

# Physical health across neurodivergent children and youth in Ontario

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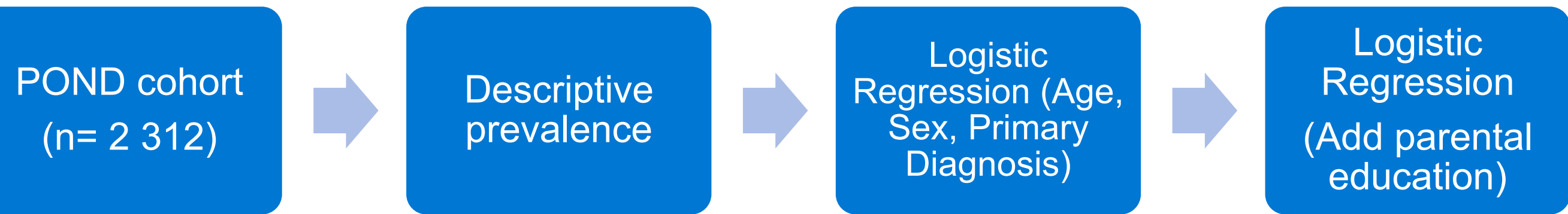
## Background/ Rationale

- Neurodevelopmental disorders (NDDs) are being increasingly recognized for their association with physical health conditions (PHCs)<sup>1,2</sup>
- Existing research is limited to Autism Spectrum Disorder (ASD), neglecting how PHCs may manifest across different diagnoses <sup>1,2</sup>

## Research Question

What are the transdiagnostic and potentially diagnosis-specific patterns and prevalence of physical health conditions in children aged 3-21 with NDDs and control participants in the Province of Ontario Neurodevelopmental Network (POND) cohort, and how do age, sex at birth and sociodemographic factors influence these associations?

## Methods



Category	Symptoms
Constitutional Symptoms	Fever, weight loss, weight gain and other
Eyes/Vision	Glaucoma, macular degeneration, cataracts and other
Ears, Nose, Throat	Tinnitus, vertigo, sinusitis, hearing loss, asthma and other
Cardiovascular	Chest pain, high blood pressure, high cholesterol, heart attack, congestive heart failure, heart murmur, diabetes, vascular disease and other
Respiratory	Cough, asthma, emphysema, chronic bronchitis, COPD and other
Digestive/Gastrointestinal	Gastroesophageal reflux, peptic ulcer disease, liver disease, hemorrhoids, colitis and other
Genitals/Urinary	Prostate enlargement, uterine/ovarian problems, kidney stones, urinary infections, kidney failure and other
Musculoskeletal	Back pain, arthritis, bone problem/disorders and other
Integumentary (skin or breasts)	Skin trouble or rash, flushing and other
Neurologic	Headaches, stroke, seizures and other
Psychiatric	Depression, eating disorder, anxiety and other
Endocrine	Diabetes, thyroid disease, osteoporosis, steroids and other
Hematologic	Anemia, bleeding problems, blood clots, blood transfusions and other
Allergic	Allergic reaction and other

## Relevance to Holland Bloorview Clients & Families



Comprehensive care



Personalized support



Equity lens

**References**  
(1) Dhanasekara, C. S.; Ancona, D.; Cortes, L.; Hu, A.; Rimu, A. H.; Robohm-Leavitt, C.; Payne, D.; Wakefield, S. M.; Mastergeorge, A. M.; Kahathuduwa, C. N. Association Between Autism Spectrum Disorders and Cardiometabolic Diseases. *JAMA Pediatr* **2023**, *177* (3), 248. <https://doi.org/10.1001/jamapediatrics.2022.5629>.  
(2) Pan, P.-Y.; Taylor, M. J.; Larsson, H.; Almqvist, C.; Lichtenstein, P.; Lundström, S.; Bölte, S. Genetic and Environmental Contributions to Co-Occurring Physical Health Conditions in Autism Spectrum Condition and Attention-Deficit/Hyperactivity Disorder. *Mol Autism* **2023**, *14* (1), 17. <https://doi.org/10.1186/s13229-023-00548-3>.

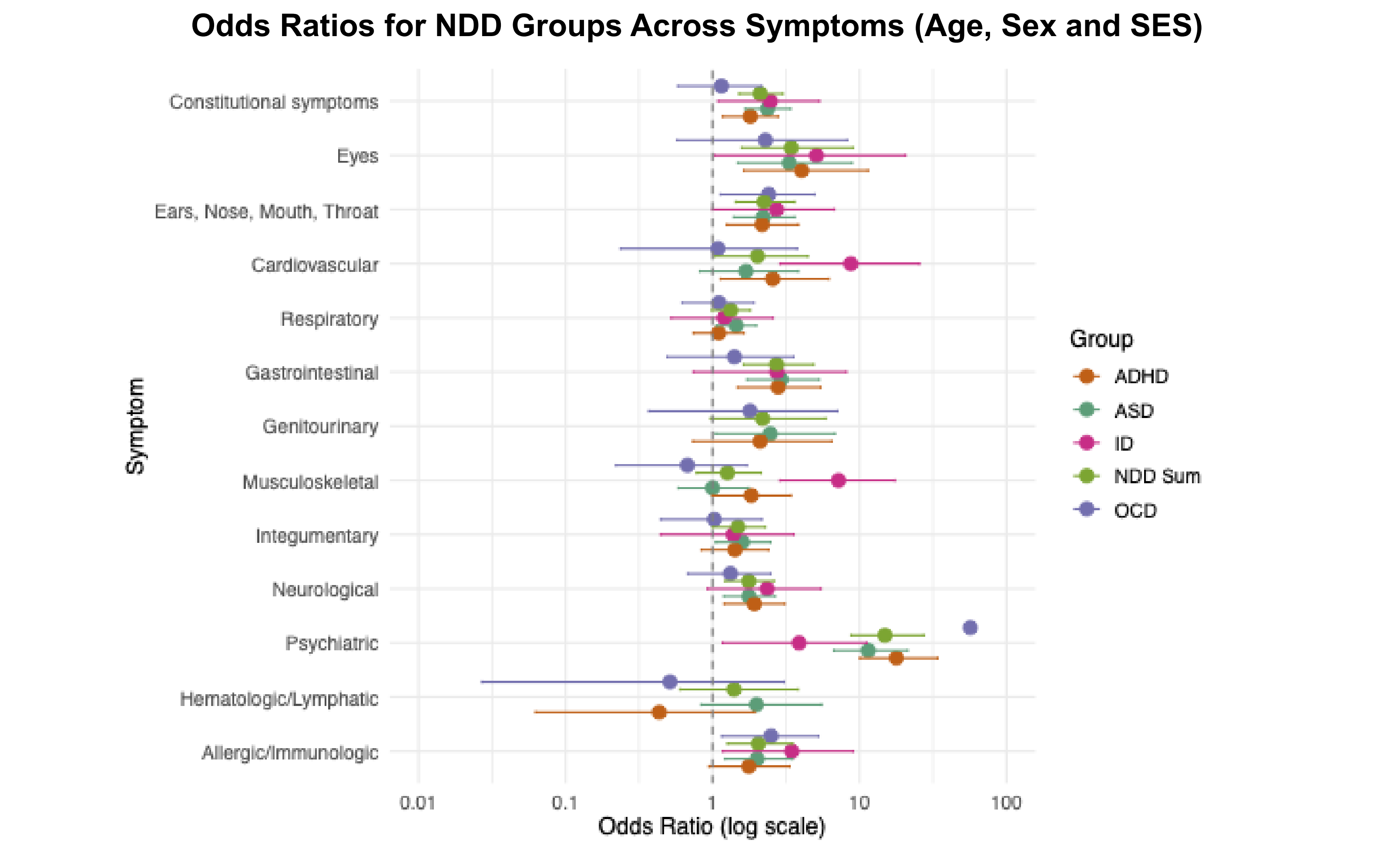
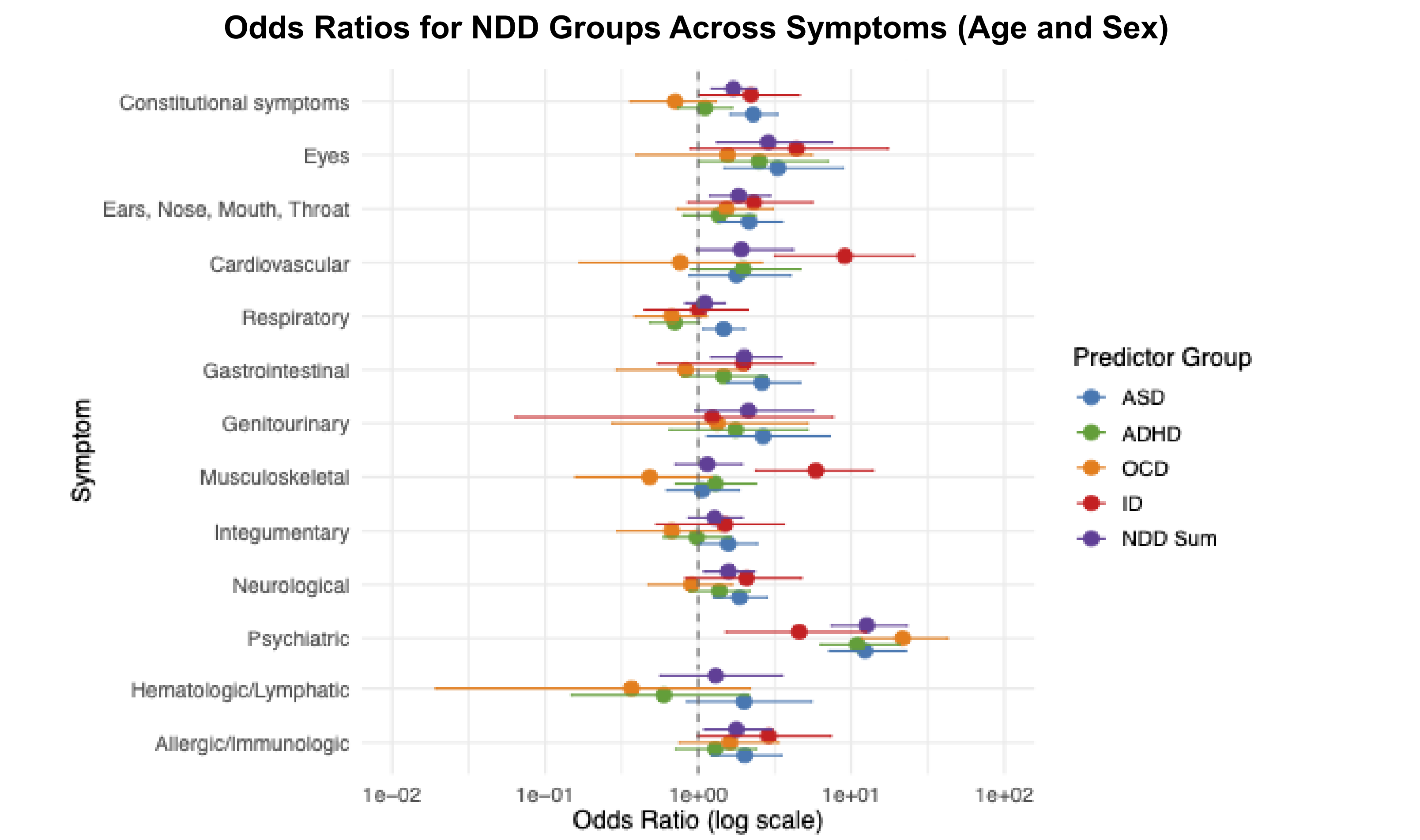
Children with neurodevelopmental disorders experience higher rates of physical health symptoms than their peers, driven by age, sex at birth and sociodemographic factors

## Results

- Diagnosis prevalence**
  - Generally, the NDD groups experienced greater physical symptoms
- Age effects**
  - Older age ↓ odds of constitutional and ears, nose, throat and respiratory symptoms and ↑ odds of neurological and psychiatric symptoms
- Sex effects**
  - Males ↓ odds of integumentary, neurological, psychiatric, and genitourinary symptoms
- SES Effects (Parental education)**
  - Parental education of high school and university ↓ odds of neurologic and gastrointestinal symptoms

Group	Nominal Significance (p-value < 0.05)	Bonferroni Significance (strict p-value < 0.03)
ASD/Control	<ul style="list-style-type: none"><li>Constitutional symptoms*</li><li>Gastrointestinal*</li><li>Psychiatric*</li></ul>	<ul style="list-style-type: none"><li>Psychiatric*</li></ul>
ADHD/Control	<ul style="list-style-type: none"><li>Respiratory</li><li>Psychiatric*</li></ul>	<ul style="list-style-type: none"><li>Respiratory</li><li>Psychiatric*</li></ul>
OCD/Control	<ul style="list-style-type: none"><li>Musculoskeletal</li><li>Integumentary</li><li>Neurological</li><li>Constitutional symptoms</li><li>Respiratory</li><li>Psychiatric*</li></ul>	<ul style="list-style-type: none"><li>Constitutional symptoms</li><li>Respiratory</li><li>Psychiatric*</li></ul>
ID/Control	<ul style="list-style-type: none"><li>Endocrine*</li><li>Eyes*</li><li>Cardiovascular*</li><li>Musculoskeletal*</li></ul>	<ul style="list-style-type: none"><li>Eyes*</li><li>Cardiovascular*</li><li>Musculoskeletal*</li></ul>

\* Indicates the NDD group experienced greater physical symptoms of the respective category



## Conclusions

- NDD youth experience more physical health symptoms across most domains
- Transdiagnostic results:** ASD and ID show the broadest PHC co-occurrence
- Age and sex** modulate PHC risk – older youth shift from constitutional to neuro-psychiatric symptoms
- SES effects:** effect on neurological and gastrointestinal symptoms
- Clinical implications:** holistic screening for PHCs in neurodivergent youth, beyond ASD and psychiatric symptoms is required



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