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Mother and Infant Research Electronic Data Analysis (MIREDA): Creating a Common Data Model for Federated Analysis to Inform Policy for Improvement in Maternal and Child Outcomes.

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Objective

MIREDA aims to provide a harmonized UK-wide resource of restructured, routinely collected anonymised data from multiple birth cohorts using the OMOP Common Data Model (CDM). It will enable analyses across sites without sharing sensitive data and produce real-world evidence to support interventions and policies that improve maternal and infant outcomes.

Methods

MIREDA harmonizes data from five UK birth cohorts by identifying and compiling common data within each Trusted Research Environment (TRE). The data is cleaned and assessed using summary reports before being mapped to a common format through a mix of automated and manual steps. Transformation rules are applied to standardize the data while ensuring privacy, as no raw data leaves the TREs. Analyses are conducted separately within each TRE using the same methods, with strict checks and validations before securely federating the results.

Results

Preliminary findings reveal significant regional variations in preterm birth rates and school attainment, alongside differing exposure risks such as smoking rates, maternal age, ethnicity, and multimorbidity. By stratifying populations with similar exposure risks but residing in different regions, the dataset enables natural experiment methods to evaluate the impact of local policies and interventions. Early results demonstrate how harmonized data can reveal disparities in crude versus

standardized prevalence rates and provide case studies highlighting the effectiveness of local interventions in improving maternal and child outcomes.

Conclusion

The OMOP CDM provides a scalable, internationally accepted framework for data harmonisation. MIREDA will expand this to include non-healthcare data, such as education and health visitor records, and foster international collaborations. This initiative will help policymakers identify effective interventions to improve maternal and infant outcomes across the UK and beyond.

