

INTRODUCTION

Nova Scotia’s school-based immunization program is delivered to grade seven students and is comprised of the following four publicly funded vaccines:

- Tetanus, Diphtheria, and Acellular Pertussis (Tdap)
- Meningococcal Quadrivalent (Men-C-ACYW)
- Human Papillomavirus (HPV)
- Hepatitis B

This report presents the immunization coverage rates for the **2018-2019** grade 7 cohort in Nova Scotia.

METHODOLOGY

Immunization coverage rates were calculated as follows:

$$\text{Coverage rate (\%)} = \left[\frac{\text{\# of students in grade seven who were immunized (numerator)}}{\text{\# of students in grade seven (denominator)}} \right] \times 100$$

Numerator¹: The number of students in grade seven in the 2018-2019 school year who received the vaccine prior to January 1, 2020.

Denominator: The total number of students in grade seven in the 2018-2019 school year.

Data Source: 2018-2019 was the first reporting cycle to use Panorama as the single data source for school – based immunization coverage analyses. Accurate student-level school and grade information in Panorama has improved the methods for defining the numerator and denominator and therefore has improved the accuracy of the 2018-2019 coverage estimates in comparison to previous years. The table below highlights the differences between the various reporting cycles.

Reporting Cycle	Numerator	Denominator
≤ 2016-2017	From the previous Public Health information systems (ANDS & ANDI), grade 7 students were defined based on immunizations between September 1 and August 31 and age at the time of immunization (11-14 years).	Aggregate grade 7 enrolment provided by the NS Department of Education and Early Childhood Development and Mi'kmaw Kina'matnewey schools.
2017-2018	From Panorama, the number of students in grade 7 in the 2017-2018 school year who received the vaccine prior to January 1, 2019.	From ANDI, the number of grade 7 students who linked to a client in Panorama. Panorama was implemented midway through this school year and grade and school information was not available in Panorama for this cohort.
≥2018-2019 Panorama	From Panorama, the number of students in grade 7 who received the vaccine prior to January 1, 2019.	From Panorama, the number of students identified as in grade 7 in the school year of interest

¹ Note: The immunization data (numerator) for two schools in Eastern Zone were not entered into Panorama prior to the data being pulled for this report, therefore these students were removed from the denominator.

Coverage timing: Students may be immunized outside of the grade 7 school year for reasons such as; a missed dose in grade 7, travel (e.g. Hepatitis B), or following an alternate immunization schedule (e.g. moving into the province). In order to look at those students who were immunized outside of the grade 7 school year, immunization coverage was broken down into the following categories.

- **Prior to grade 7:** Immunization completed prior to September 1 of the grade 7 school year.
- **Within grade 7:** Immunization completed between September 1 and August 31 of the grade 7 school year.
- **By December of grade 8:** Immunization completed between September 1 and December 31 of the grade 8 school year.

The overall coverage rates presented in this report include students immunized in any of these categories. In previous reporting cycles only coverage rates within the grade 7 school year were reported.

Number of doses and agent specific details: Panorama uses complex logic, based on age and dose spacing, to determine whether an immunization is valid². Only valid immunizations were extracted from Panorama to determine coverage and the number of valid doses required to be counted as covered are presented by vaccine in the table below. Dose spacing is presented for the circumstances where the number of doses required to be counted as covered varies by the agent and/or age.

Vaccine	# of valid doses	Additional coverage criteria
Tdap	1	If the dose is received prior to September 1, 2018, it must have been received ≤5 years prior to September 1, 2018.
Men-C-ACYW-135	1	If the dose is received prior to September 1, 2018, it must have been received at ≥8 years of age.
HPV	2	
Hepatitis B	2	HB-regular / HB-unspecified: if student is between 11 and 16 years of age HAHB-regular: if dose 1 and dose 2 were given at ≥ 6 months to < 16 years of age and ≥ 168 days apart
	3	HB-regular / HB-unspecified: if student is less than 11 or greater than 16 years of age HB-pediatric: if dose 3 has been received ≥ 1 month after dose 2 HAHB-regular: if dose 2 was given ≥ 28 days after dose 1 and dose 3 was given 140 days after dose 2
	4	HB-pediatric: if dose 3 was < 6 months after dose 1

Geography: Zone and community health network were assigned based on the location of the student’s school. For home schooled students, geography was assigned as unknown.

Home schooled: Home schooled students were included in the Nova Scotia rates but were not reflected in the zone rates.

Adverse Events Following Immunization (AEFI): AEFIs associated with school-based vaccines were pulled from Panorama for students in the 2018-2019 grade 7 cohort.

Confidence Intervals: 95% confidence intervals were calculated to identify statistically significant differences between zones. In the text, ‘significantly different’ implies a difference that is statistically significant.

² https://support.novascotia.ca/sites/default/files/NS_Documentation_of_forecaster_validation_rules_v10.pdf

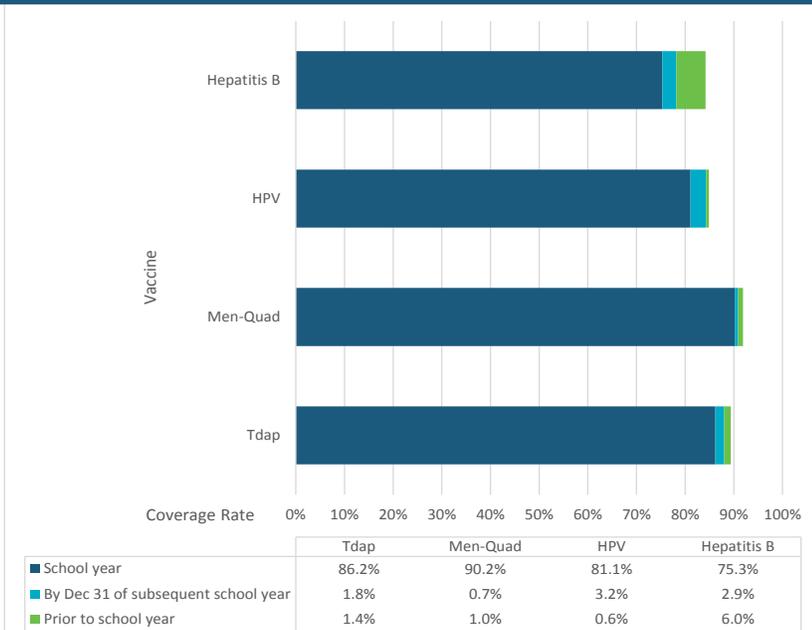
Table 1: Immunization coverage rates by vaccine and zone, grade 7, Nova Scotia, 2018-2019

Zone	Tdap	Men-Quad	HPV	Hepatitis B
Western	88.6%	91.5%	82.8%	84.0%
Northern	90.8%	92.6%	85.9%	85.5%
Eastern	88.7%	90.0%	84.6%	84.4%
Central	91% [↑]	93.9% [↑]	87.3% [↑]	85.4%
Nova Scotia	89.4%	91.8%	84.9%	84.3%

Notes: Coverage rates below the provincial target (90%) are shown in red
[↑]Rate is statistically higher than the NS rate

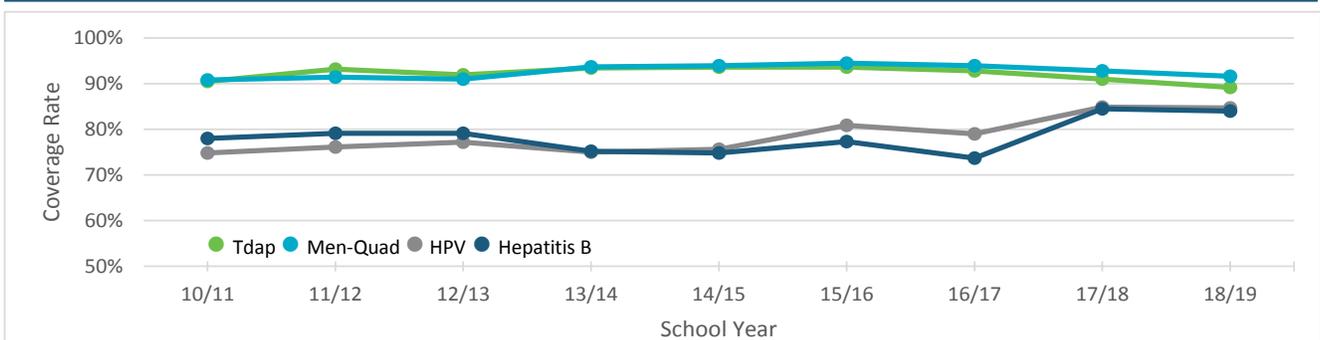
- Provincially, the only vaccine with coverage rates above the provincial target was Men-Quad.
- Coverage rates for single dose vaccines (Tdap & Men-Quad) were higher than for multi dose vaccines.
- Coverage rates in Central Zone were significantly higher than the provincial rates for Tdap, Men-Quad, and HPV vaccines.

Figure 1: Immunization coverage rates by vaccine and timing of immunization, grade 7, Nova Scotia, 2018-2019



- The timing of immunization represents when the student was considered covered (e.g. completed the series for multi-dose vaccines)
- The majority of students were immunized during the school year.
- In comparison to the other vaccines, Hepatitis B vaccine had the highest coverage rate prior to the school year.

Figure 2: Immunization coverage rates by vaccine and school year, grade 7, 2010-2019



The coverage rates over time should be interpreted in consideration of the different method for defining the numerator and denominator prior to Panorama implementation. Estimating grade using an age range (numerator) and using aggregate student counts (denominator) may have overestimated coverage rates prior to 2017-2018, particularly for single dose vaccines. The other change to note is the inclusion of immunizations up to December 31 of the subsequent school year in the coverage rates. This allows for the capture of students who complete the school-based immunizations in the fall of grade 8 and likely explains the slight increase in the coverage rates for multi dose vaccines in 2017-2018 onwards.

Figure 3: Immunization coverage rates by vaccine and community health network, grade 7, 2018-2019

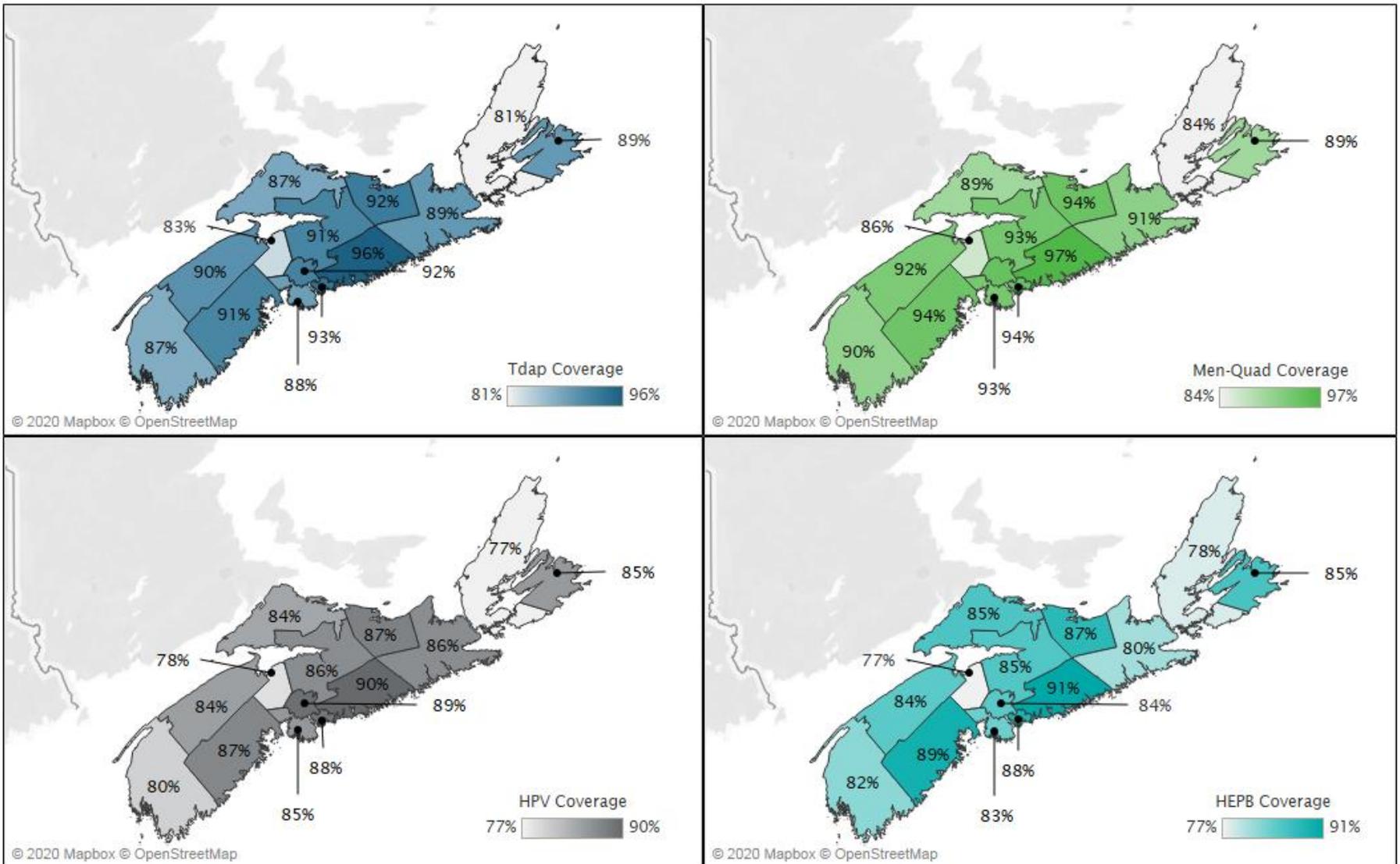
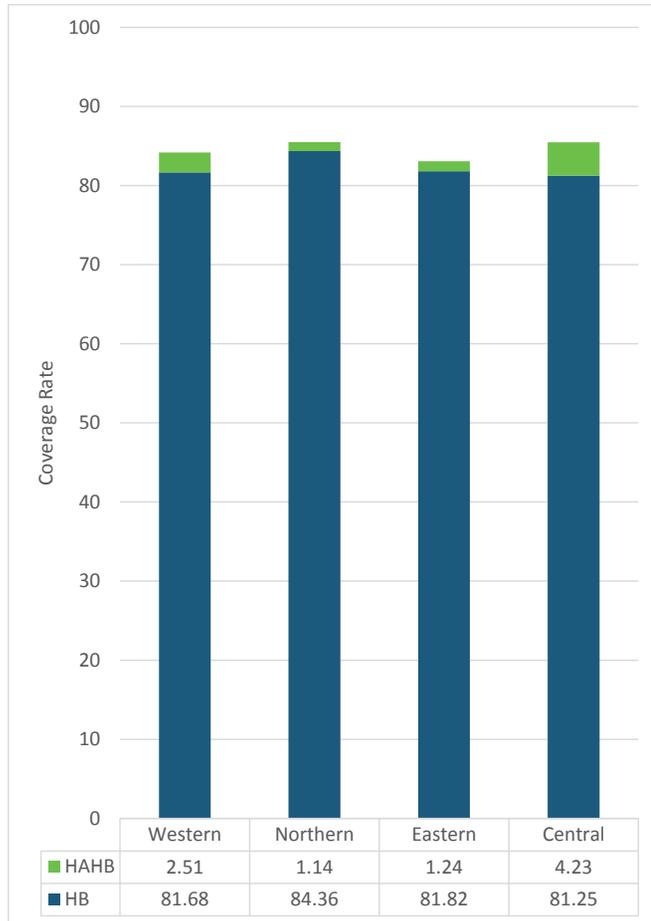
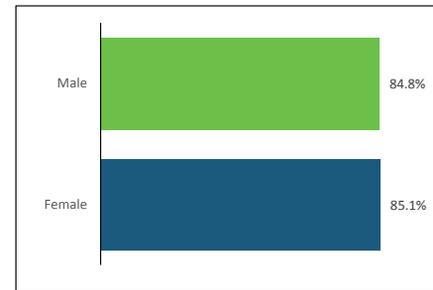


Figure 4: Hepatitis B coverage rates by agent, 2018-2019



- Overall Hepatitis B coverage includes both HB and HAHB agents.
- For Nova Scotia, 2.8 % of the 2018-2019 student population was covered by an HAHB agent.
- There was a higher proportion of students covered by an HAHB agent in Central Zone than in the other zones.

Figure 5: HPV coverage rates by sex, 2018-2019



- HPV coverage rates did not differ by sex.

Table 2: Immunization coverage rates for home-schooled students, 2018-2019

	Tdap	Men-Quad	HPV	Hepatitis B
Home-Schooled	33.0%	34.0%	24.3%	26.2%
Nova Scotia*	89.2%	91.6%	84.7%	84.0%

*Includes home-schooled students

- Home-schooled students represented 1.1 % (n= 103) of the 2018-2019 grade 7 student population.
- Coverage rates among home-schooled students were significantly lower than the provincial coverage rates for all vaccines.

Figure 6: Adverse events following school-based immunizations, 2018-2019



- There were 2 non-serious adverse events following immunization, associated with school-based vaccines, reported in Panorama for students in the 2018-2019 grade seven cohort.

SUMMARY

- Provincially and at the zone level, coverage rates for all four of the school-based immunization program vaccines were above 80%.
- Coverage rates for Men-Quad were above the provincial target of 90%, both provincially and at the zone level.
- In Northern and Central Zones, coverage rates for Tdap were above the provincial target of 90%.
- Coverage rates for single dose vaccines (Tdap & Men-Quad) were higher than for multi dose vaccines (HPV, Hepatitis B). This is likely due to the greater opportunity for missed doses with the multi-dose vaccines.
- For Central Zone, the coverage rates were significantly higher for Tdap, Men-Quad, and HPV vaccines, in comparison to the provincial coverage rates. There were no significant differences for Hepatitis B vaccine.
- For Western, Northern, and Eastern zones, there were no significant differences in the coverage rates for any vaccines, in comparison to the provincial coverage rates.
- For all four school-based immunization program vaccines, the majority of students (>75%) were fully immunized during the grade 7 school year.
- In comparison to the other vaccines, Hepatitis B vaccine had the highest coverage rate for students who were fully immunized prior to the grade 7 school year. Any students who received a travel related vaccine prior to grade 7 contribute to this because Hepatitis B coverage rates included students who were immunized with either a HB or HAHB agent.
- When Hepatitis B coverage rates were broken down by immunizing agent, 2.8 % of the 2018-2019 student population were found to have been covered by an HAHB agent. The proportion of students covered by an HAHB agent was highest in Central Zone.
- For Tdap and Men-Quad, the coverage rates in 2017-2018 and 2018-2019 were slightly lower than in the preceding years. This is likely due to the different method for defining the numerator and denominator prior to Panorama implementation. The previous methods estimated grade using an age range (numerator) and used aggregate student counts (denominator) which likely overestimated coverage rates prior to 2017-2018 by including some students in grade 8 being captured in the numerator and not the denominator.
- For HPV and Hepatitis B, the coverage rates in 2017-2018 and 2018-2019 were slightly higher than in the preceding years. This is likely due to the inclusion of immunizations up to December 31 of the subsequent school year in the coverage rates because it captures any missed grade 7 doses that were received in grade 8.
- The immunization schedule for HPV vaccine was expanded in September 2015 to include males. The coverage rates for 2018-2019 did not differ between males and females.
- For the small proportion of home-schooled students (1.1 % of the 2018-2019 grade 7 student population), coverage rates were significantly lower than the provincial coverage rates for all four vaccines.
- Among the 2018-2019 grade seven cohort, there were 2 adverse events following immunization (AEFI) associated with school-based immunization program vaccines that were reported in Panorama.