

# Intervention-generated inequalities: continuous glucose monitoring in paediatric Type 1 Diabetes

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## Background

Continuous glucose monitoring (CGM) has been shown to significantly improve glycaemic control in paediatric populations with Type 1 Diabetes (T1D)<sup>1</sup>. Given the established inequalities in outcomes for children with T1D<sup>2</sup>, it is vital to assess how inequalities in access to and use of CGM may be accelerating this divide. This systematic review characterised how disparities in CGM usage and outcomes vary across domains of disadvantage.

## Aims

This review addresses two questions:

1. How does use of CGM vary with respect to PROGRESS-plus characteristics?
2. Are there inequalities in outcomes with respect to PROGRESS-plus characteristics for those using CGM?

Figure 1. Forest plot showing odds ratios for not using CGM by socioeconomic status

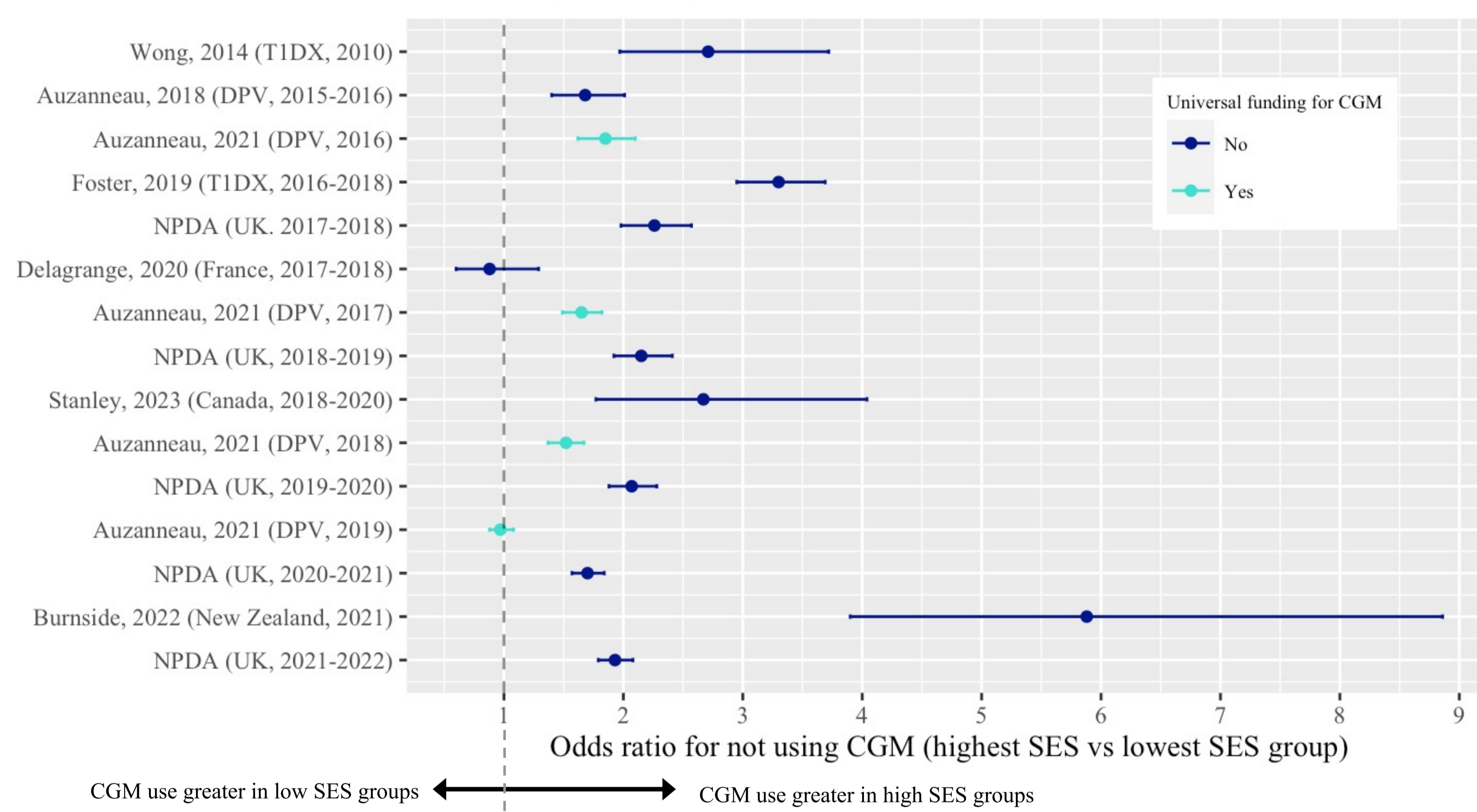
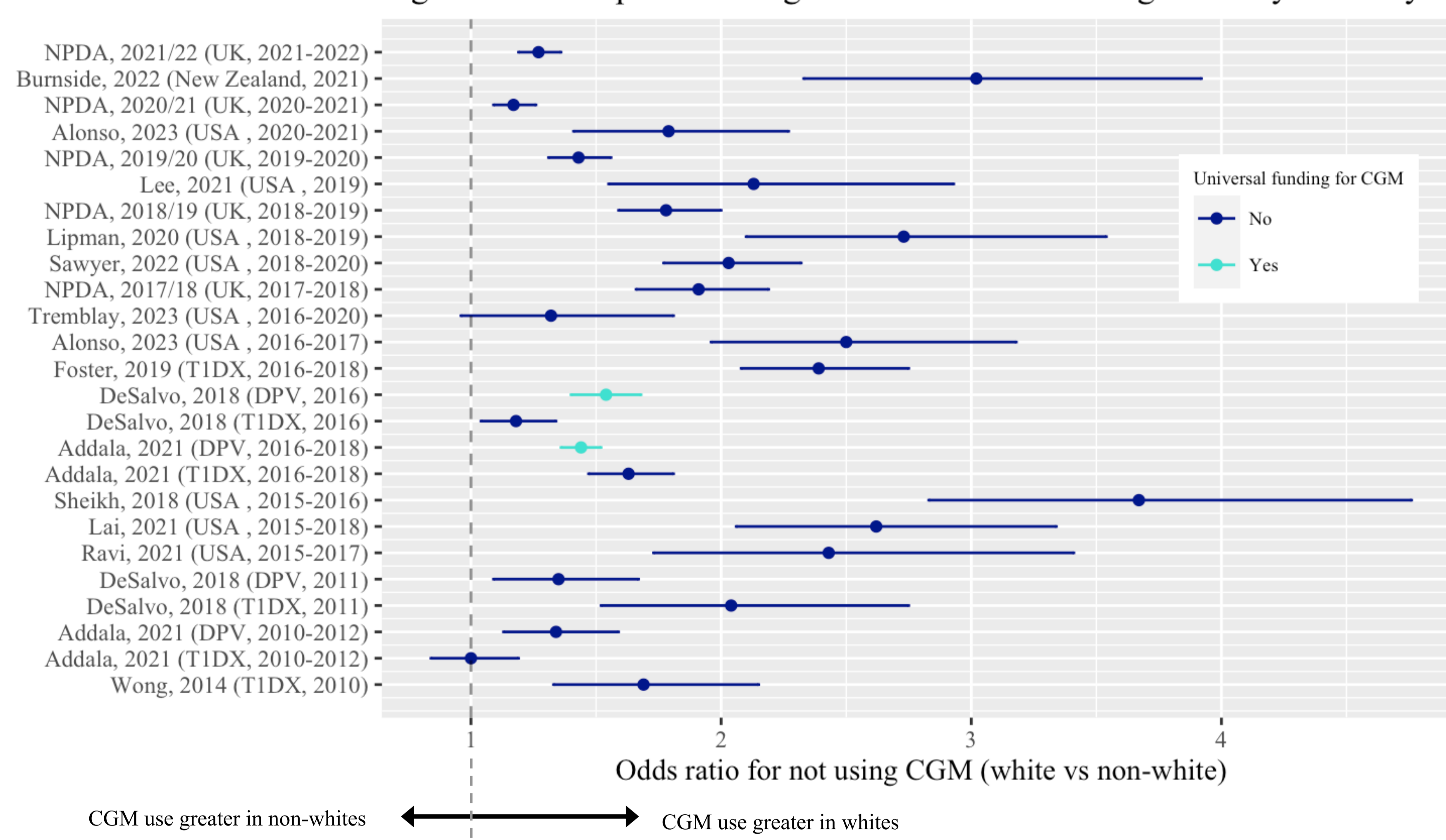


Figure 2. Forest plot showing odds ratios for not using CGM by ethnicity



## Conclusions

These findings suggest widespread inequalities in access to CGM and glycaemic outcomes for those in lower SES, lower parental education, and minority ethnic groups, even where technology is reimbursed. Future research should therefore focus on identifying factors affecting access to CGM besides cost, as increasing CGM uptake may be a powerful tool to reduce inequalities in outcomes. Additionally, the effect of factors such as occupation and religion require further investigation.

## References

- <sup>1</sup>Elbalsby M, Haszard J, Smith H, Kuroko S, Galland B, Oliver N, Shah V, de Bock MI, Wheeler BJ. Effect of divergent continuous glucose monitoring technologies on glycaemic control in type 1 diabetes mellitus: A systematic review and meta-analysis of randomised controlled trials. *Diabet Med*. 2022 Aug;39(8):e14854. doi: 10.1111/dme.14854. Epub 2022 Apr 25. PMID: 35441743; PMCID: PMC9542260.
- <sup>2</sup>Addala A, Auzanneau M, Miller K, Maier W, Foster N, Kapellen T, Walker A, Rosenbauer J, Maahs DM, Holl RW. A Decade of Disparities in Diabetes Technology Use and HbA1c in Pediatric Type 1 Diabetes: A Transatlantic Comparison. *Diabetes Care*. 2021 Jan;44(1):133-140. doi: 10.2337/dc20-0257. Epub 2020 Sep 16. PMID: 32938745; PMCID: PMC8162452.

## Conflict of Interest declaration

There are no conflicts of interest to declare.

## Methods

PubMed, Embase, and Web of Science were searched for observational studies that reported CGM usage by any of the PROGRESS-Plus criteria in patients  $\leq 26$  with T1D. The protocol was pre-registered on PROSPERO (CRD42023438139). Unadjusted odds ratios were calculated where not specifically reported.

## Results

Of 3,598 papers identified by the search, 27 met the inclusion criteria. PROGRESS-plus criteria assessed included ethnicity (70% of studies), sex (59%), socioeconomic status (SES) (48%), parental education (11%), and place of residence (4%).

Significantly lower CGM usage rates and poorer outcomes were consistently demonstrated for those who were:

- Lowest SES group
  - 92% of studies found significant difference in CGM usage between the lowest and highest SES group (Figure 1).
- Non-white
  - 100% of studies found significant difference in CGM usage for at least one ethnic minority group (Figure 2).
- Lowest parental education group
  - 100% of studies found significant differences in CGM use based on parental education level.

These disparities persisted even when CGM is fully funded. 31% of studies found significant sex differences in CGM use, but the effect size was small and the direction of the effect varied.

Disparities in outcomes were much more marked for those not using CGM.