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

Ronny Antonio Bell, Anna Bellatorre, Jasmin Divers, Anna Kahkoska, Angela Liese, Elizabeth Mayer-Davis, Jason Mendoza, Catherine Pihoker, Adrienne Williams, Lauren Wisk, Davene Wright, and Estelle Everett

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 prevalence of insulin pump use increased from 30% in Phase 1 to 58.3% in Phase 4. Compared to those of non-Hispanic (NH) white race, odds of pump use in Hispanic participants was 0.08 (95% CI 0.01-0.63) in Phase 2 and 0.65 (95% CI 0.48-0.87) in Phase 4 with significantly reduced disparities over time ($p=0.05$). The disparities for Black participants and those of other races did not change over time, but was significantly lower than for white participants in all periods (0.28 (95% CI 0.21-0.37) and 0.43 (95% CI 0.26-0.71), respectively). Across all time periods, those with some high school/high school degree and those with some college had lower odds of pump use compared to those with at least a bachelor's degree 0.38 (95% CI 0.30-0.48) and 0.69 (95% CI 0.57-0.82). Those with public insurance had lower odds for pump use

compared to those with private insurance 0.84 (0.68-1.03). Those with an income of < \$25K, \$25K-\$49K, and \$50K-74K had lower odds of 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) compared to those with household incomes \geq \$75,000.

Conclusion: Over the past two decades, there have been no 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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