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Utilising linked administrative data to model the impact of stacked early childhood interventions on developmental inequities

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Objective

To demonstrate how linked administrative data can be utilised to examine the extent to which stacking multiple policy-relevant hypothetical interventions across early childhood could potentially reduce socioeconomic inequities in children's developmental outcomes at school entry.

Methods

We used longitudinal linked administrative data from 274,123 Australian children born between January 2012–July 2013 and who participated in the 2018 Australian Early Development Census (AEDC) in their first year of formal schooling. Causal mediation analysis using an interventional effects approach was used to estimate the impact of hypothetical interventions aimed at reducing socioeconomic inequities in five intervention targets over early childhood: household income (1–2 years), home reading (2–3 years), household crowding (3–4 years), child mental health (4–5 years), and preschool attendance (4–5 years). Poor child development was measured by teacher-reported vulnerability on one or more developmental domains of the AEDC.

Results

The analytic sample included 172,615 children (87,179 male [50.5%]) with complete data. One-sixth exhibited poor development at school entry. Children who were socioeconomically disadvantaged in infancy (bottom 25th percentile on a composite of household income, parent education, and occupation) had a higher risk of poor developmental outcomes compared

to peers: absolute risk difference = 8.7% (95% CI, 8.2% to 9.1%). Intervening to reduce inequities in all five intervention targets simultaneously resulted in a 5.6% (95% CI, 5.2% to 5.9%) absolute reduction in the risk of poor developmental outcomes. Among separate interventions, the largest absolute reduction was for home reading (4.5%, 95% CI, 4.3% to 4.8%), followed by child mental health (0.6%, 95% CI, 0.5% to 0.8%) and preschool attendance (0.2%, 95% CI, 0.2% to 0.3%).

Conclusion

This is the first study to apply causal methods to linked administrative data for evaluating multisectoral early childhood interventions. Combining interventions reduces socioeconomic inequities in child development more than individual approaches. We show how such data can address causal policy questions otherwise infeasible, unethical, or impractical to test in trials.

