Impact of Chronic Illness Timing and Persistence at School Entry on Child and Parent Outcomes: Australian Longitudinal Study

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ABSTRACT

OBJECTIVE: To understand the prevalence and timing of child chronic illness at school entry; associations with child learning, behavior and health-related quality of life and parent mental health at ages 6 to 7, 8 to 9, and 10 to 11 years; and cumulative health care costs.

METHODS: Data were drawn from the first 4 waves of the Longitudinal Study of Australian Children. Children were aged 4 to 5 years at wave 1, with data collection every 2 years. Parent-reported timing of child chronic illness at school entry was categorized into 4 chronic illness groups based on changes between waves 1 and 2: none, resolving, incident and persistent. Child outcomes included: parent-reported quality of life, parent- and teacher-reported behavior, teacher-reported child learning, teacher-reported child–teacher relationship, directly assessed nonverbal and verbal cognition and parent self-reported mental health. Linear regression, adjusted for gender and socioeconomic position, was used to quantify longitudinal associations between chronic illness timing at school entry with outcomes at age 6 to 7 years, 8 to 9 years and 10 to 11 years.

RESULTS: Of the 4983 children enrolled in the study, chronic illness data was available for 4464 children (89.6%) at both waves 1 and 2. From wave 1, 6.1% had a condition that persisted until wave 2, while 14.1% had a condition that resolved. Furthermore, 4.7% had a newly emerging condition at wave 2. Compared with the no chronic illness group, children with persistent or emerging chronic illness during school entry had the poorest outcomes (except father's mental health) at all time points, while children with resolving conditions had smaller differences.

CONCLUSIONS: Child chronic illness at school entry is associated with poorer longitudinal child and maternal outcomes. Therefore, future research should aim to determine the risk and protective factors that contribute to the poorer child and parent outcomes experienced in this growing population.

KEYWORDS: chronic illness; longitudinal; population-based study; school entry

WHAT'S NEW

The timing and persistence of child chronic illness during the elementary school entry period is associated with substantially poorer long-term child learning and behavior, as well as maternal mental distress. Effects are consistent up to the age of 10 to 11 years.

UP TO 30% of children in developed countries are reported to have a chronic illness,[1] with the prevalence increasing over the past decade.[2,3] Although different accepted definitions of chronic illness have yielded differences in prevalence rates in the United States and other developed countries,[2] it has been long accepted that a noncategorical approach, independent of clinical diagnosis, is more appropriate and policy relevant to understand the consequences of having a chronic illness.[4,5] Research using this approach has shown that children with chronic illnesses are at greater risk of academic difficulties, increased absenteeism as well as poorer social and emotional functioning.[6–8] In addition, their parents are at increased risk of multiple stressors related to uncertainty over the child's health outcomes, daily hassles associated with medical regimens and financial strain.[9,10] Not surprisingly, there has been increased focus in recent years on providing support for these children during important transition periods, such as starting elementary school.[11,12]

Children who have a poor transition to elementary school are at greater risk of poorer academic pathways, school completion rates and social and emotional development.[11,12] A successful transition is not only determined by the child's academic ability but also additional factors such as their relationship with peers and teachers,[13] ability to participate in school activities,[12] and support of their parents.[14] Although these factors can be influenced by the child's biology and environment before starting school,[15] they may also be influenced by the child's health during the child's transition to elementary school.[16] Therefore, children with chronic illnesses during this period may be at greater

risk of poorer academic and social outcomes during school entry and in later school years. Moreover, the poorer outcomes may also extend to poorer parent mental health and higher health care costs.

Furthermore, it is widely accepted that children's chronic illness can change over time. Therefore, it is important to understand whether the emergence and persistence of chronic illness is associated with varying impact on key child, teacher and parent indicators of short and long-term child academic success and well-being.[11–14] This would inform those caring for these children as to the medical and educational needs of these children, taking into account their history of chronic illness.

We sought to address these current research gaps by using longitudinal data from a nationally representative Australian population cohort. Specifically, we aimed to determine: 1) The timing and persistence of chronic illness from age 4-5 years (Wave 1) to 6-7 years (Wave 2), spanning the school entry period, and 2) The associations between categories of timing and persistence (i.e. absent, resolved, incident and persistent) from Wave 1 to Wave 2 with:

a. Children's learning, relationship with their teacher, behavior, health-related quality of life and parent mental health children at child age (a) 6-7 years, (b) 8-9 years and (c) 10- 11 years.
b. Cumulative health care costs between 4-5 to age 8-9 years.

METHODS

STUDY DESIGN AND SAMPLE

Data were drawn from the first 4, biennial waves of the nationally representative Longitudinal Study of Australian Children (LSAC). The sampling design and field methods have been described elsewhere.[17] Briefly, LSAC employed a 2-stage cluster sampling design to recruit 2 independent cohorts, the B cohort (recruited at 0–1 years) and the K cohort (recruited at 4–5 years). In the first stage, postal codes (except the most remote) were sampled after stratifying by state and urban versus rural status to ensure proportional representation based on residential location. In the second stage, all children born between March 1999 and February 2000 and enrolled in the Australian Medicare database, in which 98% of all 4-year-old Australian children at the time were registered, were eligible to be approached.

This study used data from the K cohort. Children were randomly selected within each postal code to achieve a cohort aged between 4.3 and 5.2 years at the wave 1 interview. All birth months were represented. Of the 10,596 children selected, 8,391 were still resident within that postal code and could be contacted to be invited into the study. Of these, 4,983 (59%) took part during 2004 and the final sample had similar characteristics to the Australian population when compared to available census data from the Australian Bureau of Statistics.[17] The second wave of LSAC took place during 2006; 4,464 of the 4,983 wave 1 children participated in wave 2 (89.6%). At

wave 4 in 2010 when the children were 10 to 11 years, 4103 (82%) remained in the study. No data are available from the children who were no longer resident within each postal code when recruitment commenced.

PROCEDURES AND INCLUSION CRITERIA

At both waves 1 and 2, trained researchers administered a face-to-face interview in the child's home with the primary caregiver, as well as brief direct assessments with the children. In addition, written questionnaires were completed by the primary and secondary caregiver and, wherever possible, the child's elementary school teacher. The study was approved by the Australian Institute of Family Studies Ethics Committee, and a parent provided written informed consent for every participant.

MEASURES

PREDICTOR MEASURES (CHILD CHRONIC ILLNESS; WAVES 1 AND 2)

In both waves, child chronic illness was defined by the response to the following primary caregiver-reported question at interview: "Does [Study Child] have any medical conditions or disabilities that have lasted, or are likely to last, for 6 months or more?" The measure is directly derived from the Disability Module used by the Australian Bureau of Statistics to define children and adults with chronic illness for national prevalence rates and to inform federal policy in Australia.[18] The broad definition is also consistent with some previous definitions used in research and policy in the United States.

For both aims, responses at waves 1 and 2 were combined to create the following 4 chronic illness groups: (i) never (no chronic illness at either wave), (ii) resolved (chronic illness at wave 1, but not at wave 2), (iii) incident (chronic illness at wave 2, but not at wave 1), and (iv) persistent (chronic illness at both waves). Creating groups based on changes in chronic illness groups between the 2 waves recognizes that chronic illness can change over time within the same population of children and have dynamic differences in timing and persistence.[19]

OUTCOME MEASURES (WAVE 2, 3, AND 4)

Data from wave 2 were used to measure outcomes during the school entry period when children were 6 to 7 years while wave 3 and 4 data measures the longitudinal outcomes when children were 8 to 9 years and 10 to 11 years, respectively. Outcomes were selected based on a review of the literature to measure a wide range of child, teacher and parent indicators of short and long-term child academic success and well-being.[11–14]

Learning was assessed by the mean raw score of adapted versions of the teacher-reported Language & Literacy (11 items) and the Mathematical Thinking (9 items) subscales of the Academic Rating Scale from the Early Childhood Longitudinal Study (ECLS).[20] Each has a possible range of 1 to 5, with higher scores indicating greater proficiency.

Approach to Learning was assessed by the mean scores of the teacher-reported Approach to Learning subscale