Key Metrics to Benchmark State-level Early Hearing Loss Detection and Intervention Programs

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INTRODUCTION

- The CDC works closely with states and territories to collect annual Early Hearing Detection and Intervention (EHDI) program data and monitor permanent hearing loss in newborns and infants.

- Important metrics captured by EHDI programs include infants diagnosed with permanent hearing loss and infants who were lost to follow-up for diagnosis.

- According to the CDC's 2020 reports, hearing loss affects 1-2 per 1,000 infants in the United States, potentially leading to delayed speech, language issues, and a lower quality of life.

- Existing literature suggests that biopsychosocial factors, such as race and access to healthcare, play a role in both the prevalence of hearing loss and the rate of loss to follow-up.

- Our study aims to investigate the prevalence of hearing loss (HLp) and rates of loss to follow-up (LTFr) within states and District of Columbia (DC) EHDI programs, focusing on the influence of several key biopsychosocial factors.

EHDI process

Screening → Diagnosis → Early Intervention

METHODS

Data collection: We gathered data from 2007 to 2021 from the CDC's EHDI Hearing Screening and Follow-up Surveys (HSFS) and 2015 to 2020 data from Social Explorer and Kaiser Family Foundation (KFF).

Data tool creation: We calculated metrics from the existing EHDI data and visualized all metrics on a new website to facilitate comparison across locations and years.

Modeling: Separate multivariate linear regression models for years 2015 and 2020 were fitted for HLp and for LTFr using five predictors, for 50 states and DC.

HLp: Prevalence of permanent hearing loss per 1,000 infants screened

LTFr: Rate of infants who were lost to follow-up for diagnosis after not passing their last/final screening, and documented as one of three reasons (parents/family contacted but unresponsive, unable to contact, or unknown status) per 1,000 infants screened

RESULTS

### Figure 1. Maps showing distributions of HLp and LTFr, 2015 and 2020
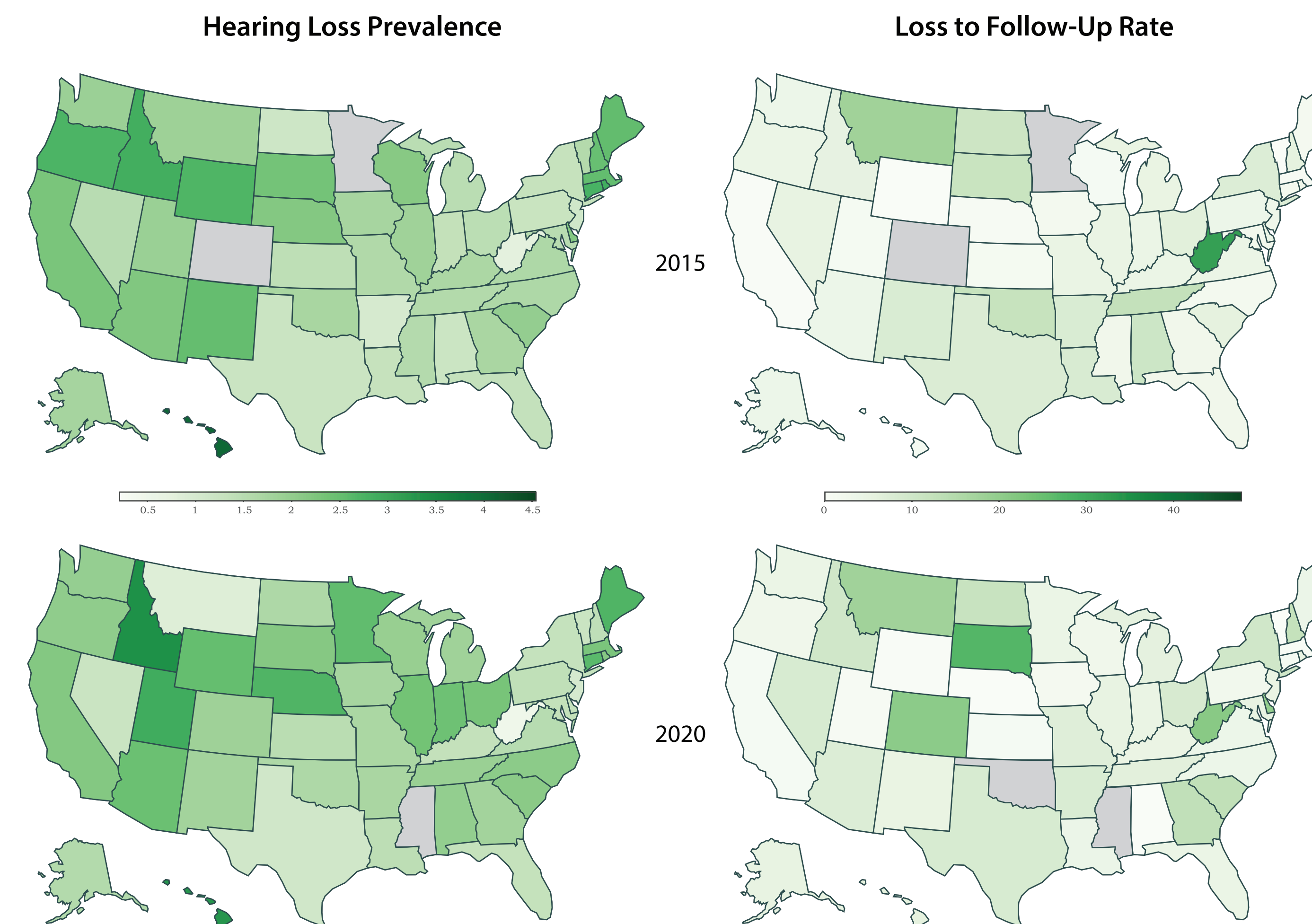
Source: Center for Public Health Systems Science. (January 31, 2024). Early Hearing Loss Detection Data. https://EHDIdata.wustl.edu
Note: Gray for a state indicates no data available: Colorado (2015), Minnesota (2015), Mississippi (2020) for HLp and LTFr; Oklahoma (2020) for LTFr.

HLp: State median *increased* from 1.72 in 2015 to 1.82 per 1,000 infants screened in 2020.

LTFr: State median *increased* from 4.20 in 2015 to 5.13 per 1,000 infants screened in 2020.

Figure 2. Coefficient plots of HLp and LTFr models, 2015 and 2020
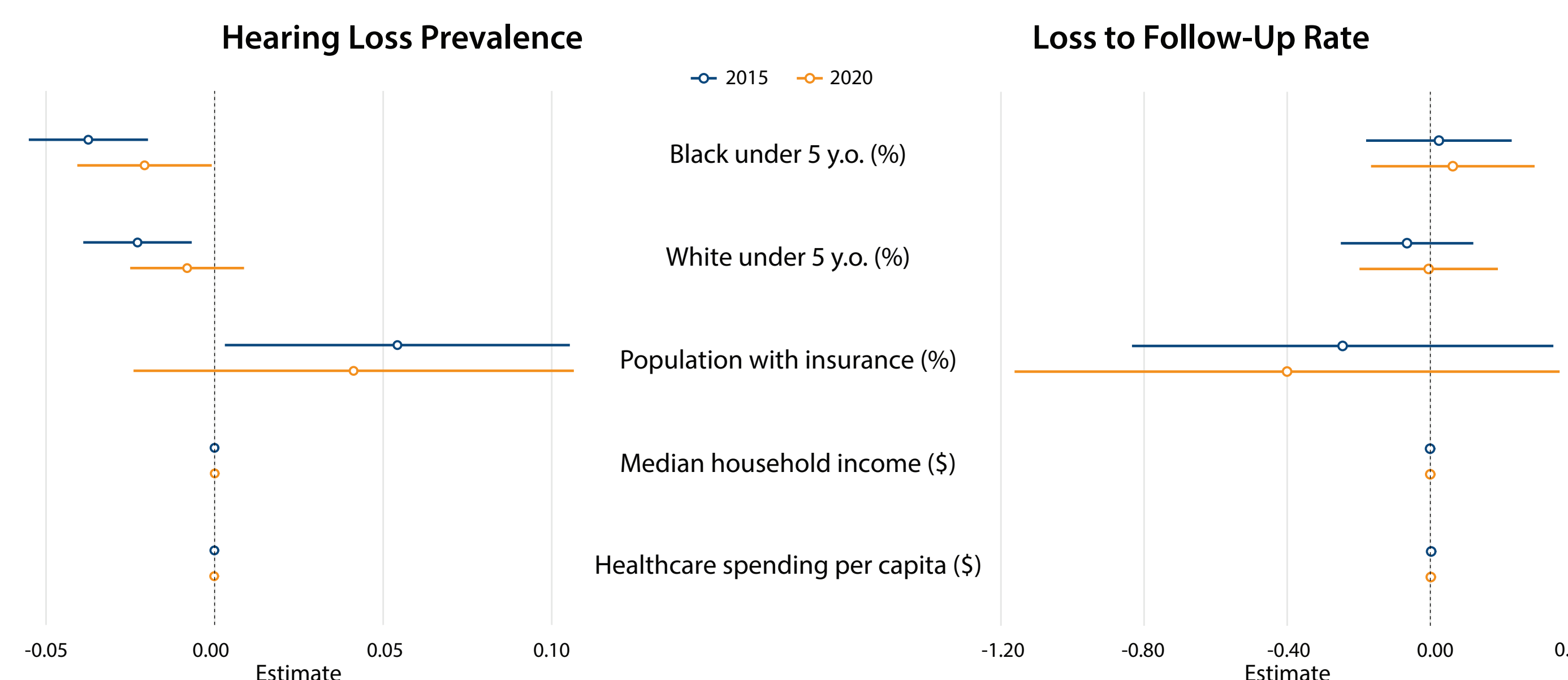
Significant predictors of HLp: Percentage of black population under 5 years of age in both 2015 ($\beta = -0.0374$) and 2020 ($\beta = -0.0213$), percentage of white population under 5 years of age in 2015 ($\beta = -0.0229$), and healthcare spending per capita in 2020 ($\beta = -0.0001$).

Significant predictors of LTFr: Median household income in 2015 ($\beta = -0.0003$) and healthcare spending per capita ($\beta = 0.0027$) in 2015; no significant predictors in 2020.

CONCLUSIONS

- The slight increase in hearing loss prevalence underscores the importance of ongoing screening, diagnosis, and intervention strategies.

- The significant associations with demographic factors highlight the need for focused approaches to address disparities and improve access to screening and diagnosis follow-up.

- The rising loss to follow-up rates suggests the need for enhanced efforts to ensure that infants receive timely and appropriate care.

NEXT STEPS

- Future research should prioritize large-scale data analysis to address disparities in access to screening and follow-up services, alongside exploring innovative approaches to enhance outcomes for infants with hearing loss.

- The website data tool created by our team can be a resource to EHDI programs to interactively explore Hearing Loss Prevalence and Loss to Follow-Up Rate further in other years. Many other metrics are also provided to explore various areas across the EHDI process.

Visit our new website at EHDIdata.wustl.edu

On the website, you can explore curated multi-year CDC EHDI data to help you determine:

- More effective EHDI programs
- Improvements for EHDI screening
- Areas that would benefit from additional resources
- Metrics that need improvement

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