Including multiple domains in analysis of health inequalities: Latent class analysis of physical, cognitive and socio-emotional development in the Longitudinal Study of Australian Children

Fiona K. Mensah (MSc)1,2,3 Jan M. Nicholson (PhD)1,4 Liz Headley (MIPH)1,5,6 John B. Carlin (PhD)1,2,3 Donna Berthelsen (PhD)4 Melissa Wake (MD)1,2,3

1Murdoch Childrens Research Institute, Melbourne, Australia

2Royal Children’s Hospital, Melbourne, Australia

3Department of Paediatrics, University of Melbourne, Melbourne, Australia

4Centre for Learning Innovation, Queensland University of Technology, Brisbane, Australia

5Victorian Public Health Training Scheme, Melbourne, Australia

6School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

Address for correspondence: [Fiona.Mensah@mcri.edu.au](mailto:Fiona.Mensah@mcri.edu.au)

Murdoch Childrens Research Institute, The Royal Children’s Hospital

Flemington Road, Parkville, Victoria 3052, Australia

Tel: +61 (0) 3 9345 4741

*Background:* The impact of socio-economic inequalities on health and development is most marked when multiple outcomes are considered. This paper explores latent class analysis as a method of integrating multiple outcomes to examine a breadth of health inequalities.

*Objectives:* To investigate which groups of children can be identified, and whether similar groupings are replicable at different ages. To examine how far individual children maintain group membership over time and examine inequalities on the basis of these profiles.

*Method:* Data were from the Longitudinal Study of Australian Children, the Birth cohort at ages 4-5 years, and the Kindergarten cohort at ages 4-5, 6-7 and 8-9 years (~5,000 children each). Measures included global health; special health care needs; asthma; sleep difficulties; injuries; body mass index; quality of life; behaviour; vocabulary; school readiness; and academic competence. Subgroups of children within each cohort at each age were identified using latent class analysis. Reproducibility of the groups was examined by comparing the Birth and Kindergarten cohorts. Continuities in group membership through ages 4 to 9, and socio-economic inequalities were examined over the repeated follow up of the Kindergarten cohort.

*Results:* Similar groupings were identified within each of the cohorts at each age. In the Kindergarten cohort at age 4-5, 59.5% of the children were classified as the healthiest group, 33.4% had a moderate level of difficulties and 7.2% had the most severe level of difficulties. Continuity between children’s group membership through ages 4 to 9 was strongly evident. Socio-economically disadvantaged children experienced severe difficulties most frequently, in the Kindergarten cohort at age 4-5, 2.8% of girls in the most advantaged families had a severe level of difficulties compared to 17.2% of boys in the most disadvantaged families.

*Conclusion:* Marked health inequalities across multiple domains have been evident and persistent through these children’s lives so far.