Assessing Longitudinal Disparities in Insulin Pump Use Among Youth with Type 1 Diabetes

Estelle Everett. *University of California, Los Angeles*

Estelle Everett[1], Davene Wright[2], Adrienne Williams[3], Jasmin Divers[4], Catherine Pihoker[5], Angela Liese[6], Ronny Antonio Bell[7], Anna Bellatorre[8], Anna Kahkoska[9], Elizabeth Mayer-Davis[9], Jason Mendoza[10], Lauren Wisk[1]

[1]University of California, Los Angeles, Los Angeles, Calif., [2]Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston, Mass., [3]DNA Data Solutions, Irvine, Calif., [4]NYU Long Island School of Medicine, New York, N.Y., [5]University of Washington, Seattle, Wash., [6]University of South Carolina, Columbia, S.C., [7]Wake Forest School of Medicine, Winston-Salem, N.C., [8]University of Colorado Denver, Denver, Colo., [9]University of North Carolina at Chapel Hill, Chapel Hill, N.C., [10]Seattle Children's Research Institute, Seattle, Wash.

Background: Insulin pump use provides many advantages for the management of type 1 diabetes (T1D), but studies have shown racial, ethnic, and socioeconomic inequities in the use of this technology. As the prevalence of insulin pump use has increased over the past two decades, we aimed to determine whether these inequities have increased or diminished over time.

Methods: We used data from the population-based SEARCH for Diabetes in Youth study to perform a serial cross-sectional analysis to evaluate changes over time in insulin pump use in participants <20 years old with T1D by racial and ethnic group, health insurance, household income, and formal parental education across 4 phases of the study (Phase 1: 2001-2005, Phase 2: 2006-2010, Phase 3: 2011-2015 and Phase 4: 2016-2019). Data from the last study visit were analyzed for those with multiple visits within a phase. Multivariable generalized estimating equations with a binomial distribution were used to assess probability of insulin pump use, and models were further adjusted for the other predictors--age at visit, diabetes duration, sex and clinic site--with clustering for individuals. An interaction effect between each primary predictor (race and ethnicity, health insurance, household income, education) and the phase variable was used to assess temporal changes.

Results: The overall prevalence of insulin pump use increased from 30% in 2001-2005 to 58.3% in 2016-2019. Compared to those who were non-Hispanic white, the adjusted OR for pump use in Hispanic participants was 0.08 (95% CI 0.01-0.63) in 2001-2006 and 0.65 (95% CI 0.48-0.87) in 2016-2019 which was a statistically significant improvement (p=0.004). Conversely, the OR for Black and other races was 0.28 (95%CI 0.21-0.37) and 0.43 (95%CI .26-0.71) and did not change over time (p=0.864 and p=0.439). Compared to those with a bachelor's degree or more, adjusted OR for pump use in those with some high school/high school degree and those with some college was 0.38 (95%CI 0.30-0.48) and 0.69 (95%CI 0.57-0.82) and did not change over time (p= (p=0.160 and p=0.894). Compared to those with private health insurance, those with public health insurance had an OR for pump use of 0.84 (0.68-1.03) which did not change over time (p=0.815). Compared to those with an annual household income >$75K, those with an income of <$25K, $25K-$49K, and $50K-74K had an OR for pump use of 0.43 (95%CI 0.34-0.54), 0.57 (95%CI 0.46-0.71) and 0.80 (95%CI 0.65-0.97) which did not change over time (p= 0.937, 0.870, 0.821, respectively).

Conclusion: Over the past two decades, there have been few improvements in the ethnic, racial, and socioeconomic inequities in insulin pump use among youth with T1D. Studies that evaluate barriers or

test interventions to improve technology access are needed to address the persistent inequities in diabetes care.

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