

Immunization status and other characteristics of Ontario students with non-medical exemptions: 2016-2017 school year

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Disclosure slide

- I have no affiliation (financial or otherwise) with a pharmaceutical, medical device or communications organization

Background

- Under the *Immunization School Pupils Act* (ISPA), Ontario students must be immunized to select diseases or provide a statement of medical or religious/conscientious exemption
- Religious/conscientious exemptions to measles antigen have slowly increased over time in Ontario¹
- Many outstanding questions regarding children with exemptions in Ontario

1. Wilson et al. CMAJ Open 2015;3(3): E317-E23 doi: 10.9778/cmajo.20140088

Objectives

1. Quantify the number of students in Ontario with religious/conscientious exemptions (non-medical exemptions, NMEs) and to assess their immunization status
2. Quantify the number of un-immunized students in Ontario and assess the extent to which these children have immunization exemptions
3. Identify factors at the individual and area-level associated with different immunization/exemptions outcomes

Methods

- Analytic cohort: Students aged 7-17 who attended school in Ontario in 2016-2017 school year identified from Digital Health Immunization Repository (DHIR)
- Reviewed immunization and exemptions information from DHIR
 - % of students with exemptions by type
 - Integrated immunization information to identify children as unvaccinated (0 doses) or ≥ 1 vaccine recorded
- Among students with NMEs:
 - Immunization status (up-to-date, under-immunized, un-immunized), by antigen

Methods

- Examined student- and area-level characteristics among students with different immunization/exemption outcomes in descriptive and multivariable regression analyses
 - Multivariable analysis: those with full covariate information
 - Reference group: ≥ 1 vaccine recorded/ no exemptions of any kind
- Individual-level characteristics from DHIR
 - Sex, age, school board type
- Area-level characteristics based on residential postal code
 - Area type, Public Health Unit Region
 - Quintile of material deprivation using the 2011 Ontario marginalization index (ON-Marg)

RESULTS

Ontario Students, 7-17 years
n=1,651,729

No exemptions
n=1,603,438 (97.1%)

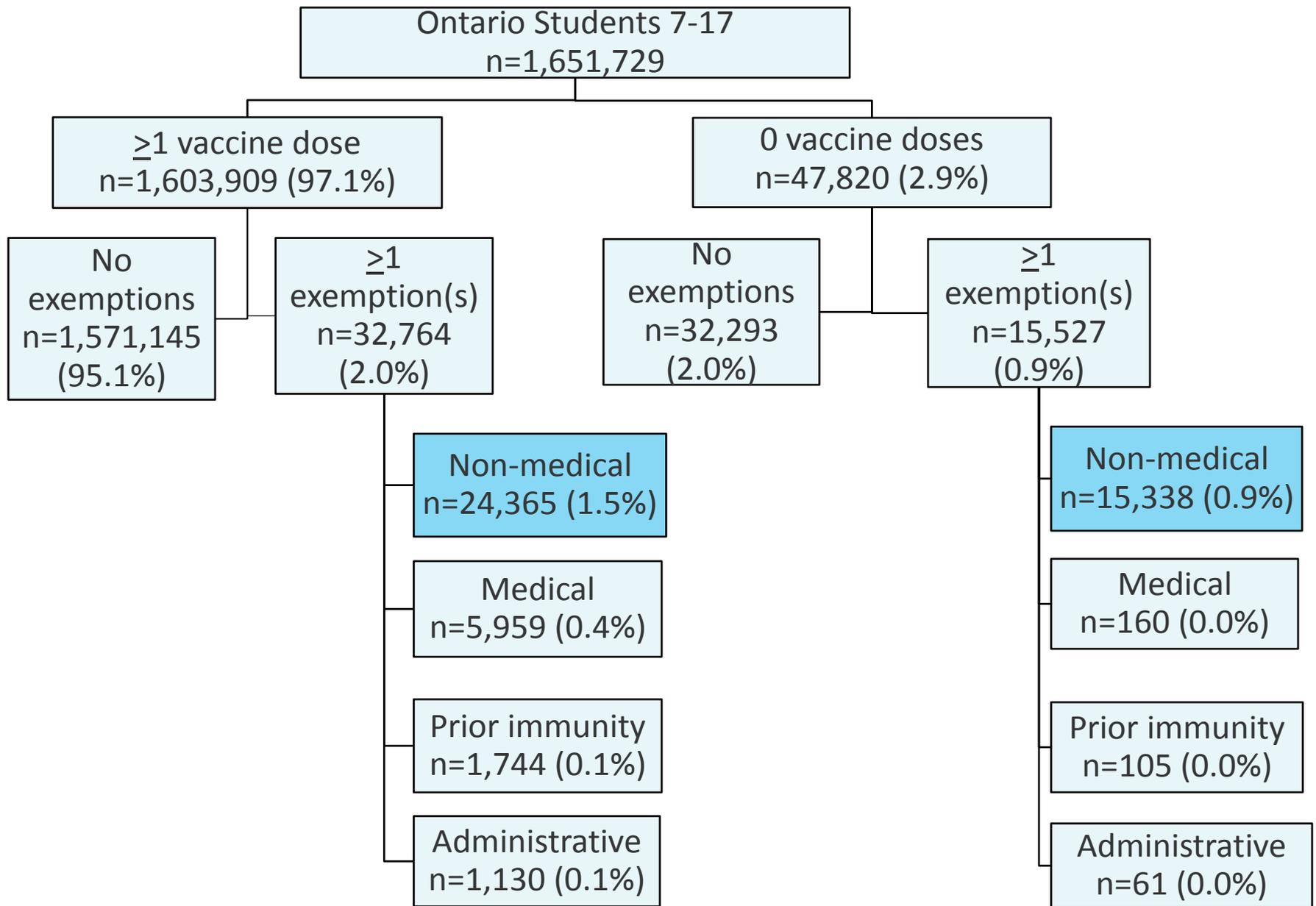
≥ 1 exemption
n=48,291 (2.9%)

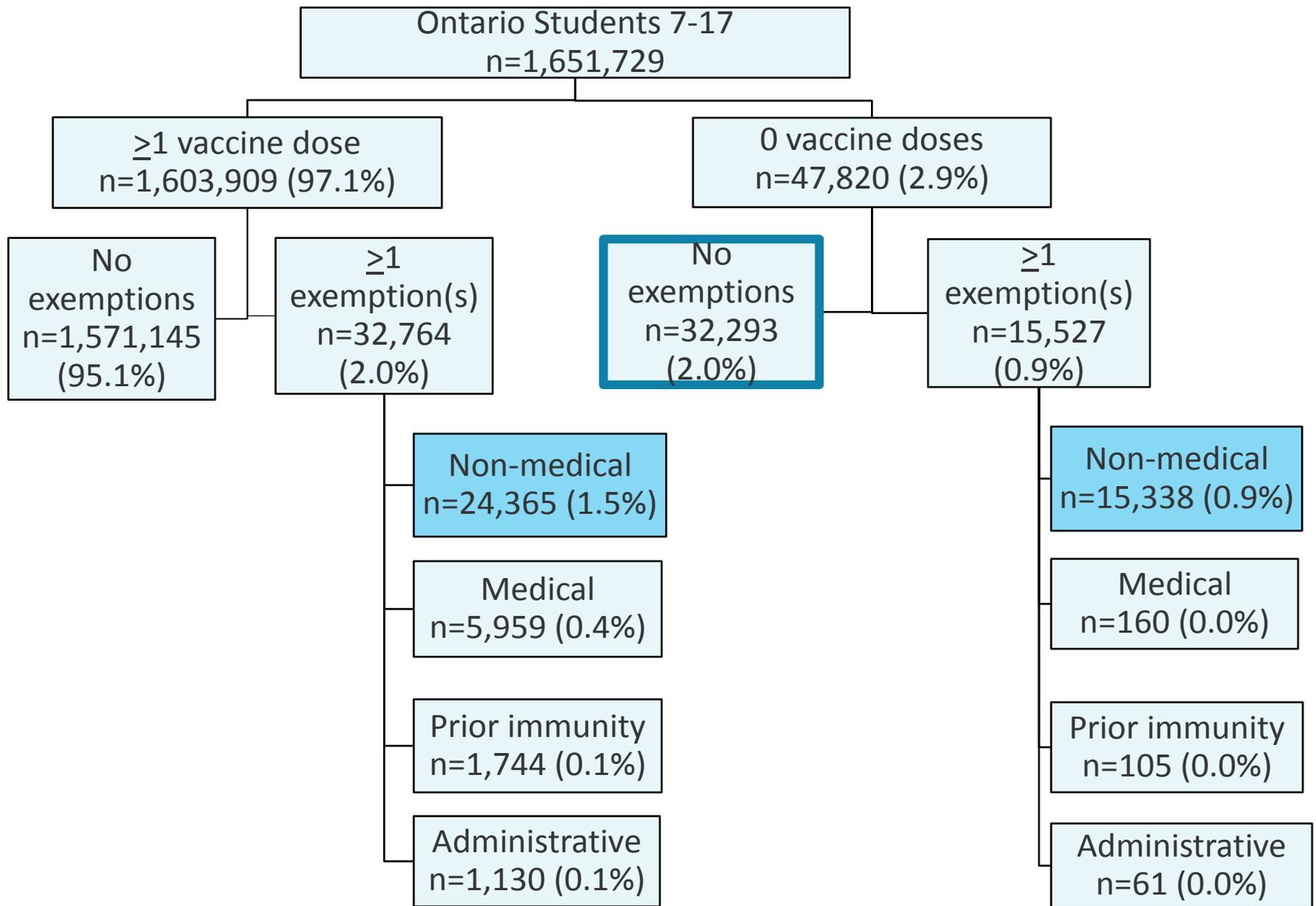
Non-medical
n=39,703 (2.4%)

Medical
n=6,119 (0.4%)

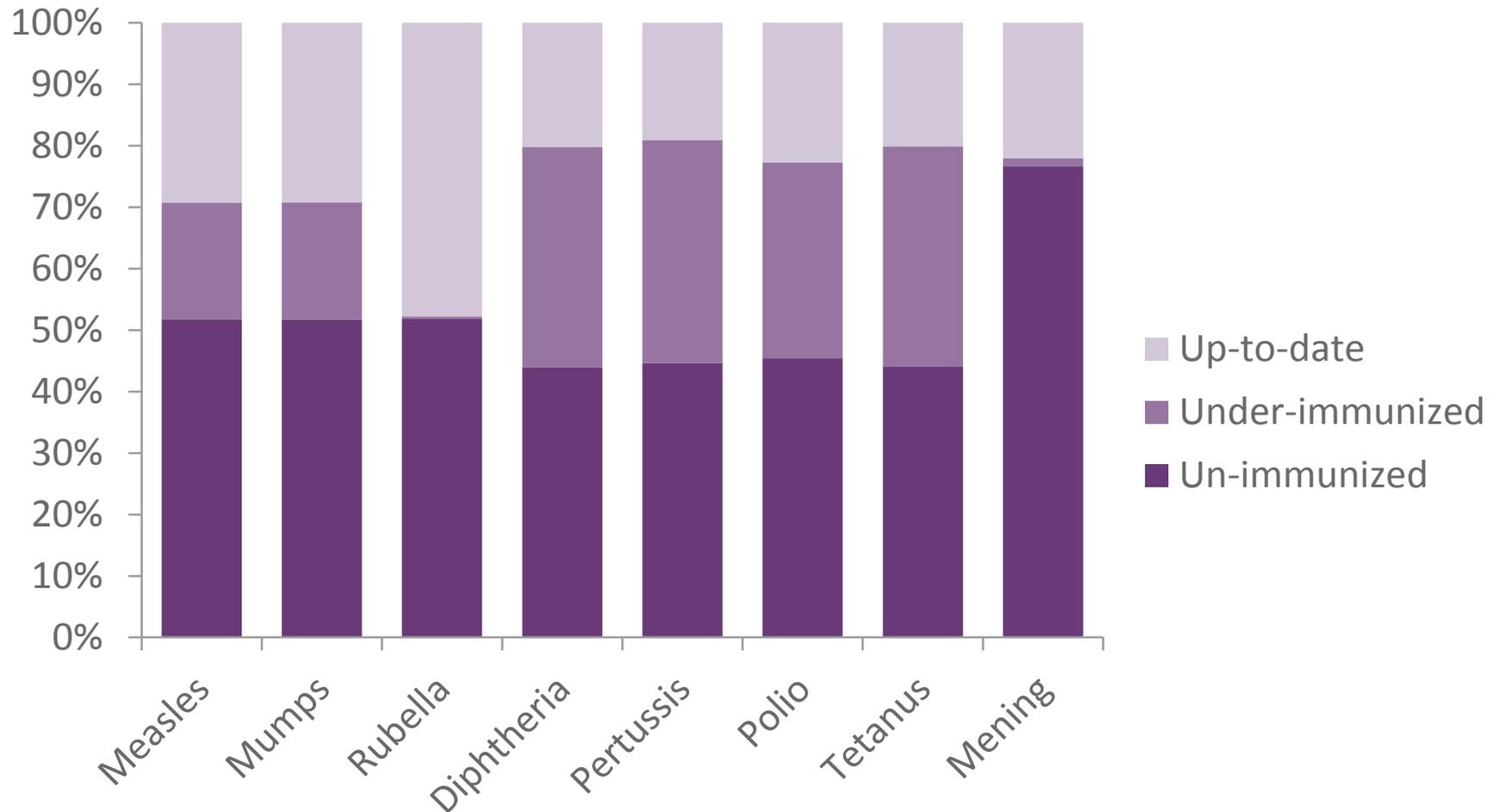
Prior immunity
n=1,849 (0.1%)

Administrative
n=1,191 (0.1%)





Antigen-specific immunization status of Ontario students with NMEs



Number of students varied from 37,325 to 38,055 by antigen

Multivariable regression

**Outcome: Students with ≥ 1 NME and ≥ 1 vaccines
(n=24,212)**

Variable	aOR 95% Confidence Interval
<u>Age group (Ref=7-10 years)</u>	
11-13 years	1.16 (1.12-1.20)
14-17 years	1.41 (1.37-1.45)
<u>School type (Ref=Public)</u>	
Private	1.76 (1.67-1.85)
Other	4.14 (3.70-4.64)
<u>Area-type (Ref=Urban)</u>	
Rural	1.50 (1.45-1.56)
<u>Material deprivation (Ref=Q1)</u>	
Q2	0.99 (0.95-1.02)
Q3	0.93 (0.89-0.97)
Q4	0.85 (0.82-0.89)
Q5 (most deprived)	0.77 (0.74-0.80)

Reference: immunized students (≥ 1 vaccine), no exemptions

Also adjusted for sex and PHU Region

Multivariable regression

Outcome: Students with ≥ 1 NME and zero vaccines
(n=15,214)

Variable	aOR 95% Confidence Interval
<u>Age group (Ref=7-10 years)</u>	
11-13 years	0.67 (0.64-0.70)
14-17 years	0.59 (0.57-0.61)
<u>School type (Ref=Public)</u>	
Private	3.29 (3.13-3.46)
Other	7.30 (6.56-8.12)
<u>Area-type (Ref=Urban)</u>	
Rural	1.95 (1.87-2.04)
<u>Material deprivation (Ref=Q1)</u>	
Q2	1.03 (0.99-1.08)
Q3	1.05 (1.00-1.10)
Q4	0.79 (0.75-0.83)
Q5 (most deprived)	0.66 (0.62-0.69)

Reference: immunized students (≥ 1 vaccine), no exemptions

Also adjusted for sex and PHU Region

Multivariable regression

Outcome: Students with no exemptions and no vaccines (n=31,879)

Variable	aOR 95% Confidence Interval
<u>Age group (Ref=7-10 years)</u>	
11-13 years	0.63 (0.61-0.65)
14-17 years	0.75 (0.73-0.77)
<u>School type (Ref=Public)</u>	
Private	4.63 (4.48-4.78)
Other	2.61 (2.22-3.08)
<u>Area-type (Ref=Urban)</u>	
Rural	0.72 (0.69-0.75)
<u>Material deprivation (Ref=Q1)</u>	
Q2	1.29 (1.23-1.35)
Q3	1.72 (1.65-1.79)
Q4	1.51 (1.45-1.58)
Q5 (most deprived)	2.43 (2.33-2.53)

Reference: immunized students (≥ 1 vaccine), no exemptions

Also adjusted for sex and PHU Region

Strengths and limitations

- Population-based assessment of all Ontario students
 - No prior assessment of exemptions in Ontario have examined immunization information or student characteristics
- Cohort age (7-17)
- Analyses conducted before the implementation of policy changes to exemptions in 2017
 - Fall 2017: mandatory education requirement for parents seeking an NME; antigens specified on NME form

Conclusions

- In 2016-17, among Ontario students aged 7-17:
 - 2.4% (n=39,703) had at ≥ 1 NME
 - Of these, 61% (n=24,365) had ≥ 1 vaccine doses recorded
 - Among those with NMEs, about 50% were partially immunized or up-to-date, varying by antigen
 - 2.0% (n=32,293) have no immunization/exemption information recorded in the DHIR
- Multivariable regression analysis identified several factors consistent with other studies of immunization exemptions
 - Students with no information in the DHIR were more likely to live in deprived neighbourhoods

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Questions?

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