BC Centre for Disease Control
Provincial Health Services Authority

Immunization Programs
and Vaccine Preventable
Diseases Service

655 West 12th Avenue
Vancouver, BC V5Z 4R4

Tel 604-707-2548
Fax 604-707-2515

www.bccdc.ca

Immunization Coverage in Grade 9 Students

2015-2024

August 2025

Provincial Health Services Authority
Province-wide solutions. Better health.

ACCREDITED · AGRÉÉ · CCHSA · CCASS

A research and teaching centre affiliated with UBC

Table of Contents

Authors

Immunization Programs and Vaccine Preventable Diseases Service

BC Centre for Disease Control, 655 West 12th Avenue, Vancouver, BC Canada V5Z 4R4

vpd.epi@bccdc.ca | Phone: 604-707-2548

Acknowledgements

We gratefully acknowledge the residents of BC whose data were integrated in the information presented here and all BC health authorities for the contribution of information for this report.

We acknowledge the Title and Rights of BC First Nations who have cared for and nurtured the lands, air and waters for all time, including the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh Úxwumixw (Squamish Nation), and səl̓ílwətaʔ (Tsleil-Waututh Nation) on whose unceded, occupied, and ancestral territory BCCDC is located. As a provincial organization, we also recognize and acknowledge the inherent Title and Rights of BC First Nations whose territories stretch to every inch of the lands colonially known as “British Columbia”.

BC is also home to many First Nations, Métis, and Inuit people from homelands elsewhere in Canada. We recognize the distinct rights of First Nations, Inuit, and Métis people and BCCDC is beginning its work to uphold a distinctions-based approach to Indigenous data sovereignty and self-determination. All Indigenous Peoples who live in BC have rights to self-determination, health and wellness, and respectful use of their data in alignment with Indigenous data governance principles, including but not limited to OCAP®.

BCCDC is working to address the consequences of settler-colonial policies, which continue to have effects on all Indigenous Peoples living in the province. Consistent with the Coast Salish teaching of Thee eat (truth) gifted to PHSA by Coast Salish Knowledge Keeper Sulksun, we recognize that ongoing settler colonial harms and ideology in BC undermine the inherent rights of Indigenous Peoples who live in BC and significantly contributes to health inequities and data gaps. For further information, please see “In Plain Sight: Addressing Indigenous-specific Racism and Discrimination in B.C. Health Care”. We also recognize the direct impact of colonial policies, which led to violations of patient autonomy and consent, resulting in vaccine hesitancy and mistrust among Indigenous Peoples in Canada:

- TB vaccine experimentation in Saskatchewan in the 1930s and 1940s
- Medical experimentation and the roots of COVID-19 vaccine hesitancy among Indigenous Peoples in Canada
- Vaccine mistrust: A legacy of colonialism

While the data shown in this report represent BC residents, there is no stratification by Indigeneity and as such, the results are not reflective of the situation for First Nations, Métis and Inuit Peoples and communities. First Nations children may also be disproportionately under-represented in the immunization registry data. Please see the Limitations section of the Data Notes for further information.

Abbreviations

Health Authorities

IH	Interior Health	ISLH	Island Health
FH	Fraser Health	NH	Northern Health
VCH	Vancouver Coastal Health		

Additional abbreviations

BC	British Columbia	HPV	Human papillomavirus
MoE	Ministry of Education	MenC-ACYW	Meningococcal quadrivalent conjugate
HA	Health Authority	Tdap	Tetanus, diphtheria, acellular pertussis
HSDA	Health Service Delivery Area		
MyEdBC	MyEducation BC		
PIR	Provincial Immunization Registry		
PARIS	Primary Access Regional Information System		

For an explanation of BC Health Authorities, please visit this website.

Executive Summary

This report outlines immunization coverage among grade 9 students from 2015 to 2024 for four antigens: tetanus/diphtheria, pertussis, meningococcal quadrivalent, and human papillomavirus (HPV). The tetanus/diphtheria and pertussis assessments are based on completion of a primary series in early childhood and a single booster dose (Tdap) received after age 10 that is primarily offered in grade 9. The meningococcal quadrivalent assessment is based on a single dose of MenC-ACYW administered in grade 9. Students who did not initiate or complete the HPV series in grade 6 are offered any missed doses in grade 9. In the 2024 report, data reflects coverage as of the 2023/2024 school year.

Provincial coverage in 2024 (2023/2024 school year) was similar across antigens, with tetanus/diphtheria the highest (74.8%), followed by pertussis (74.5%), meningococcal quadrivalent (73.9%) and HPV (74.0% in females; 71.8% in males). Coverage for all antigens has increased from lows in 2021, when prioritization of the COVID-19 pandemic response affected public health resources available for school-based immunization clinics. Since 2022 (2021/2022 school year), coverage has increased provincially for all antigens (0.7-3.2%) and coverage estimates in 2024 were within 0.4-1.1% of coverage rates in 2023 (2022/2023 school year). Across health authorities, an overall trend of increasing coverage for tetanus/diphtheria, pertussis, and meningococcal quadrivalent was seen from 2022 to 2024 (1.0-6.6%), except in Vancouver Coastal Health (VCH), where coverage decreased across these antigens (2.2-2.6%). In comparison to 2023 (2022/2023 school year), coverage estimates in Northern Health (NH) and Fraser Health (FH) increased for tetanus/diphtheria, pertussis, and meningococcal quadrivalent by 0.4-3.1%, and decreased in Interior Health (IH) and VCH by 1.1-2.1%. In Island Health (ISLH), coverage rates decreased from 2023 to 2024 for tetanus/diphtheria (0.9%) and pertussis (1.0%), and were stable for meningococcal quadrivalent (0.1% increase).

Trends in HPV coverage over the past two years varied by both health authority and gender, with an overall increase in females in FH, NH, and ISLH (1.9-2.7%) and males in VCH, FH, and ISLH (0.2-2.6%). An overall decrease in HPV coverage since 2022 was seen in females in IH and VCH (0.9-2.4%) and in males in NH and IH (3.1-3.4%). Coverage estimates for HPV in females in 2024 were within 0.2-0.7% of 2023 coverage rates across health authorities, except in NH, where coverage increased from 2023 to 2024 by 7.0%. In 2024, HPV coverage rates in males across health authorities were within 0.2-3.2% of 2023 estimates. As the 2024 grade 9 cohort were in grade 6 during the 2020/2021 school year, declines in HPV immunization coverage relative to prior cohorts may reflect the impact of COVID-19 on their grade 6 school-based HPV immunization clinics and subsequent catch-up efforts.

Reasons for non-immunization (e.g., documented refusals, exemptions, or contraindications) were assessed for each antigen. For all antigens, IH had the largest proportion of unimmunized grade 9 students with a documented refusal. Across antigens, a large proportion of students were partially immunized or unimmunized for unknown reasons, as seen in prior reports. Grade 9 students who are unimmunized, or partially immunized, for unknown reasons can include children who have missed the immunization clinics, those who deferred, or those who have not had their refusal, contraindication, or immunization doses recorded.

Since 2023, international students have been excluded from the analysis as there is a larger proportion of missing immunization records among these students. Coverage rates for international students in 2024 are reported in the appendix. Coverage rates for all four antigens in 2024 were lower among international students compared to the BC population, and ranged from 26.2% for HPV in males to 51.1% for meningococcal quadrivalent.

Please refer to the data notes for additional information and data limitations. Data tables used to create the figures in this report and prior year coverage rates for international students can be downloaded here.

Immunization coverage by Antigen

In the following coverage by antigen sections, the ‘Unknown’ subcategories of partially immunized and unimmunized includes all children who do not have a documented refusal or contraindication for the antigen of interest and were therefore partially immunized or unimmunized for a reason not recorded.

The ‘Unimmunized - Unknown’ subcategory further divides those who are unimmunized for the antigen of interest without a known reason into two additional categories: ‘Immunization Record’ for those who have any records (documented immunization, refusal, contraindication and/or exemption) for routine childhood immunizations, and ‘No Immunization Record’ for those that have no documented records for any routine childhood immunization. See data notes for further information.

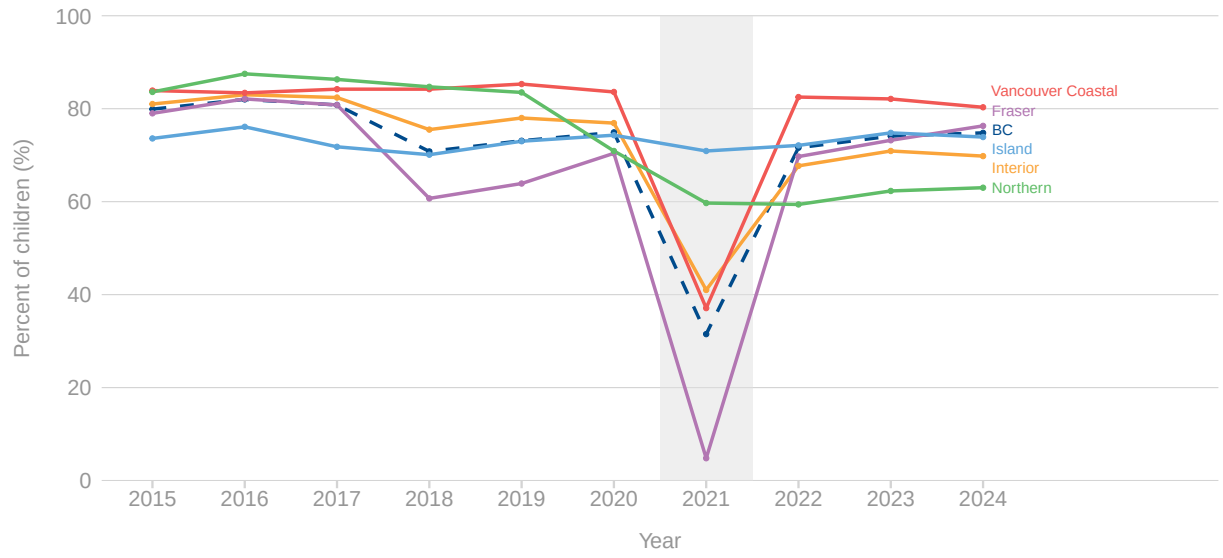
Tetanus/Diphtheria

In BC, tetanus/diphtheria immunization coverage in grade 9 students increased from 71.6% in 2022 (2021/2022 school year) to 74.8% in 2024 (2023/2024 school year), similar to the 2023 (2022/2023 school year) estimate of 74.1% (Figure 1). Over the past two years, coverage overall increased across all health authorities by 1.8-6.6%, except in VCH where coverage decreased 2.2%. In 2024, tetanus/diphtheria immunization coverage ranged from 63.0% in NH to 80.3% in VCH (Figure 2). At the HSDA level, coverage was lowest in 2024 in Northeast (49.4%) and highest in Richmond (89.1%) (Figure 2 and 3).

At the provincial level, 2.0% of grade 9 students in BC were unimmunized for tetanus/diphtheria with a documented refusal and 2.9% were partially immunized with a documented refusal (Figure 4). A further 16.9% of grade 9 students were partially immunized for unknown reasons. Among health authorities, IH had the largest proportion of students unimmunized with a documented refusal (4.6%) and partially immunized with a documented refusal (6.3%), while NH had the most students partially immunized for unknown reasons (27.8%) (Figure 4). At the HSDA level, Kootenay Boundary had the most grade 9 students unimmunized or partially immunized with a documented refusal, at 8.8% and 8.7% respectively (Figure 5). Northeast HSDA had the largest proportion of students partially immunized for unknown reasons, at 35.3%.

While tetanus/diphtheria immunization is part of early childhood immunization programs, to be considered up-to-date in grade 9, the last dose must be received on or after 10 years age (see data notes). Therefore, students who are 'partially immunized' will reflect those who have received childhood immunization(s) for tetanus/diphtheria but who have not completed the series per the BC immunization schedule.

Immunization coverage



Note: The grey shaded area highlights the impact of the COVID−19 pandemic on administration of school−based vaccination for the 2021 grade 9 cohort. See data notes for more information.

Figure 1. Tetanus/Diphtheria coverage by year and health authority, Grade 9 students, British Columbia

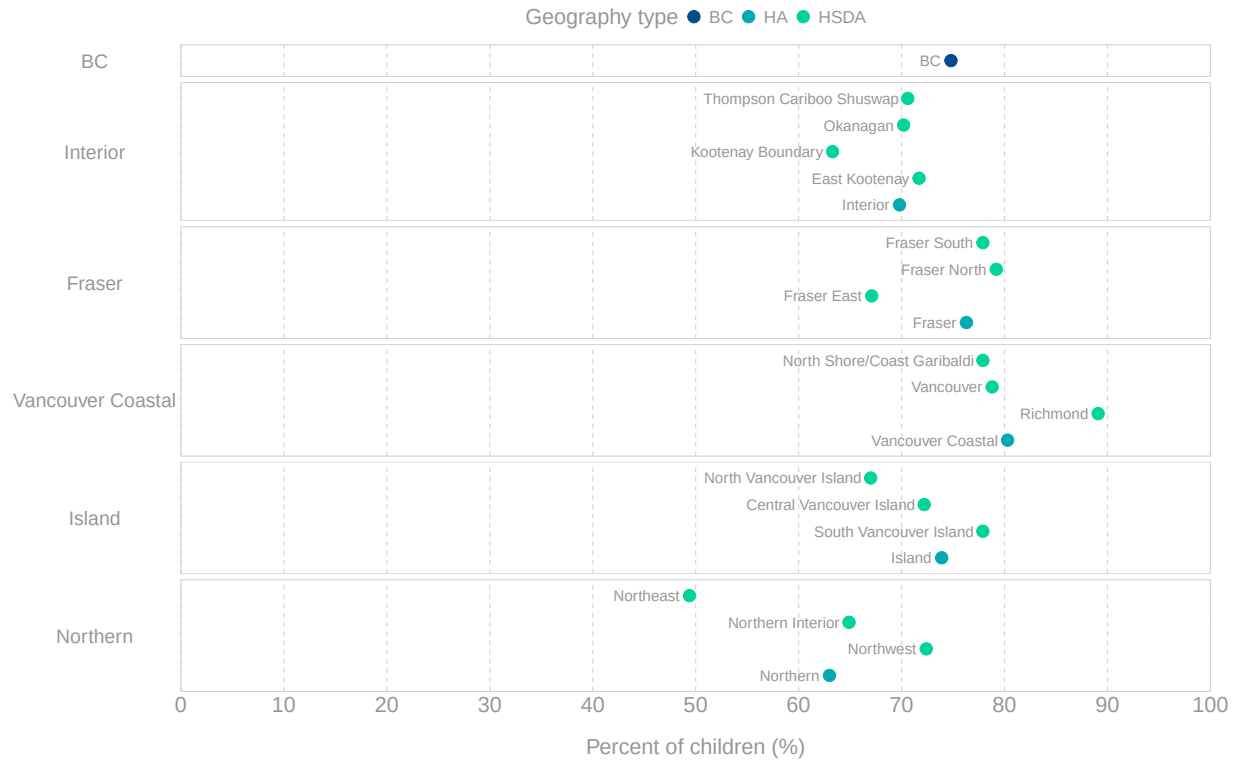
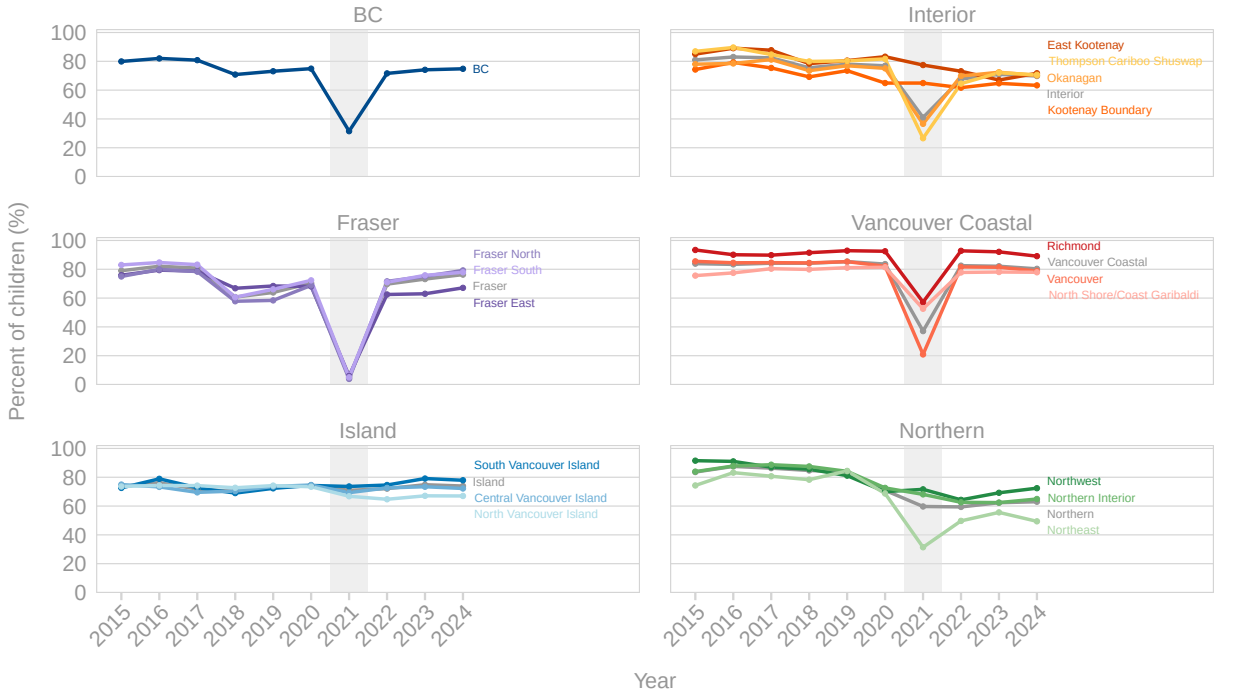


Figure 2. Tetanus/Diphtheria coverage by geographic region, Grade 9 students, British Columbia, 2024



Note: The grey shaded area highlights the impact of the COVID−19 pandemic on administration of school−based vaccination for the 2021 grade 9 cohort. See data notes for more information.

Figure 3. Tetanus/Diphtheria coverage by year and geographic region, Grade 9 students, British Columbia

Reasons for non-immunization

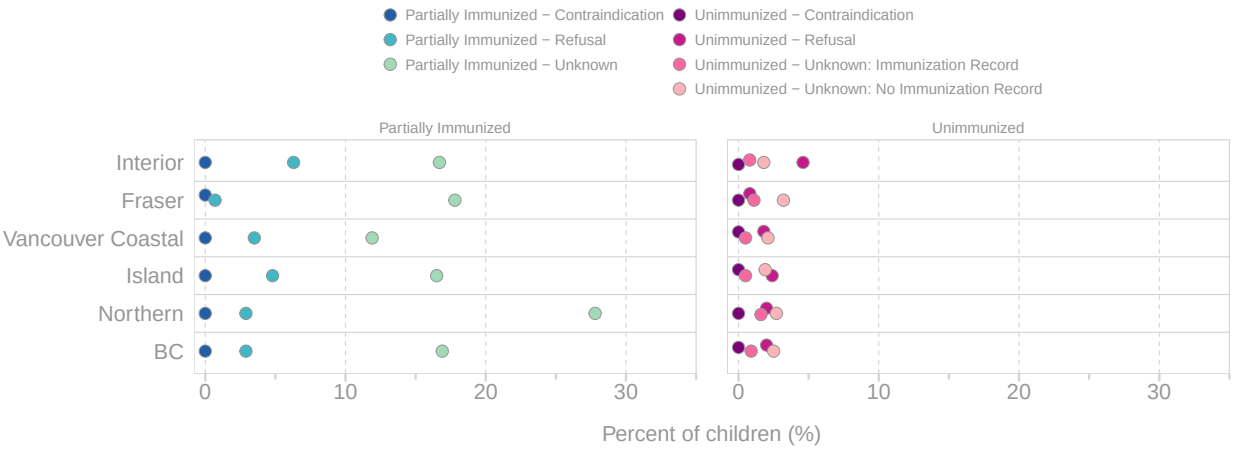


Figure 4. Reasons for non-immunization by health authority, Tetanus/Diphtheria, Grade 9 students, British Columbia, 2024

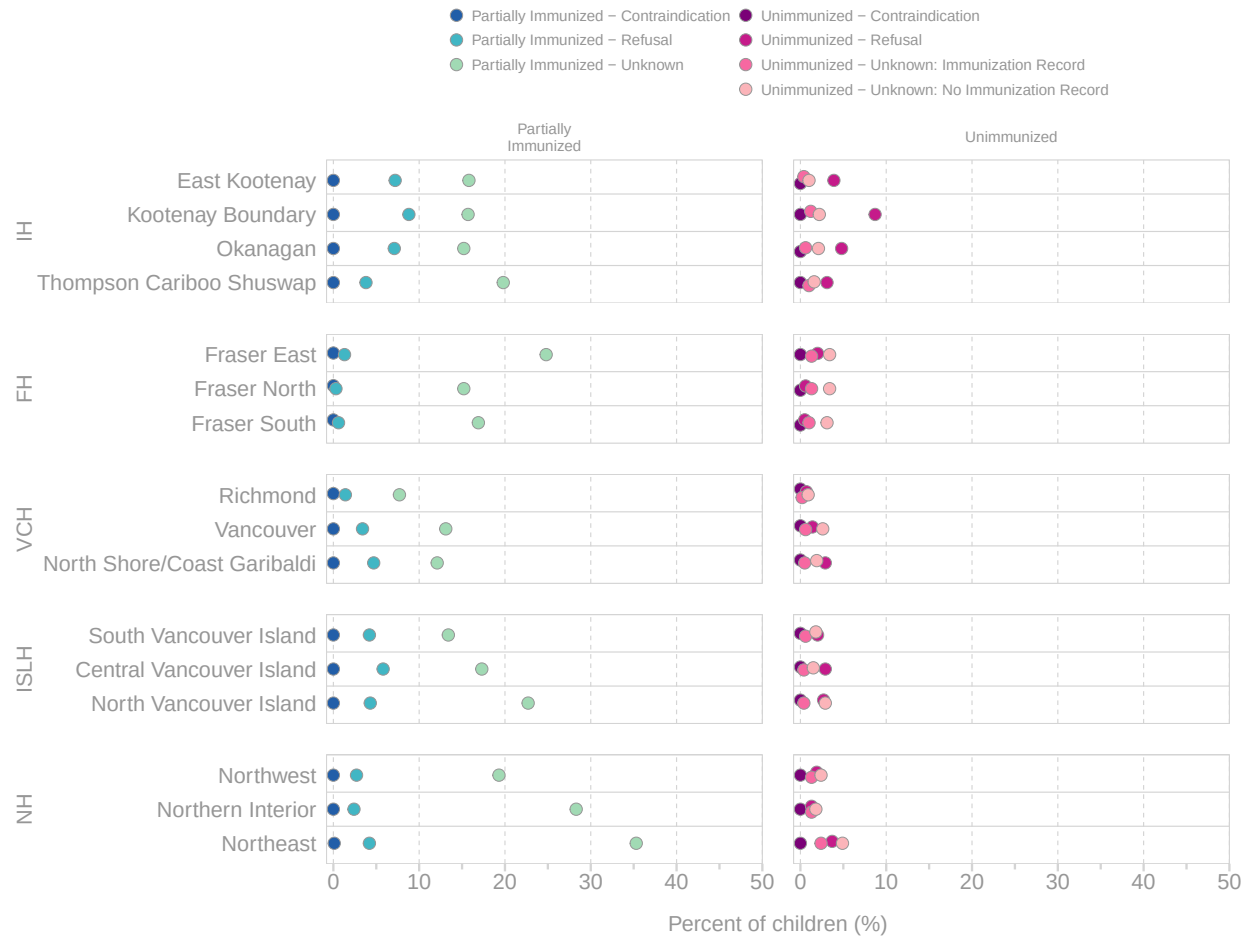


Figure 5. Reasons for non-immunization by health service delivery area, Tetanus/Diphtheria, Grade 9 students, British Columbia, 2024

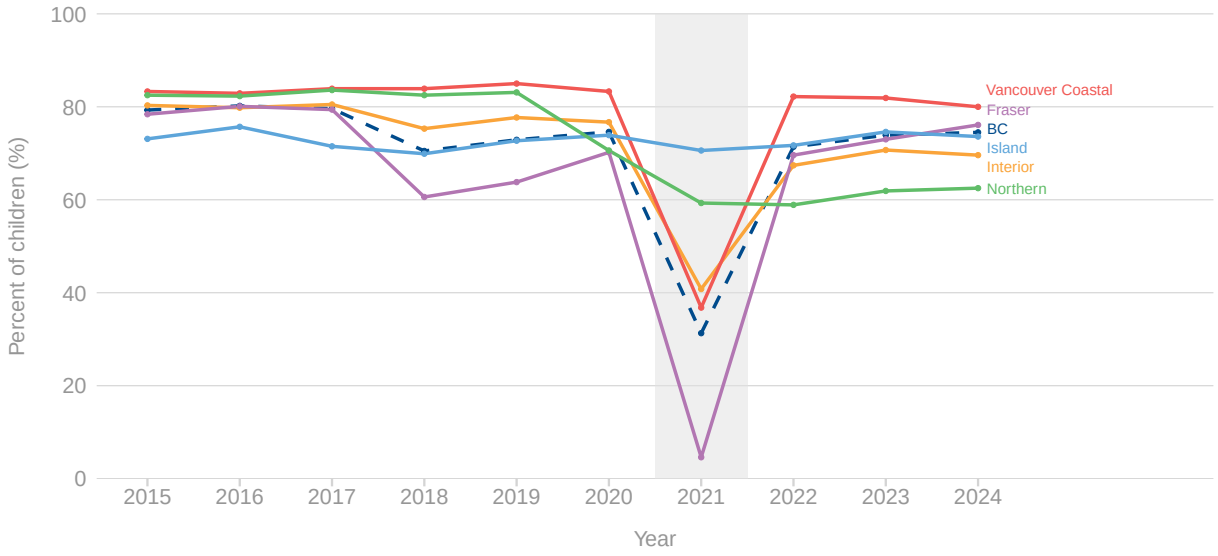
Pertussis

In 2024 (2023/2024 school year), pertussis immunization coverage in grade 9 students was 74.5% in BC, an increase of 3.1% since 2022 (2021/2022 school year), and similar to the 2023 (2022/2023 school year) coverage estimate of 73.9% (Figure 6). As seen with tetanus/diphtheria coverage, pertussis immunization coverage increased from 2022 levels across all health authorities (1.9-6.5% increase), except VCH (2.2% decrease). In 2024, coverage ranged from 62.5% in NH to 80.0% in VCH (Figure 7). Across HSDAs, Northeast had the lowest coverage at 49.3%, and Richmond the highest at 88.8% (Figure 7 and 8).

In BC, 1.7% of grade 9 students were unimmunized for pertussis with a documented refusal in 2024 (2023/2024 school year) (Figure 9). A further 17.6% of grade 9 students were partially immunized for unknown reasons. In IH, 4.0% of students were unimmunized with a documented refusal, and in NH, 29.1% of students were partially immunized for unknown reasons (Figure 9). At the HSDA level, Kootenay Boundary had the most students unimmunized with a documented refusal (8.5%) and Northeast had the most students partially immunized for unknown reasons (36.6%) (Figure 10).

As with tetanus/diphtheria immunization, pertussis immunization is part of early childhood immunization programs and to be considered up-to-date in grade 9 the last dose must be received on or after 10 years age (see data notes). Therefore, students who are 'partially immunized' will reflect those who have received childhood immunization(s) for pertussis but who have not completed the series per the BC immunization schedule.

Immunization coverage



Note: The grey shaded area highlights the impact of the COVID−19 pandemic on administration of school−based vaccination for the 2021 grade 9 cohort. See data notes for more information.

Figure 6. Pertussis coverage by year and health authority, Grade 9 students, British Columbia

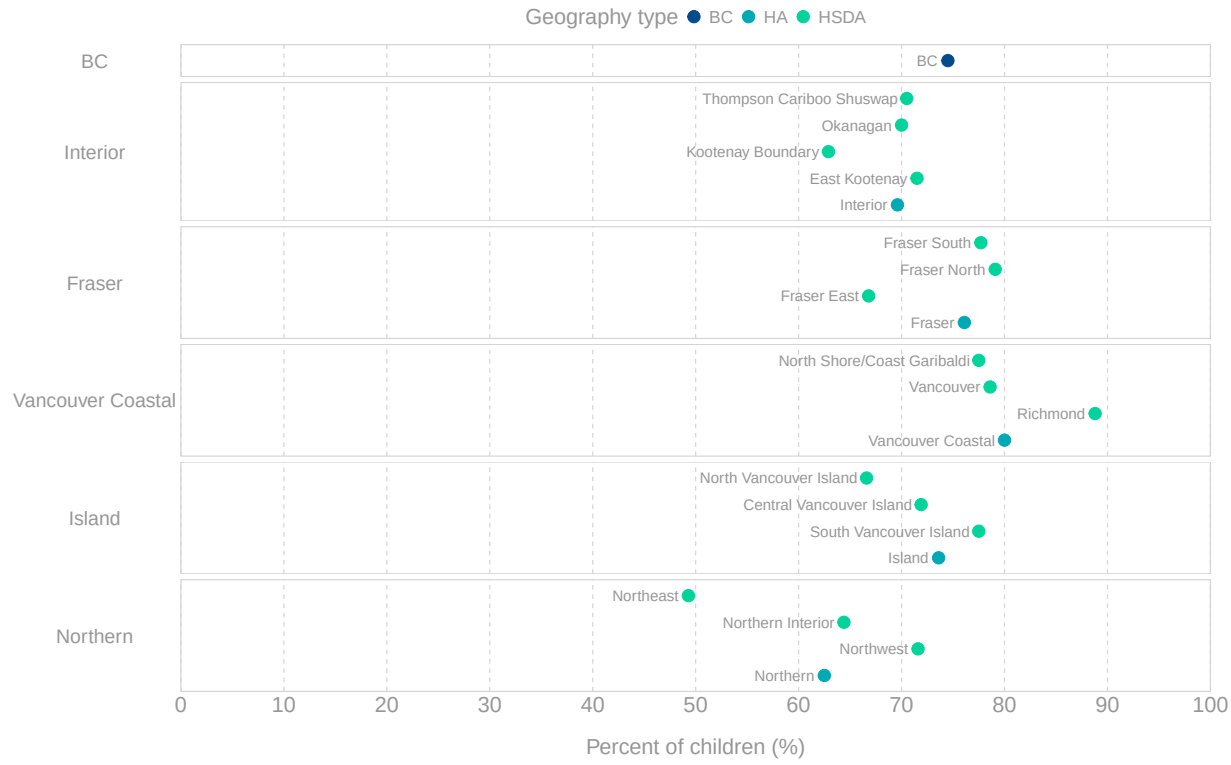
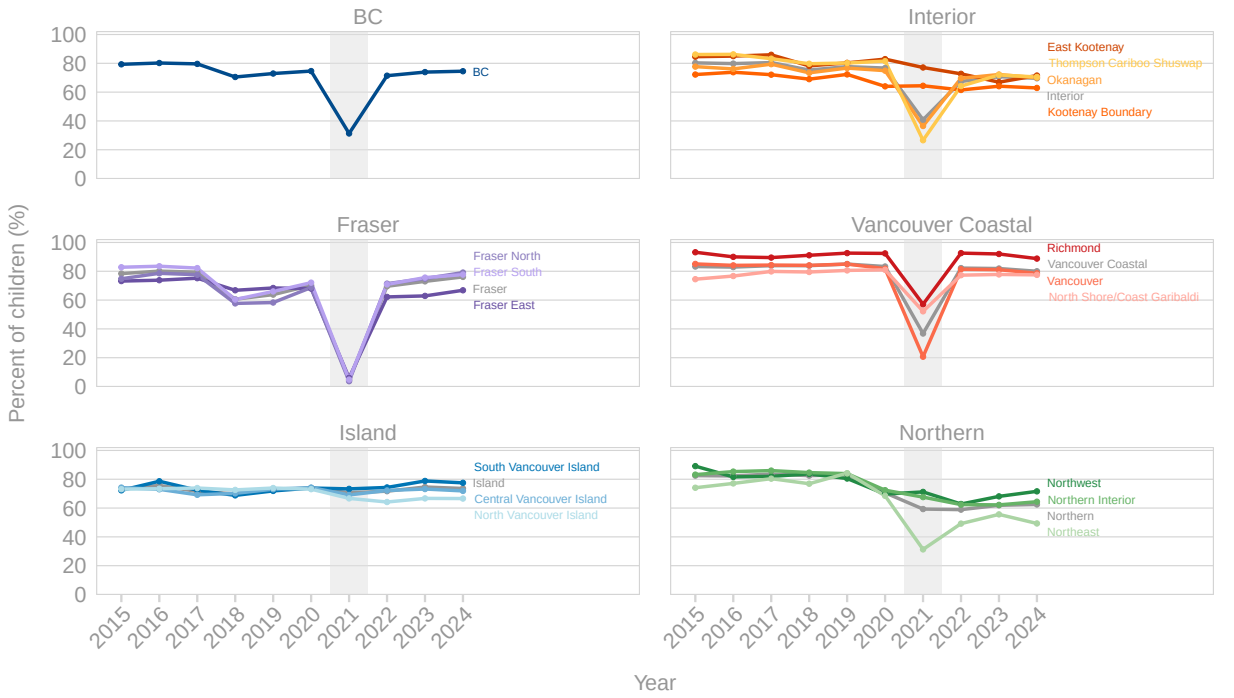


Figure 7. Pertussis coverage by geographic region, Grade 9 students, British Columbia, 2024



Note: The grey shaded area highlights the impact of the COVID−19 pandemic on administration of school−based vaccination for the 2021 grade 9 cohort. See data notes for more information.

Figure 8. Pertussis coverage by year and geographic region, Grade 9 students, British Columbia

Reasons for non-immunization

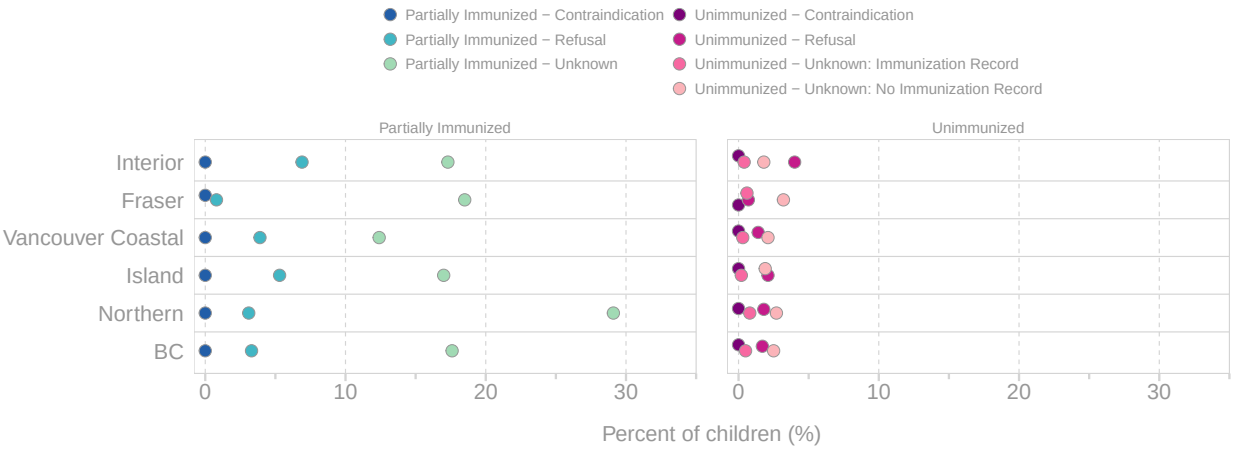


Figure 9. Reasons for non-immunization by health authority, Pertussis, Grade 9 students, British Columbia, 2024

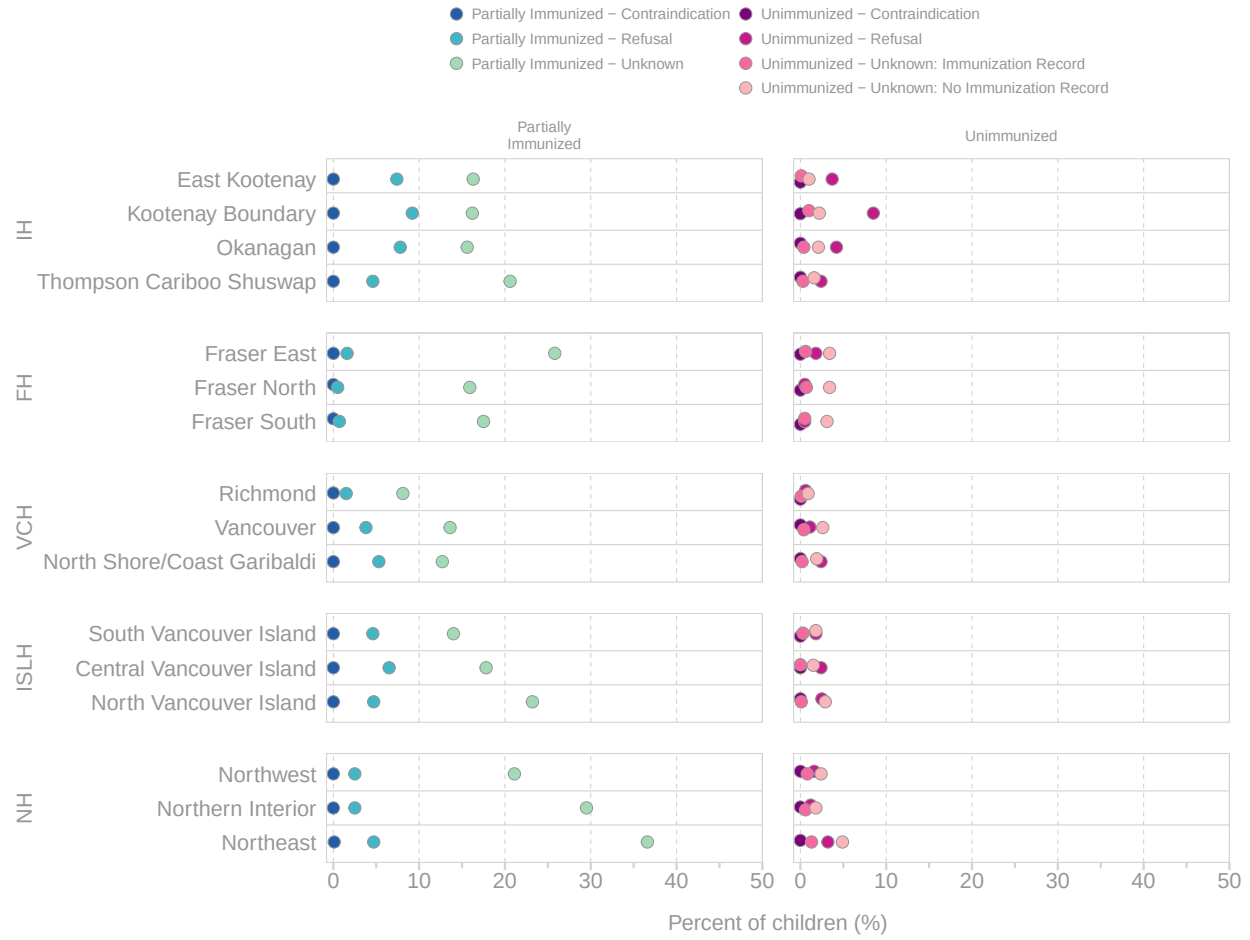


Figure 10. Reasons for non-immunization by health service delivery area, Pertussis, Grade 9 students, British Columbia, 2024

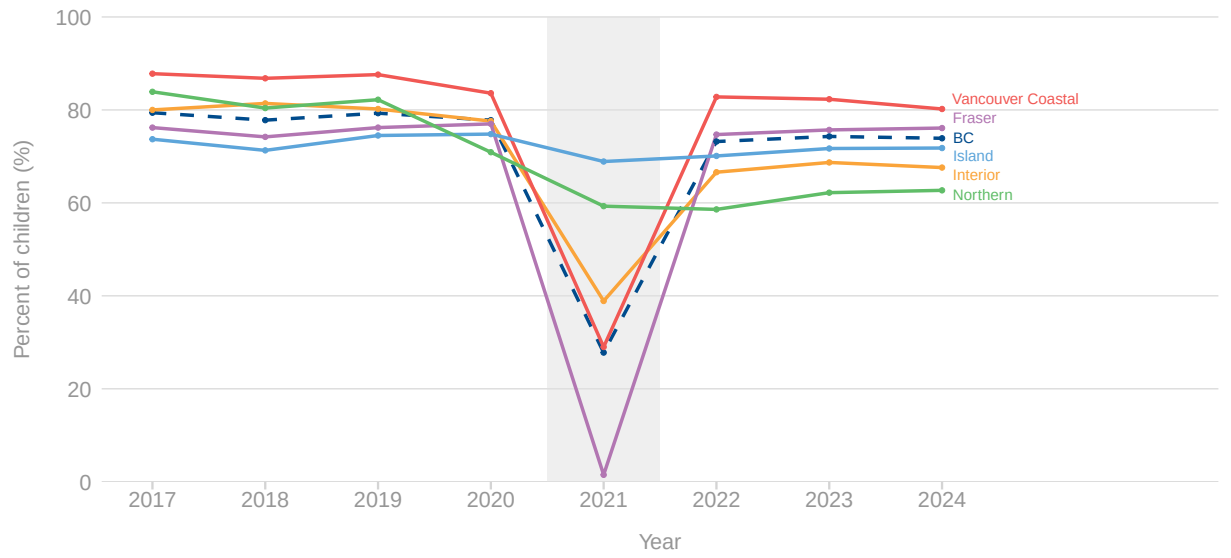
Meningococcal quadrivalent

The provincial meningococcal quadrivalent conjugate program in grade 9 began September 2016, with coverage assessed for the first time in 2017 (2016/2017 school year). To be considered up-to-date, a single dose of meningococcal quadrivalent vaccine on or after 11 years and 8 months of age is required (see data notes).

In BC, coverage for meningococcal quadrivalent immunization increased from 73.2% in 2022 (2021/2022 school year) to 73.9% in 2024 (2023/2024 school year), and was similar to the 2023 coverage estimate of 74.3% (Figure 11). Across health authorities coverage increased by 1.0-4.1%, except in VCH where it decreased by 2.6%. In 2024, coverage ranged from 62.7% in NH to 80.2% in VCH (Figure 12). Within HSDAs, coverage was lowest in Northeast, at 48.0%, and highest in Richmond, at 89.3% (Figure 12 and 13).

Provincially, 2.9% of grade 9 students in 2024 (2023/2024 school year) were unimmunized with meningococcal quadrivalent vaccine with a documented refusal and 23.1% were unimmunized for unknown reasons (Figure 14). In IH, 8.4% of grade 9 students were unimmunized with a documented refusal while 37.7% of students in NH were unimmunized for unknown reasons (Figure 14). Within HSDAs, 12.6% of students in Kootenay Boundary were unimmunized with a documented refusal, and 52% of students in Northeast were unimmunized for unknown reasons (Figure 15).

Immunization coverage



Note: The grey shaded area highlights the impact of the COVID−19 pandemic on administration of school−based vaccination for the 2021 grade 9 cohort. See data notes for more information.

Figure 11. Meningococcal quadrivalent coverage by year and health authority, Grade 9 students, British Columbia

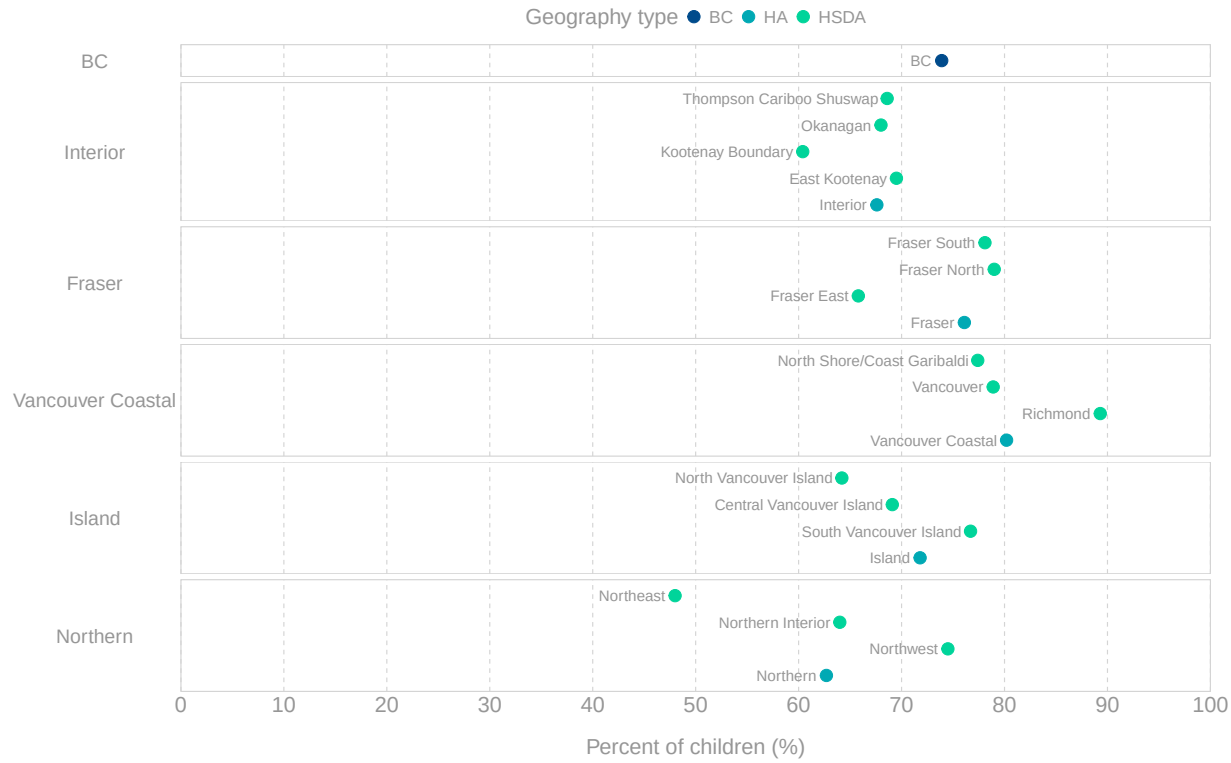
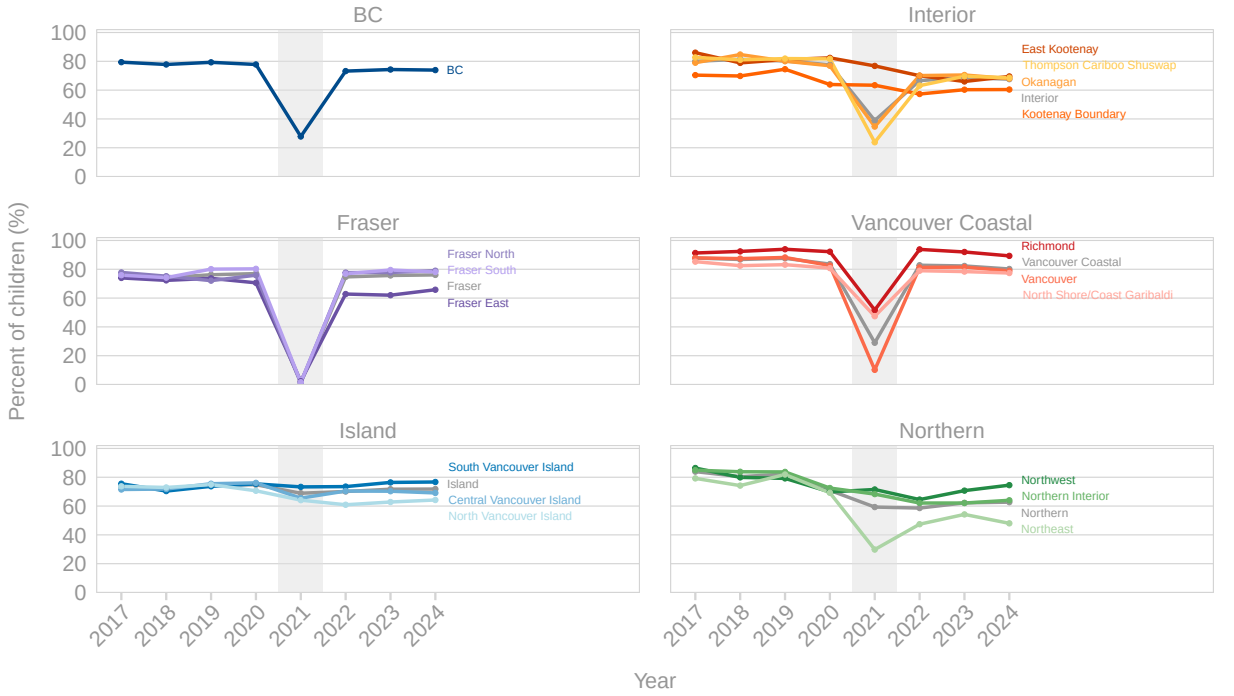


Figure 12. Meningococcal quadrivalent coverage by geographic region, Grade 9 students, British Columbia, 2024



Note: The grey shaded area highlights the impact of the COVID−19 pandemic on administration of school−based vaccination for the 2021 grade 9 cohort. See data notes for more information.

Figure 13. Meningococcal quadrivalent coverage by year and geographic region, Grade 9 students, British Columbia

Reasons for non-immunization

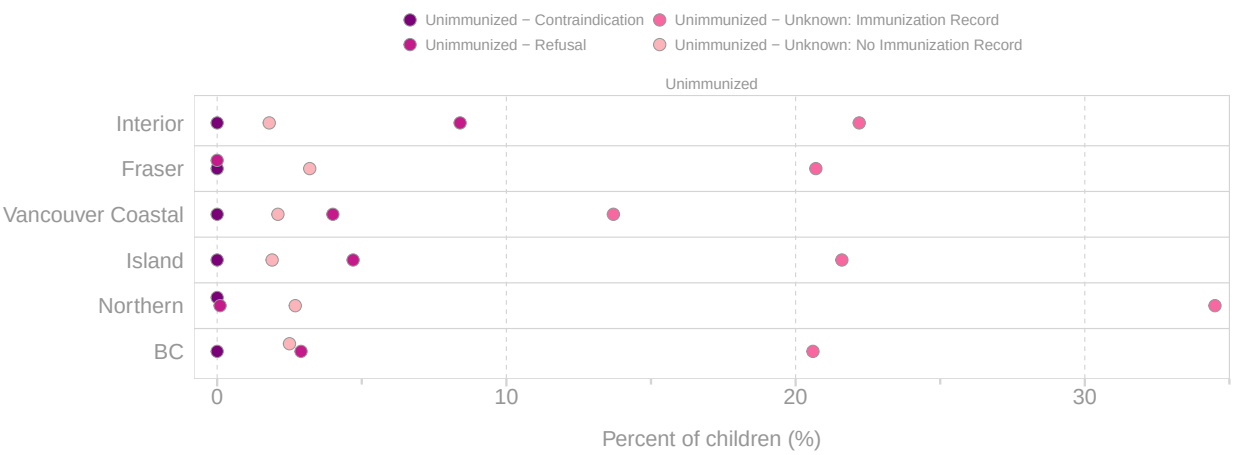


Figure 14. Reasons for non-immunization by health authority, Meningococcal quadrivalent, Grade 9 students, British Columbia, 2024

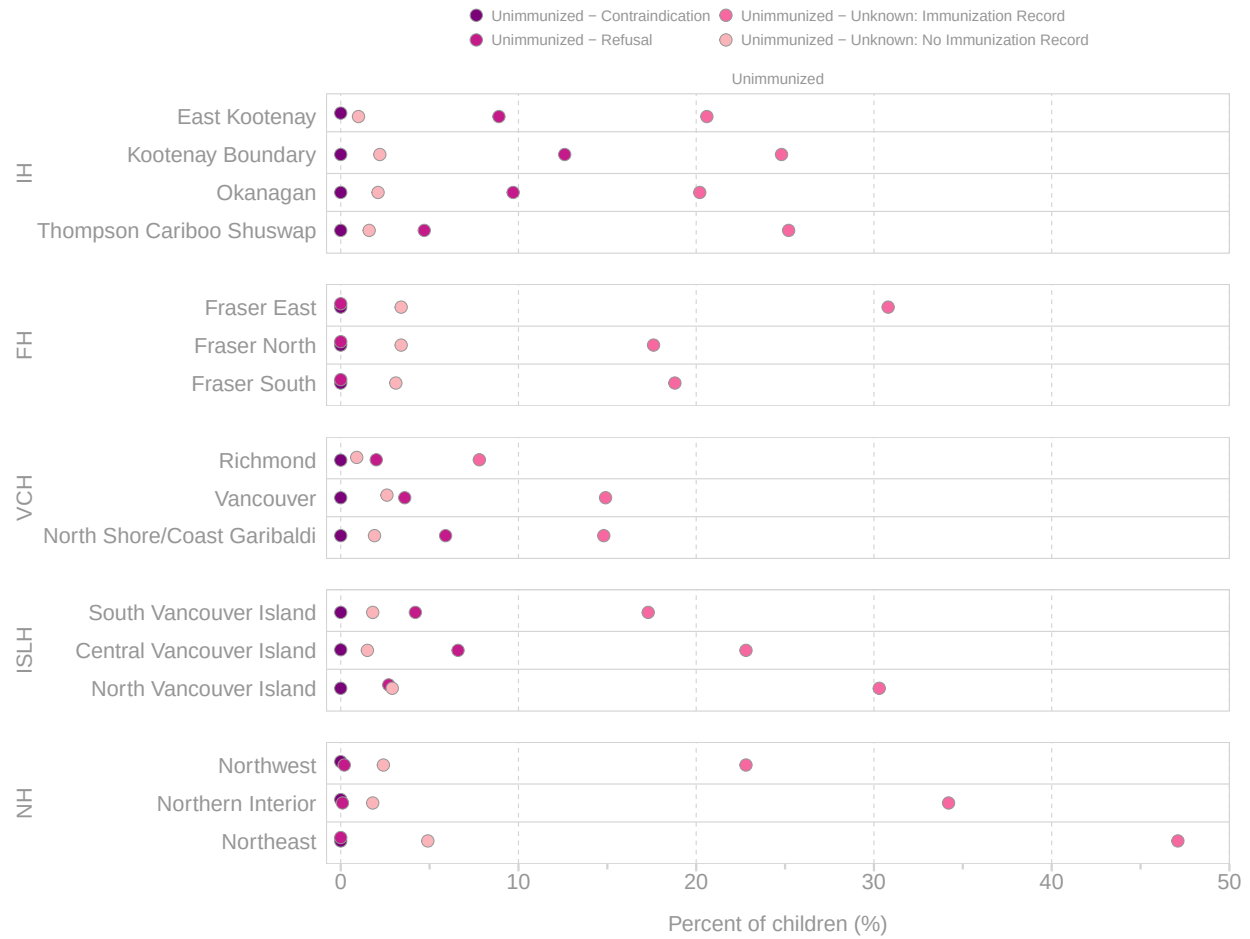


Figure 15. Reasons for non-immunization by health service delivery area, Meningococcal quadrivalent, Grade 9 students, British Columbia, 2024

Human Papillomavirus (HPV)

The 2024 (2023/2024 school year) grade 9 cohort were in grade 6 during the 2020/2021 school year when prioritization of the COVID-19 pandemic response impacted school-based HPV immunization programs. While initial catch-up efforts for this cohort of students (2021 grade 6 report) were reported on in the 2022 grade 6 report, coverage estimates in 2024 will reflect any additional catch-up efforts for this cohort of students by the grade 9 milestone (see Immunization Coverage in Grade 6 Students: 2022 and 2021).

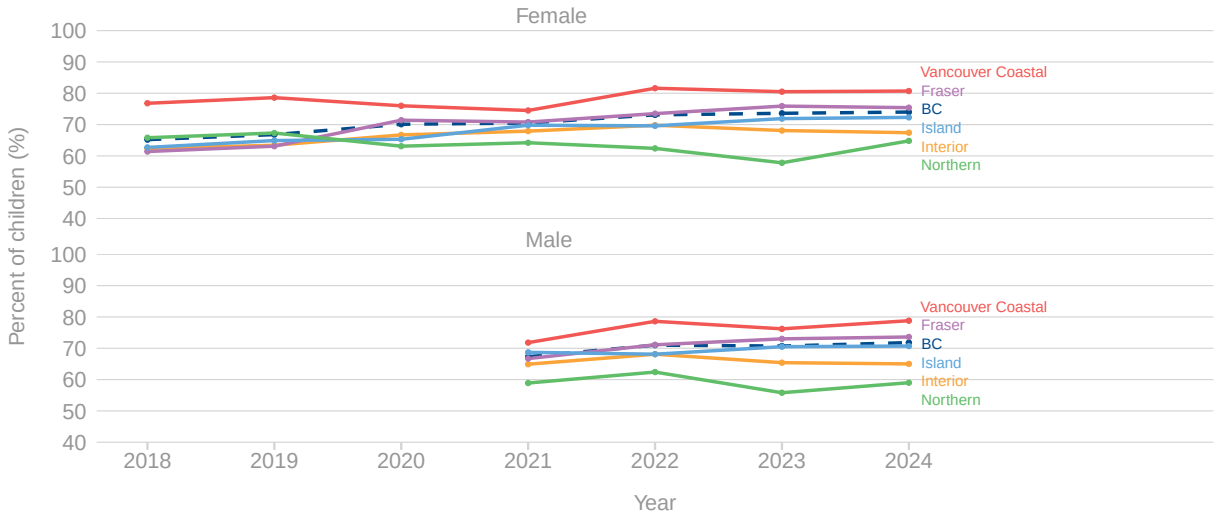
In 2024 (2023/2024 school year), 74.0% of female and 71.8% of male students in grade 9 received a complete HPV immunization series, an increase in coverage rates from both 2022 (2021/2022 school year) (73.1% and 71.0%, respectively) and 2023 (2022/2023 school year) (73.6% and 70.7%, respectively) (Figure 16). At the health authority level, HPV immunization coverage from 2022 to 2024 for both females and males increased in FH and ISLH (1.9-2.7% in females; 2.5-2.6% in males), and decreased in IH (2.4% in females; 3.1% in males). In VCH, HPV coverage decreased from 2022 to 2024 for females (0.9%) while slightly increasing for males (0.2%), and in NH, HPV coverage increased from 2022 to 2024 in females (2.4%) while decreasing for males (3.4%) (Figure 16). In 2024, HPV coverage in females ranged from 64.8% in NH to 80.7% in VCH, and in males from 59.0% in NH to 78.8% in VCH (Figure 17). At the HSDA level, HPV coverage in females and males was lowest in Northeast, at 51.6% and 45.6%, respectively, and highest in Richmond, at 87.3% and 85.6% (Figure 17 and 18).

Available evidence shows that the efficacy of a single dose of HPV vaccine is greater than 95% against included HPV types (see here). Considering both one (series initiation) or two doses (series completion), 83.4% of females and 82.2% of male students in grade 9 had received at least one dose of HPV vaccine in 2024 (2023/2024 school year) (Figure 17). HPV coverage of one or two doses across health authorities ranged in females from 76.1% in NH to 86.8% in VCH, and in males from 73.5% in NH to 86.0% in VCH. At the HSDA level, coverage of one or two doses in females and males in 2024 ranged from a low in Northeast, at 65.0% and 60.9%, respectively, to a high in Richmond of 91.2% and 89.8% (Figure 17).

In the 2023/2024 school year, 5.8% of female and 5.9% of male grade 9 students in BC were unimmunized with a documented refusal (Figure 19). Within health authorities, IH had the largest proportion of female (14.5%) and male (15.2%) students unimmunized with a documented refusal (Figure 19). NH had the most female (20.6%) and male (24.1%) students unimmunized for unknown reasons. At the HSDA level, the highest proportion of female and male students unimmunized with a documented refusal was in Kootenay Boundary, at 21.7% and 21.1%, respectively (Figure 20). The largest proportion students unimmunized for unknown reasons was in Northeast HSDA, at 29.1% of females and 35.5% of males.

Data tables containing overall, female, and male HPV series completion and HPV series initiation (one dose) coverage estimates for current and prior school year cohorts can be found here.

Immunization coverage

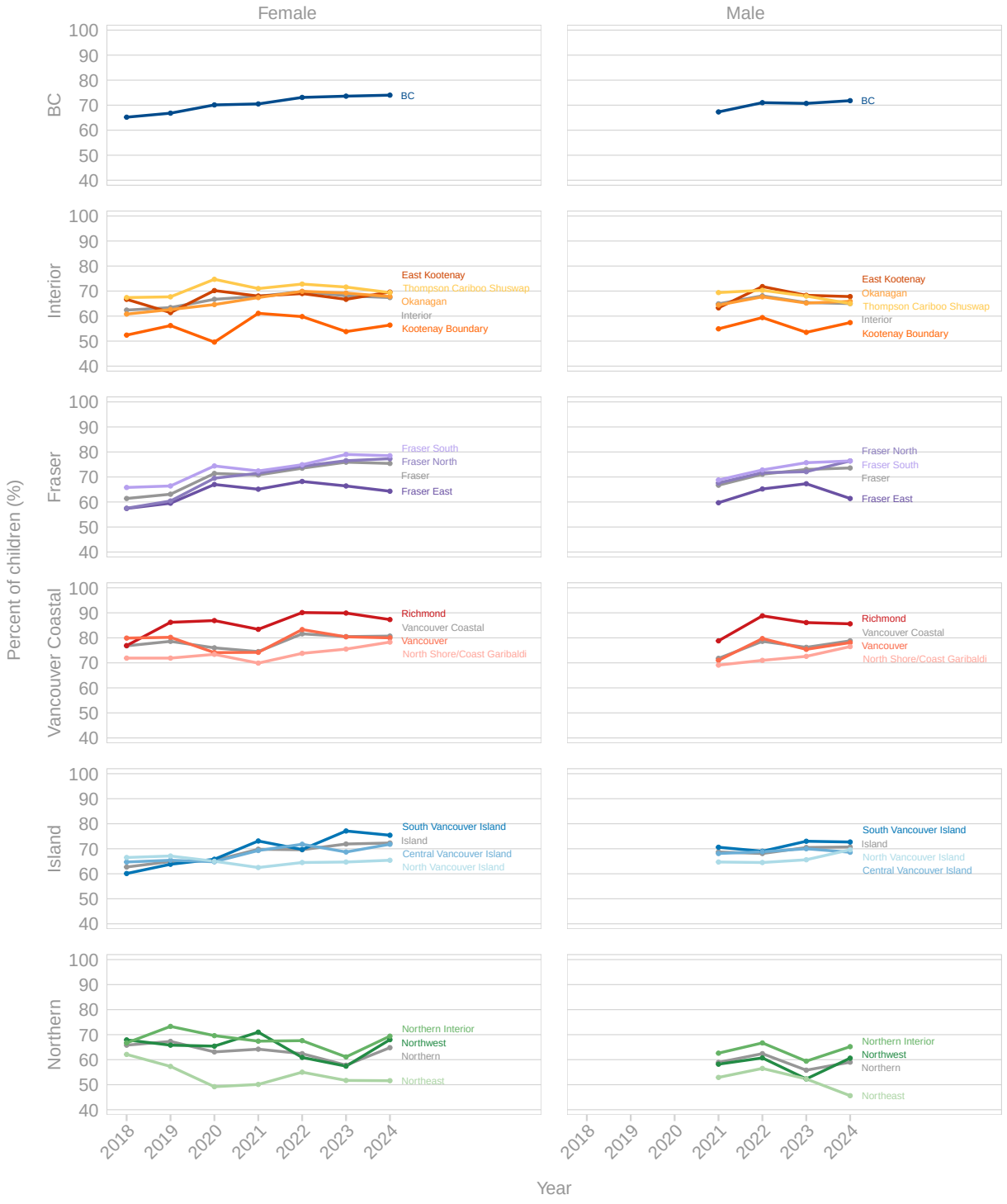


Note: The y−axis for this figure starts at 40% for clearer data visualization. Assessment of HPV coverage in grade 9 males began in 2021. The data presented in this figure do not include individuals where gender is reported as undifferentiated or unknown. See 'Other data notes', pg 27.

Figure 16. HPV coverage by year, health authority and sex, Grade 9 students, British Columbia

Note: The data presented in this figure do not include individuals where gender is reported as undifferentiated or unknown. See 'Other data notes', pg 27.

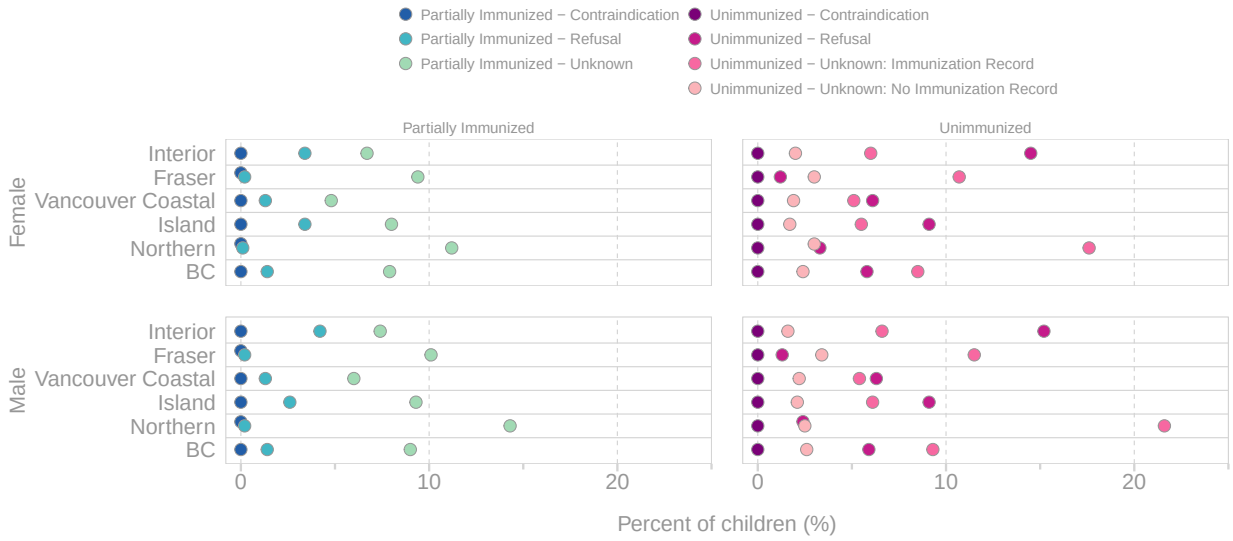
Figure 17. HPV initiation or series completion coverage by geographic region and sex, Grade 9 students, British Columbia, 2024



Note: The y−axis for this figure starts at 40% for clearer data visualization. Assessment of HPV coverage in grade 9 males began in 2021. The data presented in this figure do not include individuals where gender is reported as undifferentiated or unknown. See 'Other data notes', pg 27.

Figure 18. HPV coverage by year, geographic region and sex, Grade 9 students, British Columbia

Reasons for non-immunization



Note: The data presented in this figure do not include individuals where gender is reported as undifferentiated or unknown. See 'Other data notes', pg 27.

Figure 19. Reasons for non-immunization by health authority and sex, HPV, Grade 9 students, British Columbia, 2024

Note: The data presented in this figure do not include individuals where gender is reported as undifferentiated or unknown. See 'Other data notes', pg 27.

Figure 20. Reasons for non-immunization by health service delivery area and sex, HPV, Grade 9 students, British Columbia, 2024

Data Notes

Data Sources

In 2024, coverage estimates for all health authorities are based on records extracted from the Provincial Immunization Registry (PIR) (including records transmitted from regional registry systems) on July 31, 2024.

All doses are recorded in PIR if administered by public health, reported by a parent/guardian to public health (e.g., for children arriving from outside of BC), or if reported by a primary care provider to public health. Additionally, doses administered by pharmacists and entered in PharmaNet are also recorded in PIR. In 2024, coverage estimates are based on immunizations recorded as administered by July 31, 2024; in report years prior to this, coverage reflected doses recorded as administered up to June 30th of the report year.

Data sources used for each of the health authorities have changed over time as follows:

<table>
<tr><th rowspan="2">Health Authority</th><th colspan="10">Year</th></tr>
<tr><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th><th>2020</th><th>2021</th><th>2022</th><th>2023</th><th>2024</th></tr>
<tr><td>IH</td><td colspan="3">Health Authority Summary Reports *</td><td colspan="7">Pan-Grade*</td></tr>
<tr><td>FH</td><td colspan="3">Health Authority Summary Reports</td><td colspan="7">Pan-Grade</td></tr>
<tr><td>VCH</td><td colspan="9">Health Authority Summary Reports</td><td>Pan-Grade</td></tr>
<tr><td>ISLH</td><td colspan="3">Pan-Year/MoE</td><td colspan="7">Pan-Grade</td></tr>
<tr><td>NH</td><td colspan="5">Health Authority Summary Reports</td><td colspan="5">Pan-Grade</td></tr>
</table>

*In 2017, the Rutland Branch in the Okanagan HSDA used Pan-Grade, while the rest of IH used Health Authority Summary Reports.

Data source	Numerator	Denominator
Pan-Grade	Number of children from the denominator who were up-to-date for age for the specified agent(s) by June 30th of the indicated year, based on PIR immunization records.	Number of students with active records in PIR that indicated they were in grade 9 as of June 30th of the school year of interest. For HPV coverage stratified by gender, only the number of female or male students enrolled in grade 9 as of June 30th was used.
Health Authority Summary Reports	Number of children from the denominator who were up-to-date for age for the specified agent(s) by June 30th of the indicated year, usually based on HA records of immunizations given.	Number of students in grade 9 during the school year of interest, usually based on class lists provided by schools. For HPV coverage stratified by gender, only the number of female or male students enrolled in grade 9 as of June 30th was used.

Pan-Year/MoE	Number of children in the birth cohort for which the majority of children attended grade 9 during the school year of interest with active records in PIR who were up-to-date for age for the specified agent(s).	Number of children in the birth cohort of interest attending grade 9 within the health authority, based on estimates derived from BC MoE enrollment statistics

School and grade information is attached to student's records in the PIR in two ways:

- For schools using either the MyEdBC or CIMS information system and who have signed a letter of agreement, information is uploaded from a MoE extract into PIR using a tool called STIX. As of September 2023 and for the 2022/2023 school year, this process included 95% of students in schools registered with the BC MoE. Health authority staff reconcile the school information against the PIR record when discrepancies occur. Efforts to onboard additional schools to MyEdBC continue.
- For schools using other information systems, health authority staff may manually enter or upload school and grade information. The process of adding enrollment details may not be completed for all health authorities and grades. Most health authorities prioritize milestone grades (kindergarten, grade 6 and grade 9) and a small number of schools may not make their class lists available.

The use of different data sources for numerators and denominators can impact coverage rates and comparability of data across years:

- IH (2013-2014), ISLH (2013-2015), and FH (2013-2017): These regions were unable to routinely ascertain completion of the primary series for tetanus/diphtheria and pertussis. Therefore, the numbers reported represent the proportions of students enrolled in grade 9 as of June 30 who received any tetanus/diphtheria- or pertussis-containing vaccine within the past five years and by June 30, regardless of whether the primary series was complete.
- ISLH (2014-2017): Due to the use of different data sources for numerator and denominator, ISLH results and the corresponding provincial data for 2014 to 2017, are not directly comparable to previous or later years. Related to implementation of the Panorama public health information system in July 2013, ISLH was unable to reconcile all records of students enrolled in schools. Therefore, coverage was calculate using numerator data from Panorama on active records for those born in 2002 (for 2014), 2003 (for 2015), 2004 (for 2016) and 2005 (for 2017) without the ability to confirm school/grade 9 enrolment; denominators were aggregate data from the BC MoE's data on enrolment in grade 9 to attempt to account for those who have moved out of ISLH. As different data sources were used for the numerators and denominators, immunization coverage rates approaching 100% in ISLH from 2014-2017 are likely over-estimates. This artifact was rectified when the same data source was used for numerators and denominators.
- IH: Due to the difference in methods used to calculate coverage in the Rutland branch in the Okanagan HSDA in 2017, the Okanagan and IH results, and corresponding provincial data for 2017 are not directly comparable to previous years.
- IH, ISLH, FH, NH, VCH: Due to changes in data sources used to calculate coverage in IH, ISLH, and FH from 2018, NH from 2020, and VCH from 2024, the corresponding provincial data are not directly comparable to previous years.

Cohort

The grade 9 cohort is defined as students whose records indicated they attended school within the region's service area based on Ministry of Education enrolment data as recorded in the online MyEdBC system and on students records obtained from schools not participating in MyEdBC. When using PIR data, students were included in the numerator and denominator if they had a value of 'Grade 9', 'Home Schooled', or Secondary ungraded' in the Grade variable, and met the required birth date range. For the 2024 report, students in 'Grade 9' were included when born between January 1, 2008 and December 31, 2010, while students 'Home Schooled' or in 'Secondary ungraded' were included when born between January 1, 2009 and December 31, 2009.

Coverage reported for any given year reflects children enrolled in grade 9 as of June 30th (e.g., 2024 results are for children enrolled in grade 9 as of June 30, 2024).

Calculations

All analyses were conducted using business rules which calculated ages and time intervals at receipt of immunization. Each dose was counted as a valid dose only if given at or after the earliest eligible age and/or at a time interval greater than or equal to the shortest acceptable interval. Beginning in 2024, coverage reported for any given year reflects doses recorded as administered up to July 31 of that year (e.g., 2024 coverage is for doses administered by July 31, 2024). Prior to 2024, coverage reported reflected doses recorded as administered up to June 30th of that report year.

For HPV, data are shown for series completion, and series initiation but not completion; these categories are mutually exclusive. Where stratified by gender, the HPV coverage denominator includes the number of female or male students enrolled in grade 9.

Coverage results by health authority and HSDA are reported based on the location of the child's school.

Limitations

Data included in this report need to be interpreted with caution for the following reasons:

- All calculations are based on vaccine doses recorded in the provincial immunization registry or regional clinical systems and school enrollment records maintained by regional health authorities using electronic enrollment records from the Ministry of Education, or records received directly from schools. To be considered up-to-date for age, documentation of every dose in an immunization registry (PIR) or clinical system (PARIS) is required. Doses administered by providers other than public health and not reported to public health or the registry, including doses administered outside of BC to newly arrived students whose records have not yet been received by public health, may not be documented in the registry. All regions make their best efforts to obtain vaccination records pertaining to immunizations given by providers other than public health.
- There can be a delay in obtaining immunization records, which can result in delay of data entry.
- First Nations children may not be completely captured in the registries. On-reserve birth records and immunizations may not be reported to the regional health authorities.
- The PIR includes the following school types: Alternate, Distance, Distance Learning, Independent, Long Term Program, Self-Directed, Short Term Program, and Standard. Students attending First Nations schools may be under-represented in this dataset because some First Nations schools are not registered with the BC Ministry of Education and are therefore not captured in the provincial list of schools.

- Starting in 2023, international students were excluded from the main immunization coverage analysis and reported separately in the Appendix as there is a larger proportion of missing immunization records among these students. Some schools do not provide information allowing for separation of non-international and international students, and as such, some international students may continue to be included in the main (non-international student) analysis.
- Data may not be comparable by HSDA from year to year due to ongoing changes in data collection methods and changes in geographic health area boundaries. However, assuming consistency in reporting practices, overall trends in immunization coverage can be assessed by examining these data.

Definitions

Up-to-date for age

Measure	Definition
Tetanus / Diphtheria	Completed a primary series of tetanus/diphtheria-containing vaccine before ten years of age and received a tetanus/diphtheria booster dose on or after the tenth birthday, or completed a primary series of tetanus/diphtheria-containing vaccine on or after the tenth birthday.
Pertussis	Completed a primary series of pertussis-containing vaccine before ten years of age and received an acellular pertussis booster dose on or after the tenth birthday, or completed a primary series of acellular pertussis-containing vaccine on or after the tenth birthday.
Meningococcal Quadrivalent Conjugate	At least 1 dose of meningococcal quadrivalent conjugate vaccine in grade 7 or later.
HPV (up-to-date/series completion)	If given between 9 to 14 years of age, 2 doses of HPV vaccine (with at least 5 months between doses); if given at age 15+, 3 doses of HPV vaccine (with at least 4 weeks between doses 1 and 2 and at least 12 weeks between doses 2 and 3, and at least 24 weeks between doses 1 and 3).
HPV (series initiation, but not completion)	At least 1 dose of HPV vaccine, but did not complete a 2-dose or 3-dose series.

Reasons for non-immunization

Measure	Definition
Partially Immunized with Contraindication	*For agents/antigens requiring more than one dose.* For the agent/antigen of interest that has received at least one valid dose and has an active contraindication recorded prior to June 30th.
Partially Immunized with Refusal	*For agents/antigens requiring more than one dose.* For the agent/antigen of interest, does not meet any of the previous definitions and has received at least one valid dose and has an active or inactive refusal recorded prior to vaccine administration cutoff date.

Partially Immunized - Unknown	*For agents/antigens requiring more than one dose.* For the agent/antigen of interest, does not meet any of the previous definitions and has received at least one valid dose. **Note:** These children may have invalid doses or inactive refusals, exemptions, or contraindications for the agent/antigen of interest. They may also have valid/invalid doses or active or inactive refusals, exemptions, or contraindications that do not apply to the agent/antigen of interest, or no recorded refusals, exemptions, or contraindications for any agent/antigen.
Unimmunized with Contraindication	For the agent/antigen of interest, does not meet any of the previous definitions and has no recorded valid dose(s) and has an active contraindication recorded prior to June 30th.
Unimmunized with Refusal	For the agent/antigen of interest, does not meet any of the previous definitions and has no recorded valid dose(s) and has an active or inactive refusal recorded prior to vaccine administration cutoff date.
Unimmunized - Unknown	For the agent/antigen of interest, does not meet any of the previous definitions and has no recorded valid dose(s) at any time up to/including the data extract date. **Note:** These children may have invalid doses or inactive refusals, exemptions, or contraindications for the agent/antigen of interest. They may also have valid/invalid doses or active/inactive refusals, exemptions, or contraindications that do not apply to the agent/antigen of interest, or no recorded refusals, exemptions, or contraindications for any agent/antigen.
2024 report:	
Unimmunized – Unknown: Immunization Record	Meets the ’Unimmunized - Unknown’ definition and has recorded invalid doses or inactive contraindications or exemptions for the agent/antigen of interest or has active or inactive refusals, contraindications or exemptions that do not apply to the agent/antigen of interest at any time up to/including the data extract date. The antigens considered include diphtheria, tetanus, pertussis, polio, hepatitis B, meningococcal C, measles, mumps, rubella, varicella, and human papillomavirus.
Unimmunized – Unknown: No Immunization Record	Meets the ’Unimmunized - Unknown’ definition and has no recorded valid or invalid doses or active or inactive refusals, exemptions, or contraindications for any of diphtheria, tetanus, pertussis, polio, hepatitis B, meningococcal C, measles, mumps, rubella, varicella, and human papillomavirus.

Minimum Intervals and Ages Between Doses

Antigen/Agent	Minimum Age or Minimum Time Interval Between Eligible Doses			
	Dose 1[A]	Dose 2	Dose 3	Dose 4
Tetanus/Diphtheria and Pertussis				
Series started at any age	42 days	28 days	28 days	24 weeks[B]
Dose 1 received after 1 year and dose 3 after 10 years of age	1 year	28 days	24 weeks[C]	
Meningococcal Quadrivalent Conjugate	11 years + 8 months			
HPV				
2 dose schedule (for dose 1 given age 9 to 14)	9 years	150 days		
3 dose schedule (for dose 1 given age 15+)	15 years	28 days	12 weeks[D]	

A. Dose 1 refers to the earliest age a child can receive the initial dose.
B. Most children immunized according to BC schedule would have received 6 doses. To be considered up-to-date, the last dose must be received on or after 10 years of age.
C. To be considered up-to-date, dose 3 must be received on or after 10 years of age.
D. Dose 3 must be given at least 24 weeks after dose 1.

Other data notes

New changes to the 2024 grade 9 immunization coverage report:

- Coverage estimates are based on immunization doses recorded as administered by July 31, 2024. In prior years, coverage estimates reflected doses recorded as administered up to June 30th of the report year.

Historical changes to the grade 9 immunization coverage report:

- Starting in 2023, analyses for grade 9 students were stratified by international student status and reported separately in the appendix.
- In 2015, one school in the Kootenay Boundary HSDA did not provide public health with grade 9 class lists. As the children attending this school could not be identified, they could not be included in the immunization coverage analysis. Based on information posted on the BC MoE's website, this school accounted for approximately 0.9% of grade 9 students in Kootenay Boundary.
- In the 2014/2015 school year, due to program changes HPV coverage statistics could not be obtained for three schools in Fraser East, eleven schools in Fraser South, and three schools in Okanagan. These schools account for approximately 13%, 27%, and 36% of grade 9 girls in Fraser East, Fraser South, and Okanagan, respectively.

Immunization program and coverage assessment rule changes:

COVID-19 pandemic impacts：

- In the 2021/2022 school year, school-based clinics were offered in all HAs with some providing catch-ups for grade 10 students to receive the grade 9 milestone vaccines. Ongoing catch-up was offered during subsequent years, as required. Where coverage has not returned to pre-pandemic levels it may reflect ongoing operational impacts of the COVID-19 response (e.g., increases in absenteeism among school children due to illness, lack of staffing resources in remote and rural areas, or competing priorities in public health departments) or changes in data sources between pre- and post-pandemic periods.
- In the 2020/2021 school year, ongoing prioritization of the COVID-19 pandemic response affected some public health resources available for school-based immunization programs. This was most significant in FH, which did not complete any school-based clinics in the 2020/2021 school year. As a result, some coverage rates were lower in 2021 than previous years.
- In March 2020, the COVID-19 pandemic was declared and initially resulted in a province-wide shut down that impacted the provision of public health services including routine immunization services.

Meningococcal quadrivalent vaccine：

- In 2017, the meningococcal quadrivalent conjugate vaccine program for grade 9 students was implemented. Some parents are believed to have refused the vaccine for their children, thinking it was the same as the meningococcal C conjugate vaccine the children received in grade 6.

PIR notes:

- Due to ongoing development of the interface between the FH information system and PIR, supplementary information on reasons for non-immunization (e.g., exemptions, refusals and contraindications) is not complete. Therefore, the proportion of partially immunized and unimmunized grade 9 students with unknown reasons for non-immunization is likely to be overestimated. The number of children partially immunized or unimmunized due to refusals or contraindications would be underestimated.

- The gender variable in the PIR contains the following values: Male, Female, Undifferentiated, and Unknown. For the purpose of this report, only stratified coverage for males and females were reported in the HPV figures as the proportion of those in the Undifferentiated and Unknown categories comprise <0.01% of the total population. Those in the Undifferentiated and Unknown categories are included in the figures and supplementary data tables that report coverage values for the total population.
- International students who attend school in BC are classified into two categories in the PIR based on their length of stay: 1) short stay (<6 months) and 2) long stay (≥6 months). HAs attempt to collect immunization records for all long stay students in the province, however the length of stay is unknown for the majority of international students in the registry. Thus, immunization records may be incomplete for international students and coverage is likely underestimated for this population. Because of this, coverage for international students is reported on separately in the appendix.

Appendix

International student immunization coverage

Table A1. Percent of grade 9 international students up-to-date for diphtheria/tetanus, pertussis, and meningococcal quadrivalent, 2024.

		Tetanus/Diphtheria		Pertussis		Meningococcal quadrivalent	
Geography	**Population**	**Count**	**%**	**Count**	**%**	**Count**	**%**
BC	4,201	1,789	42.6	1,758	41.8	2,147	51.1
Interior	252	93	36.9	90	35.7	113	44.8
East Kootenay	18	4	22.2	4	22.2	3	16.7
Kootenay Boundary	14	7	50.0	7	50.0	8	57.1
Okanagan	169	56	33.1	54	32.0	74	43.8
Thompson Cariboo Shuswap	51	26	51.0	25	49.0	28	54.9
Fraser	2,150	855	39.8	844	39.3	1,126	52.4
Fraser East	263	56	21.3	56	21.3	91	34.6
Fraser North	839	392	46.7	389	46.4	468	55.8
Fraser South	1,048	407	38.8	399	38.1	567	54.1
Vancouver Coastal	1,198	665	55.5	655	54.7	718	59.9
Richmond	256	176	68.8	173	67.6	182	71.1
Vancouver	634	346	54.6	340	53.6	378	59.6
North Shore/Coast Garibaldi	308	143	46.4	142	46.1	158	51.3
Island	548	153	27.9	146	26.6	162	29.6
South Vancouver Island	362	114	31.5	111	30.7	123	34.0
Central Vancouver Island	93	29	31.2	25	26.9	27	29.0
North Vancouver Island	93	10	10.8	10	10.8	12	12.9
Northern	53	23	43.4	23	43.4	28	52.8
Northwest	8	2	25.0	2	25.0	6	75.0
Northern Interior	31	18	58.1	18	58.1	19	61.3
Northeast	14	3	21.4	3	21.4	3	21.4

Table A2. Percent of grade 9 international students who have completed or initiated a HPV series, by sex, 2024.

	Female					Male				
		HPV series completion		HPV series initiation but not completion			HPV series completion		HPV series initiation but not completion	
Geography	**Population**	**Count**	**%**	**Count**	**%**	**Population**	**Count**	**%**	**Count**	**%**
BC	2,023	637	31.5	455	22.5	2,176	571	26.2	567	26.1
Interior	120	26	21.7	33	27.5	132	26	19.7	29	22.0
East Kootenay	8	0	0.0	2	25.0	10	0	0.0	2	20.0
Kootenay Boundary	9	4	44.4	2	22.2	5	1	20.0	1	20.0
Okanagan	76	16	21.1	19	25.0	93	18	19.4	21	22.6
Thompson Cariboo Shuswap	27	6	22.2	10	37.0	24	7	29.2	5	20.8
Fraser	981	271	27.6	287	29.3	1,168	248	21.2	360	30.8
Fraser East	127	26	20.5	16	12.6	136	20	14.7	27	19.9
Fraser North	398	110	27.6	124	31.2	440	97	22.0	159	36.1
Fraser South	456	135	29.6	147	32.2	592	131	22.1	174	29.4
Vancouver Coastal	598	281	47.0	79	13.2	599	267	44.6	109	18.2
Richmond	133	67	50.4	27	20.3	123	73	59.3	19	15.4
Vancouver	314	156	49.7	31	9.9	320	130	40.6	65	20.3
North Shore/Coast Garibaldi	151	58	38.4	21	13.9	156	64	41.0	25	16.0
Island	297	46	15.5	53	17.8	251	21	8.4	65	25.9
South Vancouver Island	187	31	16.6	34	18.2	175	15	8.6	55	31.4
Central Vancouver Island	59	8	13.6	14	23.7	34	5	14.7	9	26.5
North Vancouver Island	51	7	13.7	5	9.8	42	1	2.4	1	2.4
Northern	27	13	48.1	3	11.1	26	9	34.6	4	15.4
Northwest	4	3	75.0	0	0.0	4	1	25.0	1	25.0
Northern Interior	15	8	53.3	2	13.3	16	7	43.8	3	18.8
Northeast	8	2	25.0	1	12.5	6	1	16.7	0	0.0

Note: The data presented in this table do not include individuals where gender is reported as undifferentiated or unknown. See 'Other data notes', pg 27.