Prevalence and geographical variation of anxious behaviours and comorbidity problems in children at school entry using teacher-reported population-level data over time in Ontario

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Introduction

Background
- Children with anxiety face barriers in obtaining optimal-educational outcomes from typical school environments.
- Previous work examined the geographical variance of average anxiety prevalence across Ontario between the years of 2004-2012 inclusive.
- Previous analyses did not include diagnostic or comorbidity information.

Purpose
- To address the knowledge gap and expand on previous work by:
  1. Updating geographical variation data on average prevalence of anxious behaviours to include the year 2015.
  2. Examining differences in variation of average prevalence of anxious behaviours compared to diagnosed anxiety for the years 2010-2015.
  3. Consider the average prevalence and geographic variation of comorbidities.

Methods

The Early Development Instrument
- Population-based measure of children's developmental health at school entry.
- 103 items in 5 domains: (1) physical health and well-being, (2) social competence, (3) emotional maturity, (4) language and cognitive development, and (5) communication skills and general knowledge.
- Completed for individual children by their kindergarten teachers, these data are then aggregated.

Inclusion Criteria
- (1) Child is at the senior kindergarten (or provincial equivalent) level, (2) in the classroom for more than 1 month (to insure the teacher has adequate knowledge of the individual child), and (3) the EDI has fewer than one missing domain.

Indicators and Analysis
- EDI "anxiety" sub-domain was used to determine teacher-reported anxious behaviours
- From 2010 onward: Section D of the EDI contains reports on up to 3 diagnoses, including anxiety
- Comorbidity: Diagnosis of anxiety with a secondary diagnosis on Section D of the EDI.
- Analysed across years and geography levels using nested methodologies to account for the nested nature of the Canadian Census geographies; Dissemination Areas (DA), Census Divisions (CD), and Census Sub-Divisions (CSD).

Results

Prevalence
- **Anxious Behaviour:** Between the years of 2004 and 2015 2.4% (N=11990) children were identified by their teachers as having anxious behaviour. Maximum: 3.2% in Cycle 4 at the CSD and CD geography levels; minimum: 2.2% in Cycle 1 and 3 at the CSD geography level. (Table 1)
- **Anxiety Diagnoses:** Between 2010 and 2015 teacher's recorded 0.1% (N=178) children in Ontario with diagnosed anxiety. Maximum: 0.09% in Cycle 4 at the DA geography level; minimum: 0.05% in Cycle 3 at the CSD geography level. (Table 2)
- **Comorbidities:** In 2015 it was possible for teachers to record comorbidities. Of the children with an anxiety diagnosis in this year (N=96) 30.2% (N=29) were also identified with another, secondary diagnosis. The prevalence at various geography levels was: DA 30.21%, CSD 24.44%, and CD 20.22%.

Geographic Variance
- **Anxious Behaviour:** Maximum variation (SD=8.9) in Cycle 4 at the DA geography level; minimum variation (SD=0.6) during Cycle 1 at the CD geography level.
- **Anxiety Diagnoses:** Maximum variation (SD=1.64) in Cycle 4 at the DA geography level; minimum variation (SD=0.11) during Cycle 3 at the CD geography level.
- **Comorbidities:** The standard deviation at each geography level for children living with comorbidities among children with anxiety was: DA SD=46.16, CSD SD=37.79, and CD SD=24.01

Conclusions

- Children with anxious behaviours and diagnosed anxiety face difficulties when trying to take advantage of the typical school system. The addition of comorbidities can make the adjustment to the educational system even more difficult.
- Prevalence and its variation are not equal between geography levels in Ontario, nor over time. However, *anxious behaviours* increased at every level between Cycles 3 and 4.

Implications
- The determinants underlying the development of anxious behaviour, anxiety, and comorbidity in children need to be identified and addressed with the understanding that solutions may need to be considered at various levels of geography.

Future Directions
- The Canadian Children's Health in Context Study (CCHICS) will build on these findings and investigate the determinants of health disorders, including anxiety, using data linkages between child development data from the EDI, socio-demographic data from Census and Tax filer, and health data from provincial administrative databases.

Demographic Information

	Overall	Cycle 1	Cycle 2	Cycle 3	Cycle 4
N	510176	124866	120302	129071	135936
Males	51.2%	51.1%	51.2%	51.3%	51.3%
Special Needs	3.8%	3.5%	3.7%	3.9%	4.2%
Aboriginal Status	1%	1.2%	1.3%	1.4%	.
E/F Sec Lang	12%	11.7%	12.3%	12.3%	11.7%
Mean Age	5.68	5.71	5.66	5.68	5.68

Children with EDI-based Anxious Behaviours

	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Total
Overall	2.3%	2.4%	2.3%	2.7%	2.4%
DA	2.3 (8.3)	2.5 (8.6)	2.4 (8.4)	2.9 (8.9)	2.57 (4.6)
CSD	2.2 (3.3)	2.5 (4.3)	2.2 (3.3)	3.2 (6.4)	2.65 (3.8)
CD	2.5 (0.6)	2.5 (1)	2.5 (1)	3.2 (1)	2.68 (0.6)

Table 1 Prevalence and Variance of *Anxious Behaviours* in Ontario Children: based on EDI "anxious behaviour" subdomain, with standard deviations (in brackets). The higher the percentage the more children in that group were identified with anxious behaviours. The higher the standard deviation the greater variation of anxious behaviours in that group.

Children with EDI-based Anxiety Diagnosis

	Cycle 3	Cycle 4	Total
Overall	0.1%	0.1%	0.1%
DA	0.08 (1.6)	0.09 (1.64)	0.08 (1.05)
CSD	0.05 (0.29)	0.08 (0.4)	0.06 (0.23)
CD	0.08 (0.11)	0.08 (0.12)	0.08 (0.09)

Table 2 Prevalence and Variance of *Anxiety Diagnoses* in Ontario Children: based on teacher reported diagnosis of anxiety, with standard deviations (in brackets). These are limited to cycles where diagnostic data were available. Higher average prevalence percentages indicate more children in that population with anxiety diagnosed, higher standard deviations represent more variation in scores in that group.

Strengths & Limitations

Strengths
- EDI data provide information for whole populations of children.
- With over 35 possible diagnoses and the option to specify others the EDI provides an opportunity to assess anxiety and comorbidity in detail.

Weaknesses
- Responses reflect teacher knowledge and awareness.
  - Teachers may not be aware of a child's diagnosis.
  - The child may not be identified at this early stage.

References

1. Janus, M., Brinkman, S., Duku, E., Hertzman, C., Santos, R., Sayers, M., ... & Walsh, C. (2007). The Early Development Instrument: A population-based measure for communities. *A handbook on development, properties, and use Hamilton, ON: Offord Centre for Child Studies.*
2. Janus, M., Hughes, D., & Duku, E. (2010). Patterns of school readiness among selected subgroups of Canadian children: Children with special needs and children with diverse language backgrounds. *The Canadian Council on Learning.*