

## Are There Long-term Academic Benefits of Full-Day Kindergarten? A Population-Based Analysis

Brownell, Marni<sup>1,2\*</sup>, Nickel, Nathan<sup>1</sup>, Chateau, Dan<sup>2</sup>, Taylor, Carole<sup>2</sup>, Crockett, Leah<sup>3</sup>, Katz, Alan<sup>2</sup>, Sarkar, Joykrishna<sup>2</sup>, and Burland, Elaine<sup>2</sup>

<sup>1</sup>University of Manitoba

<sup>2</sup>Manitoba Centre for Health Policy

<sup>3</sup>Children's Hospital Research Institute of Manitoba

### Objective

Despite the implementation of full-day kindergarten (FDK) in several Canadian provinces, there is little evidence on the long-term outcomes associated with this program. Our objective was to use population-level linked data sources from Manitoba, Canada, to determine whether FDK results in better long-term academic outcomes and reduced inequities in outcomes.

### Approach

Using data held in the Manitoba Centre for Health Policy Data Repository we examined provincial reading and numeracy assessments in grades 3, 7, and 8 and a performance index in grade 9 for students in two Manitoba school divisions between 1999-2012. In School Division A (SDA), FDK is targeted in the lowest SES schools; in School Division B (SDB) FDK was gradually introduced universally. SDA FDK students were matched using propensity scores to students in an adjacent school division with similar socioeconomic status (SES) but no FDK; in SDB a stepped-wedge design was used. Logistic regressions accounted for confounders including classroom effects and sex. Gamma sensitivity analyses were used to assess sensitivity of results to unmeasured confounding. The Kakwani Progressivity Index (KPI) determined how FDK affected equity.

### Results

There were 224-544 children in FDK and 869-1923 non-FDK matches in SDA, depending on the outcome examined; numbers in SDB ranged from 335-707 (FDK) and 222-475 (non-FDK). Including interactions, 35 comparisons were examined in SDA and 24 in SDB. None of the outcomes examined in SDB showed

statistically significant effects of FDK that were robust to unmeasured confounding. In SDA there were only 3 statistically significant and robust findings of benefits of FDK, all related to math. Comparisons of KPIs for FDK and non-FDK children in both school divisions demonstrated inequities in outcomes associated with SES, however there were no significant differences in equity between the FDK and non-FDK children for any of the outcomes.

### Conclusion

Our findings indicate no apparent benefits of universal FDK, and limited benefits from targeted FDK, specifically long-term improvements in numeracy for low-income girls. No reductions in inequity were found. Decisions regarding FDK implementation should weigh the costs of this program against the limited long-term academic benefits.

\*Corresponding Author:

Email Address: [marni\\_brownell@cpe.umanitoba.ca](mailto:marni_brownell@cpe.umanitoba.ca) (M. Brownell)

