

Better prescribing. Better health.



Trends in School-break Effects of ADHD Pharmacotherapy: a Canadian Population-Based Study

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Background

- ADHD → persistent neurobiological difference
 - Symptoms affect daily functioning
 - NOT just academic performance.
- Overprescribing concerns:
 - Driven by educational and family pressures
 - NOT necessarily sustained clinical need
- **Importance**: examining whether medication use patterns align with school calendars may help distinguish performance-driven prescribing vs. clinically-indicated treatment.

Objectives

- Evaluate the school-break effects on ADHD prescribing patterns and how it changes over time.
- Assess how these patterns differ by age, sex and medication type.

Methods

Design

Population-based retrospective cohort study

Data Sources

BC administrative databases

- Physician services
- Community pharmacy dispensations
- Hospital admissions
- Emergency department visits

Outcome

ADHD-specific prescribing including

Stimulants:

Methylphenidate, Lisdexamfetamine, Dextroamphetamine, Mixed amphetamine salts;

Non-stimulants: Atomoxetine,

Participants

Between 2014 and 2023, BC residents aged 3 to 29 years with active ADHD diagnosis in the past year:

≥1 ADHD-specific prescription, or

Guanfacine.

- ≥1 ADHD hospitalization with ICD-10 F90, or
- ≥1 ADHD physician visit with ICD-9 314 and another ADHD visit, ADHD prescription, or ADHD hospitalization within one year

Stratified by

Sex: male and female

Age groups:

- Preschool: 3–5 years;
- Elementary school: 6–12 years;
- High school: 13–17 years;
- Young adults: 18–29 years.

Statistical Analysis

Regression models estimating risk ratios of receiving ADHD medication:

Comparison (I_{break})

- School-break month: August vs.
- Reference month: January

Effect Modifier (t)

Calendar year (excluding 2020 to account for COVID-related service disruptions)

Model

 $\log(Y_t/N) = \beta_0 + \beta_I \cdot I_{\text{break}} + \beta_t \cdot t + \beta_X \cdot t \cdot I_{\text{break}},$ $\beta_{\rm I}$: school-break effect in 2014 (baseline effect);

 β_t : January trend estimate;

 β_X : changes in school-break effect over time (trend).

Results

Table 1. ADHD Prescription Patterns by Sex over the Study Period

	Male	Female								
Diagnosed with ADHD	(N = 113,139)	(N = 79,244)								
	N (%)	N (%)	SMD							
Ever filled ADHD prescription	87,886 (77.7%)	65,123 (82.2%)	0.113							
Age 3-5	2,280 (35.6%)	634 (31.4%)	0.089							
Age 6-12	37,688 (71.0%)	14,643 (67.8%)	0.069							
Age 13-17	32,899 (80.0%)	19,520 (80.4%)	0.010							
Age 18-29	42,414 (82.1%)	43,060 (86.7%)	0.129							
Of those who filled an ADHD prescription										
Stimulants	85,088 (96.8%)	63,213 (97.1%)	0.015							
Methylphenidate	63,139 (71.8%)	42,766 (65.7%)	0.133							
Lisdexamfetamine	28,423 (32.3%)	24,003 (36.9%)	0.095							
Dextroamphetamine	19,030 (21.7%)	14,740 (22.6%)	0.024							
Mixed amphetamine salts	13,953 (15.9%)	9,643 (14.8%)	0.030							
Non-stimulants	16,505 (18.8%)	9,151 (14.1%)	0.128							
Atomoxetine	10,171 (11.6%)	6,553 (10.1%)	0.049							
Guanfacine	8,525 (9.7%)	3,488 (5.4%)	0.165							
	Median (Q1-Q3)	Median (Q1-Q3)	SMD							
Number of ADHD prescription filled	10 (4-28)	8 (3-20)	0.154							
Days of ADHD prescription dispensed	366 (120-1,013)	284 (98-703)	0.216							

Figure 1. Heatmap of Monthly ADHD Prescription (%)

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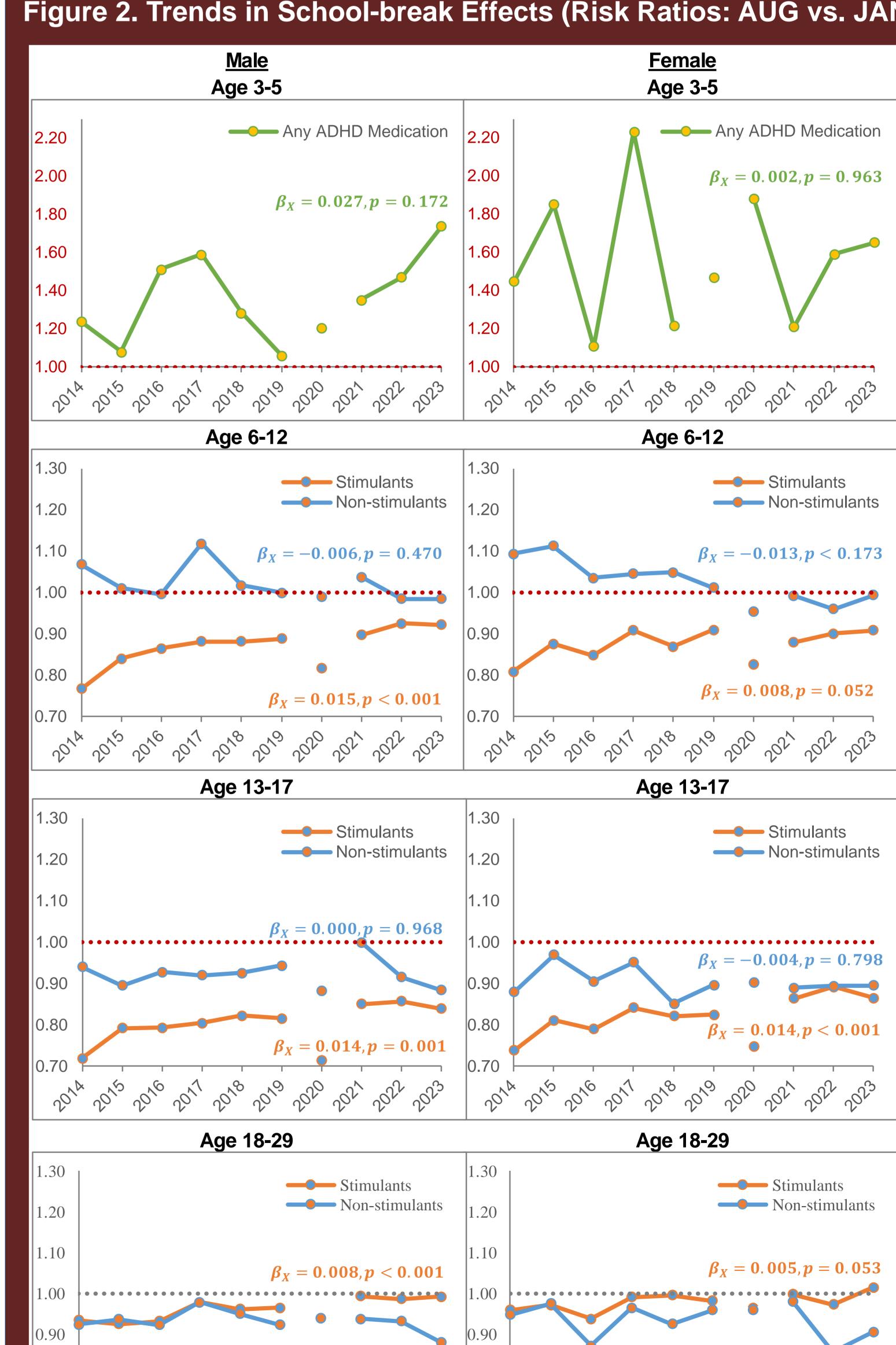
Declarations

CD is funded by grant to UBC from the BC Ministry of Health. ZC is supported by CIHR postdoctoral fellowship. Therapeutics Initiative members do NOT accept any payment from pharmaceutical companies. All inferences, opinions, and conclusions drawn in this material are those of the author(s), and do **NOT** reflect the opinions or policies of the Data Steward(s).

Conclusions

- Poor pharmacotherapy persistence of those diagnosed with ADHD:
 - > 1/2 had a cumulative ADHD medication use of < 1 year;
 - < 2/3 received ADHD medication in any given month;
 - Females < Males in number of prescriptions and duration of use.
- ADHD medication use among preschoolers diagnosed with ADHD:
 - One in three preschoolers received medications, despite NO approved ADHD medications for this age group;
 - Decreasing medication dispensation over calendar year;
 - Increasing medication dispensation over calendar month.
- School-break effects among children and adolescents:
 - Peaked in high-school age adolescents, followed by elementary-school aged children;
 - Effects decreased over time, despite longer and deeper during COVID;
 - Primarily driven by reductions in stimulant prescriptions.
- ADHD medication use among young adults diagnosed with ADHD:
 - School-break effect diminished;
 - Increasing prescription dispensations amid increasing diagnoses.

Figure 2. Trends in School-break Effects (Risk Ratios: AUG vs. JAN)



 $\beta_X = -0.005, p = 0.561$