal of Equal UTD Rates by Age Two



- Equal UTD rates can mask underlying differences in access and barriers to early/complete WBVs- and in practice, missed early shots are difficult to catch-up.

Milestone Analysis

- One approach to assessing early immunization completeness relative to WBV is a milestone approach(1)
- Milestones are the point at which recommended immunizations per age period are first late.
- For example, for shots due at the 2 month visit, the milestone is complete if all are received before the start of the 3rd month.
- A comprehensive overview of non-endpoint immunization analysis has also recently been published, covering milestones and alternative measures(2)

1. Luman ET, Chu SY. When and why children fall behind with vaccinations: missed visits and missed opportunities at milestone ages. Amer J Prev Med. 2009
2. Newcomer SR, Glanz JM, Daley MF. Beyond vaccination coverage: population-based measurement of early childhood immunization schedule adherence. Academic Pediatrics. 2023

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Oregon Milestone Analysis (2023 data)

- We defined milestone completeness overall as having complete immunizations at the first four milestones.
- For this round, we also excluded HepB- as birth doses, (often fragmented in IIS reporting), complicate milestone calculations.
- The first four milestone periods are
  - 2 month- (late by the start of the 3rd month)
  - 4 month (late by the start of the 5th month)
  - 6 month (late by the start of the 7th month)
  - 12 month (late by the start of the 16th month)
- Based on infants with reported shots by 7 months of age

Milestone	Timeframe	Immunizations
1	2mo	DTaP, Polio, HIB, Pneumococcal
2	4mo	DTaP, Polio, HIB, Pneumococcal
3	6mo	DTaP, Pneumococcal
4	12-15mo	HIB, Pneumococcal, MMR, Var
UTD	By age 2	4 DTaP, 3 Polio, 1 MMR, 3 HepB, 3 Hib, 1 Var, 4 Pneumococcal

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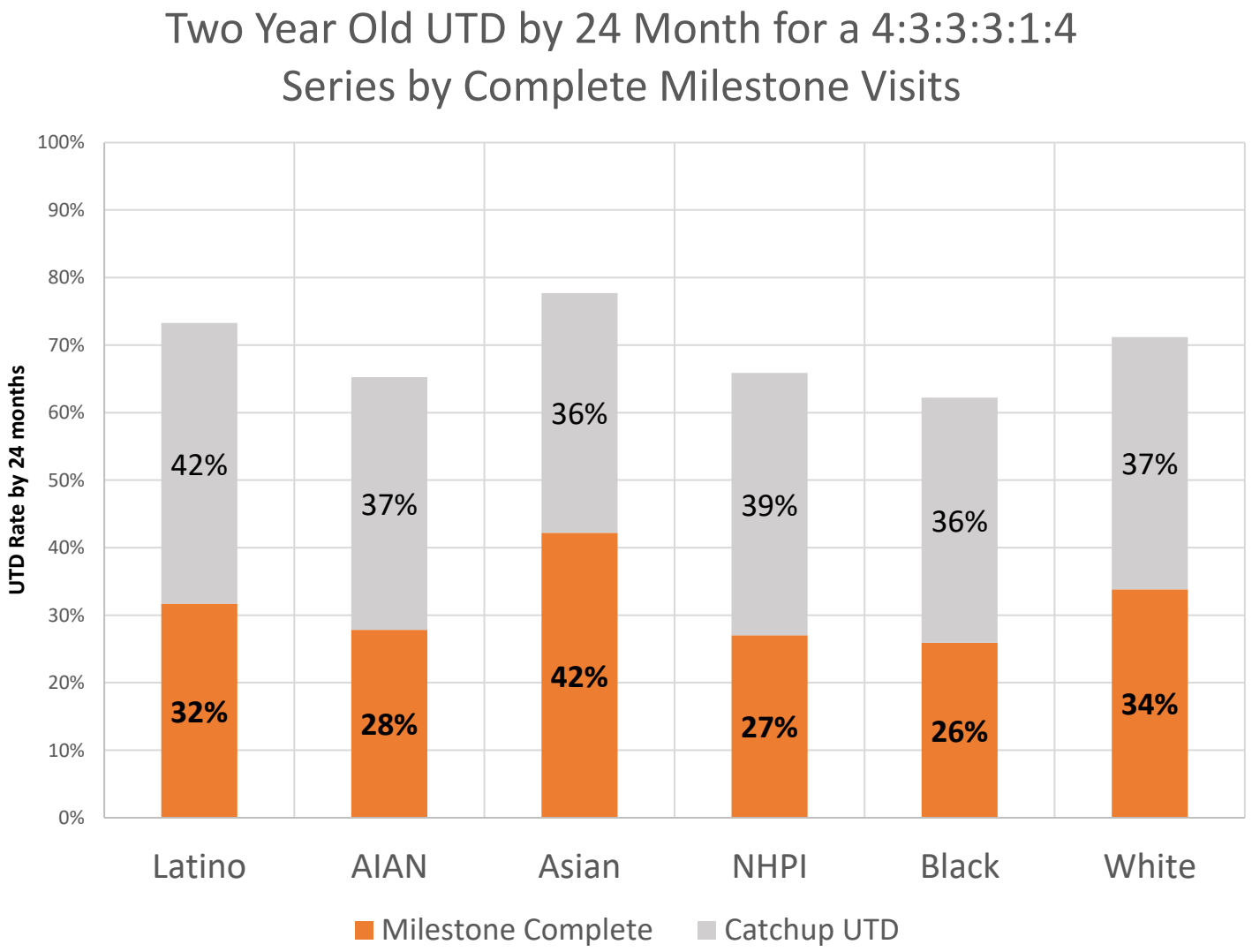
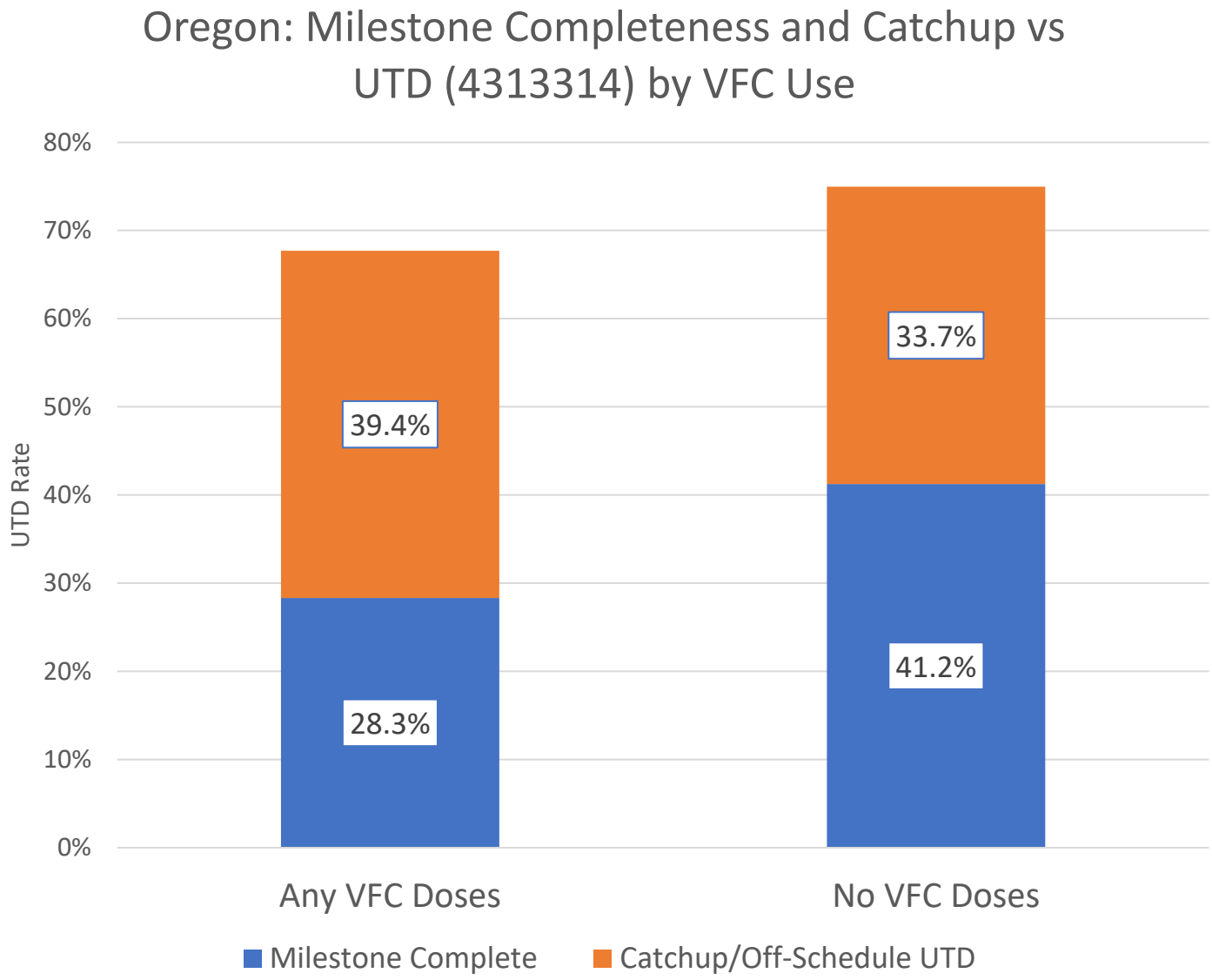
Milestones and Race/Ethnicity

- Maybe the inequity isn't so hidden? Present in both milestones and UTD rates.
- 98% of those milestone complete were also UTD by 24 months



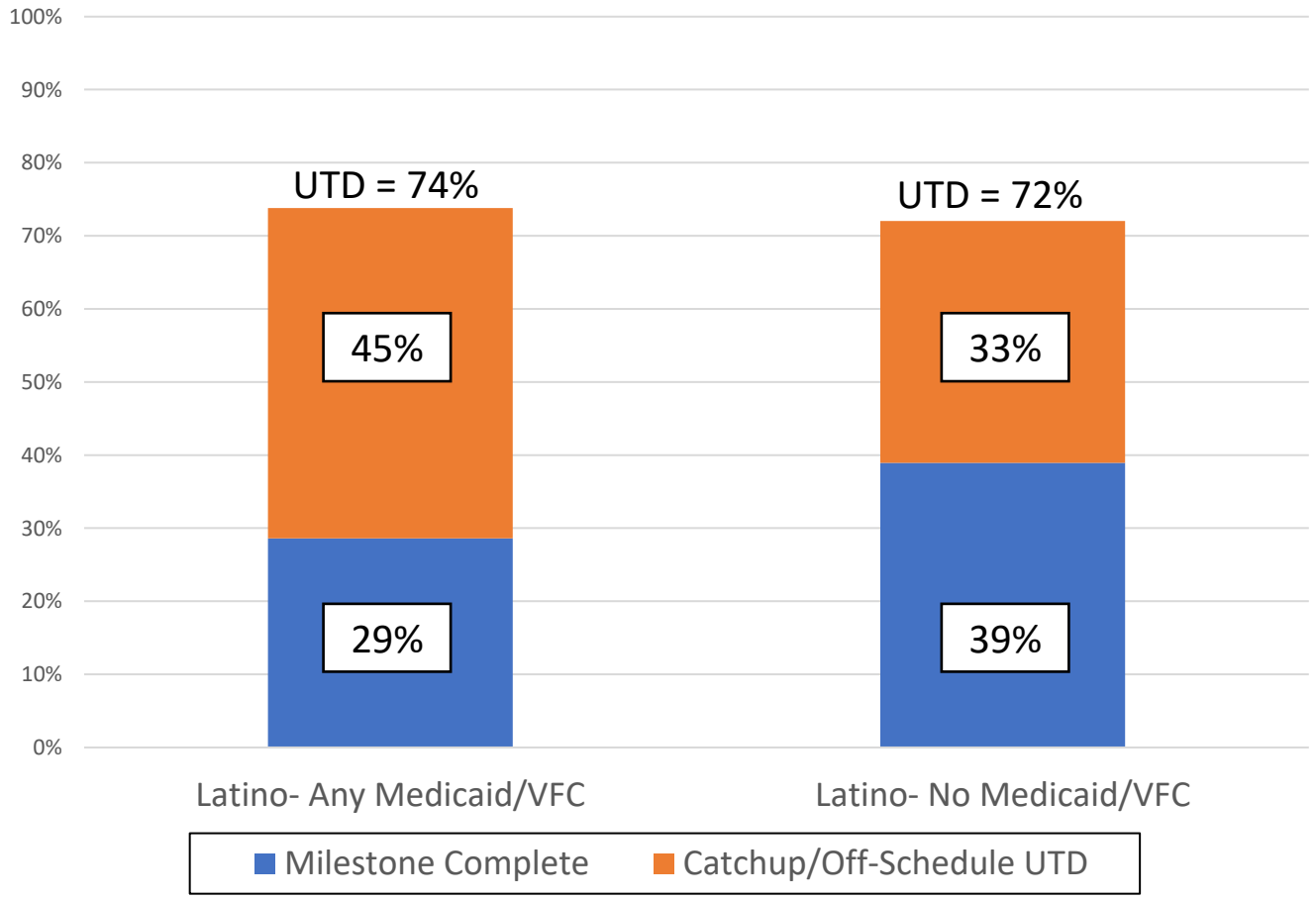
Medicaid/VFC & Milestones

- In Oregon almost all VFC doses are given to Medicaid clients(>97%)
- Infants with any Medicaid/VFC use have lower milestone completion, and higher catchup rates.
- This is evidence of barriers to care for infants using Medicaid/VFC.



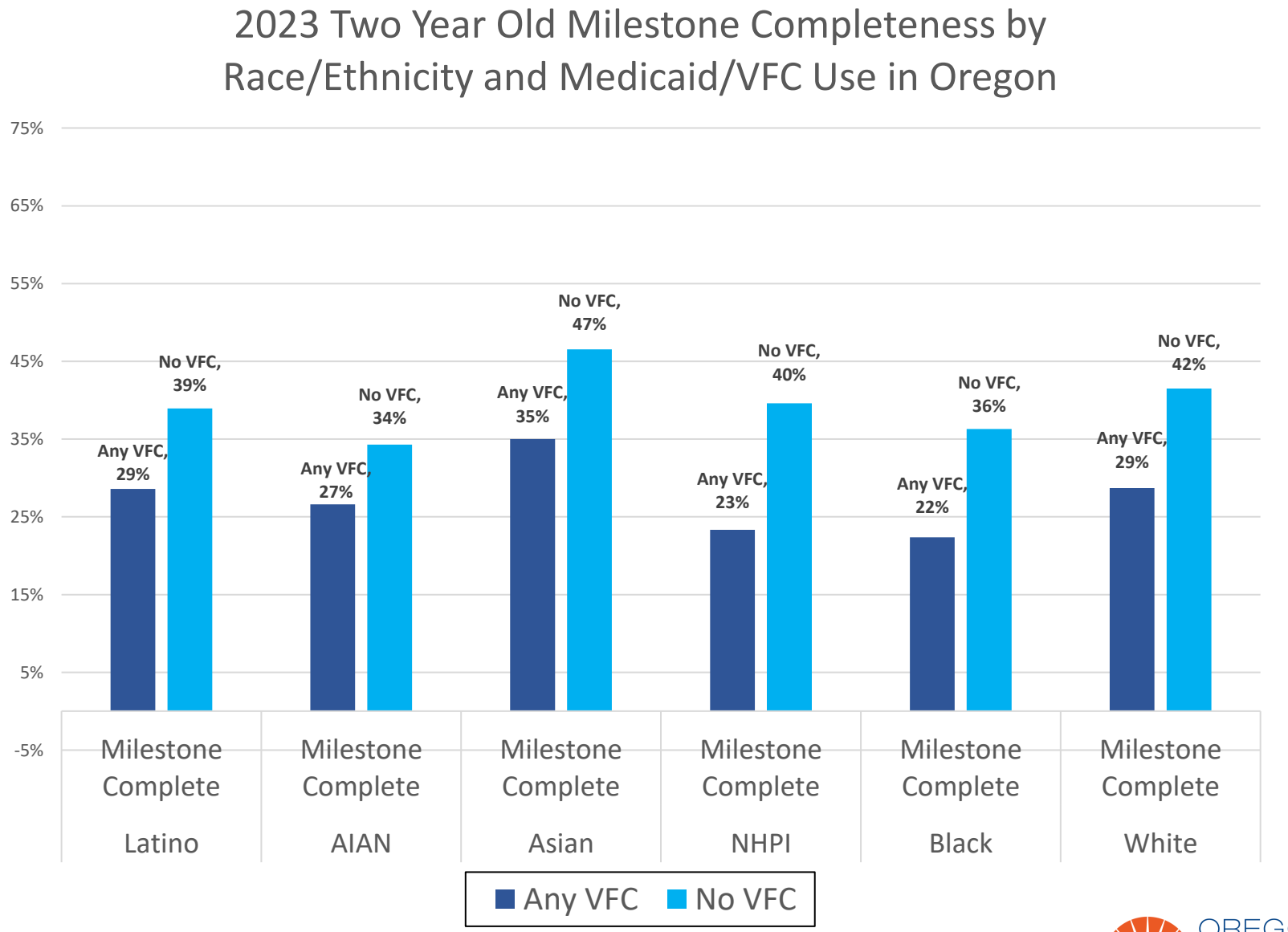
Hidden Inequity Example

- Latino two-year old UTD rates in Oregon are an example of hidden inequity;
- UTD Rates for Medicaid/VFC-using Latinos are marginally higher;
- But Latino milestone rates are substantially lower within Medicaid/VFC.



Medicaid/VFC by Race/Ethnicity

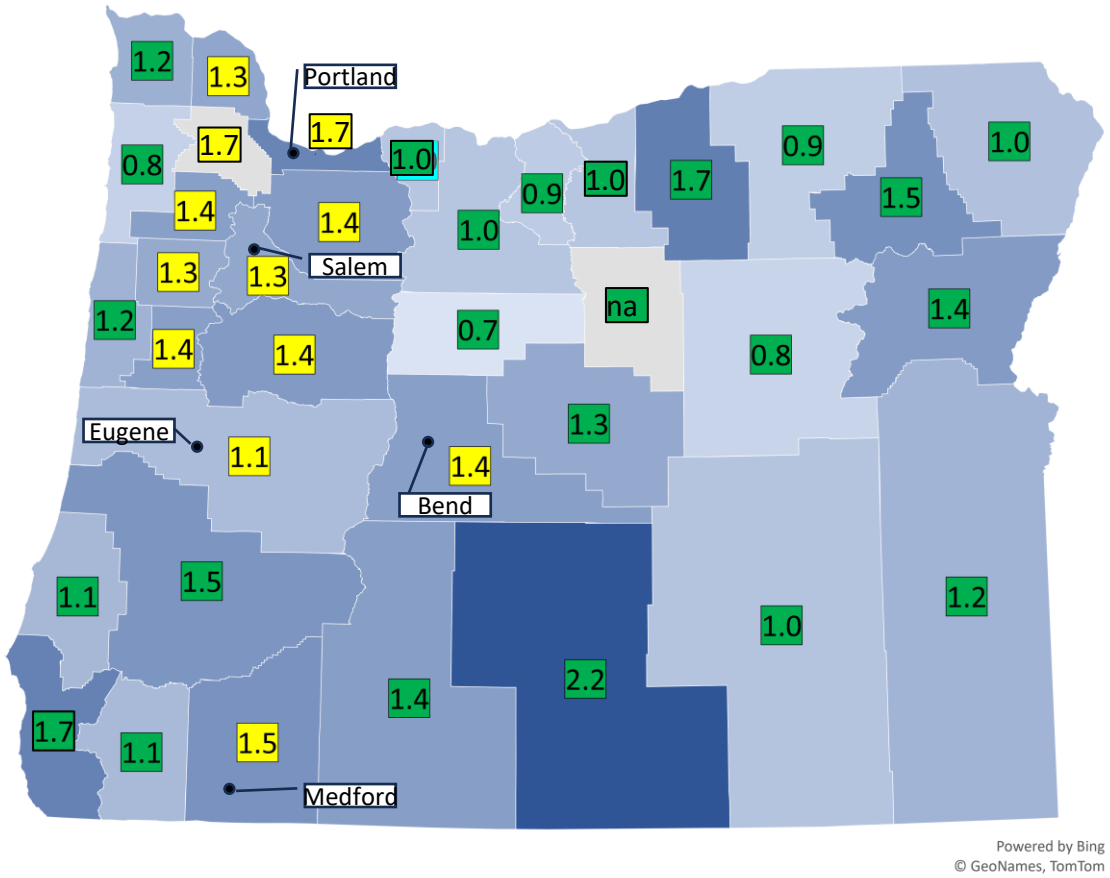
- Barriers to timely access to care exist across all race/ethnicity categories for infants using Medicaid/VFC.



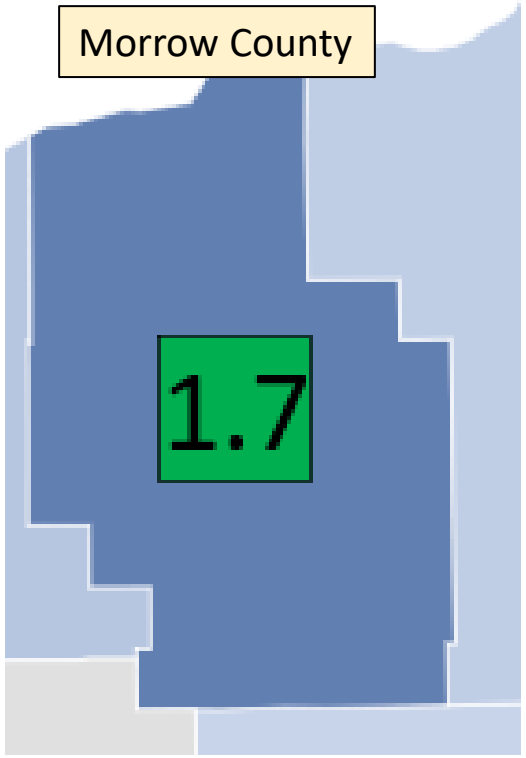
Geographic Inequity in Medicaid/VFC

- A simple measure, the ratio of milestone percentages, shows potential barriers/inequity on a population level.
- Here, a ratio close to 1.0 indicates milestone equity.
- Ratios much larger than 1 indicate potential inequity for Medicaid recipients.

Ratio of Non-Medicaid Milestone Completeness to Medicaid by County



County Example



Morrow County

		UTD	Milestone Complete	Catchup UTD
White	Medicaid/VFC	62%	19%	43%
	No Medicaid/VFC	66%	38%	28%
Latino	Medicaid/VFC	60%	21%	40%
	No Medicaid/VFC	75%	50%	25%

Morrow County is a small, rural Oregon county; ~3/4th of infants are immunized through Medicaid/VFC

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Conclusion

Alternatives to endpoint UTD measures provide better assessments of inequities in early immunizations.

A Milestone approach is a useful tool for looking for inequity.

Oregon's milestone analysis has found that barriers to timely care and potential inequity exist across race, Medicaid/VFC use, and geographic regions.

Our results suggest that focusing on 2 Year Old UTD rates as performance measures may dilute a needed focus on timely immunization and WBV.

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