



**BC Centre for Disease Control**

An agency of the Provincial Health Services Authority

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# Immunization Coverage in Grade 9 Students

## 2011-2020

May 13, 2021

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## Data Sources and Definitions

### Data Sources

1. As of 2020 for Northern Health Authority (NHA), 2018 for Fraser Health Authority (FHA), Vancouver Island Health Authority (VIHA) and Interior Health Authority (IHA) and in 2017 for the Rutland branch in the Okanagan Health Service Delivery Area (HSDA) of IHA: Panorama immunization registry data based on the grade cohort defined as students whose Panorama records indicated they attended grade 6 at a school within the region's service area.
2. For Vancouver Island Health Authority (VIHA) in 2014 to 2017: Panorama immunization registry and enrolment estimates from the BC Ministry of Education (BC MoE).
3. For all other health regions and years: summary reports by HSDAs and/or Health Authorities.

Coverage reported for any given year reflects coverage as of June 30 of that year (e.g., 2020 coverage is for students completing grade 9 by June 30, 2020).

Coverage presented in this report is based on reporting to September 30, 2020.

### Up-to-date for Age Definitions

Tetanus / Diphtheria	The proportion of students enrolled in grade 9 as of June 30 who 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 and by June 30, or completed a primary series of tetanus/diphtheria-containing vaccine on or after the tenth birthday and by June 30. (See <a href="#">Note #3</a> )
Pertussis	The proportion of students enrolled in grade 9 as of June 30 who 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 and by June 30, or completed a primary series of acellular pertussis-containing vaccine on or after the tenth birthday and by June 30. (See <a href="#">Note #3</a> )
Meningococcal Quadrivalent Conjugate Vaccine	The proportion of students enrolled in grade 9 as of June 30 who received at least one dose of meningococcal quadrivalent conjugate vaccine in grade 7 or later.
Human Papillomavirus	The proportion of female students enrolled in grade 9 as of June 30 that was up-to-date for age for Human Papillomavirus vaccine (HPV) by June 30.

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, or at a time interval equal to or greater than the shortest recommended interval.

See: [Minimum Intervals between Eligible Doses](#)

### Caution

Data in this report should be interpreted with caution. Please refer to the [Notes](#) for additional information.

## Grade 9 Students with Up-to-date Immunizations: Tetanus/Diphtheria

HEALTH AUTHORITY / HEALTH SERVICE DELIVERY AREA	YEAR									
	2011	2012	2013	2014*	2015*	2016*	2017*	2018*	2019*	2020*
<b>INTERIOR *</b>	<b>86.3%</b>	<b>83.8%</b>	<b>83.4%</b>	<b>82.2%</b>	<b>81.0%</b>	<b>83.0%</b>	<b>82.4%</b>	<b>75.5%</b>	<b>78.0%</b>	<b>76.9%</b>
East Kootenay	89.4%	91.0%	87.7%	82.8%	85.0%	89.1%	87.7%	78.4%	80.5%	83.2%
Kootenay Boundary	83.0%	81.1%	82.0%	77.9%	74.3%	79.2%	75.4%	69.2%	73.5%	64.9%
Okanagan	83.8%	78.5%	78.8%	78.8%	78.0%	78.5%	81.2%	73.5%	76.9%	75.1%
Thompson Cariboo Shuswap	90.0%	90.5%	89.4%	88.2%	86.9%	89.6%	84.7%	79.9%	80.3%	81.7%
<b>FRASER *</b>	<b>88.3%</b>	<b>85.4%</b>	<b>84.6%</b>	<b>84.3%</b>	<b>79.0%</b>	<b>82.1%</b>	<b>80.8%</b>	<b>60.7%</b>	<b>63.9%</b>	<b>70.4%</b>
Fraser East	87.5%	80.3%	83.7%	84.4%	75.9%	79.4%	78.7%	66.8%	68.4%	68.1%
Fraser North	84.6%	85.2%	81.1%	83.4%	75.0%	79.9%	78.4%	57.8%	58.4%	68.8%
Fraser South	91.3%	87.6%	87.5%	85.0%	83.0%	84.7%	83.2%	60.6%	66.1%	72.3%
<b>VANCOUVER COASTAL</b>	<b>85.4%</b>	<b>85.2%</b>	<b>82.4%</b>	<b>84.5%</b>	<b>83.9%</b>	<b>83.4%</b>	<b>84.2%</b>	<b>84.2%</b>	<b>85.3%</b>	<b>83.6%</b>
Richmond	93.6%	93.5%	93.3%	94.8%	93.4%	90.1%	89.8%	91.5%	92.9%	92.5%
Vancouver	80.3%	83.8%	85.5%	86.5%	85.5%	84.5%	84.6%	84.4%	85.3%	82.1%
North Shore / Coast Garibaldi	87.7%	82.3%	69.8%	75.1%	75.6%	77.5%	80.4%	79.9%	81.1%	81.4%
<b>VANCOUVER ISLAND *</b>	<b>87.0%</b>	<b>83.5%</b>	<b>80.6%</b>	<b>73.4%</b>	<b>73.6%</b>	<b>75.8%</b>	<b>71.8%</b>	<b>70.1%</b>	<b>73.0%</b>	<b>74.3%</b>
South Vancouver Island	88.2%	85.3%	81.7%	71.1%	72.6%	78.7%	72.7%	69.0%	72.3%	74.3%
Central Vancouver Island	84.6%	81.9%	80.2%	75.8%	74.9%	73.0%	69.5%	70.4%	73.6%	74.6%
North Vancouver Island	88.8%	82.0%	78.3%	74.3%	73.6%	74.0%	74.2%	72.7%	74.2%	73.4%
<b>NORTHERN *</b>	<b>90.7%</b>	<b>90.1%</b>	<b>87.8%</b>	<b>85.6%</b>	<b>83.6%</b>	<b>87.5%</b>	<b>86.3%</b>	<b>84.7%</b>	<b>83.5%</b>	<b>70.9%</b>
Northwest	91.5%	91.5%	86.6%	86.5%	91.5%	91.0%	87.0%	85.6%	81.1%	70.0%
Northern Interior	90.5%	89.4%	92.0%	86.6%	83.9%	87.8%	88.7%	87.5%	84.1%	72.6%
Northeast	90.4%	89.9%	79.8%	82.2%	74.3%	83.2%	80.7%	78.3%	84.4%	68.7%
<b>BRITISH COLUMBIA *</b>	<b>87.2%</b>	<b>85.2%</b>	<b>83.6%</b>	<b>82.3%</b>	<b>79.9%</b>	<b>81.9%</b>	<b>80.8%</b>	<b>70.8%</b>	<b>73.1%</b>	<b>74.9%</b>

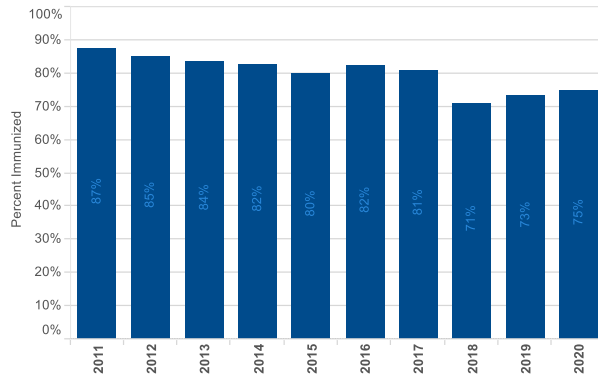
Tetanus/diphtheria uptake was assessed in 2002 onward. Data for 2005-2020 are available in the BCCDC [Childhood Immunization Coverage Dashboard](#). Data for 2002-2004 are available in previous coverage reports.

\* The 2014-2020 estimates for BC and some of the Health Authorities are not directly comparable to previous years. See [Notes](#).

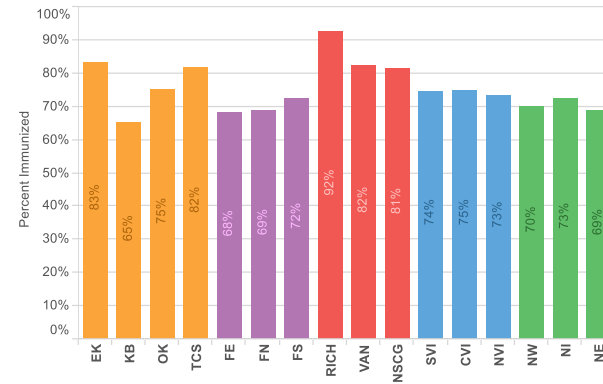
When compared to 2019 results, tetanus/diphtheria coverage in grade 9 students in 2020 increased dramatically in Fraser Health Authority. Vancouver Island Health Authority had a small increase, while decreases were observed in the Interior, Vancouver Coastal and Northern Health Authorities. Prior to 2018, Fraser Health was unable to routinely ascertain completion of the primary series and coverage results represented grade 9 students who received a dose of tetanus/diphtheria-containing vaccine in grade 9, regardless of whether a primary series had been completed. Starting in 2018, only grade 9 students who completed a primary series and received their grade 9 booster were counted. This likely explains the apparent drop in tetanus/diphtheria coverage in Fraser Health Authority in 2018. The increase in 2020 may reflect improved data on primary series completion. Redirection of public health resources from routine immunization programs to the COVID-19 pandemic response did not appear to impact tetanus/diphtheria coverage rates, likely because this booster dose was administered earlier in the school year, prior to the start of the pandemic. Rates and trends varied by Health Service Delivery Area, with 2020 tetanus/diphtheria coverage rates ranging from 64.9% to 92.5%.

### Grade 9 Students Immunized Tetanus/Diphtheria Vaccine, British Columbia

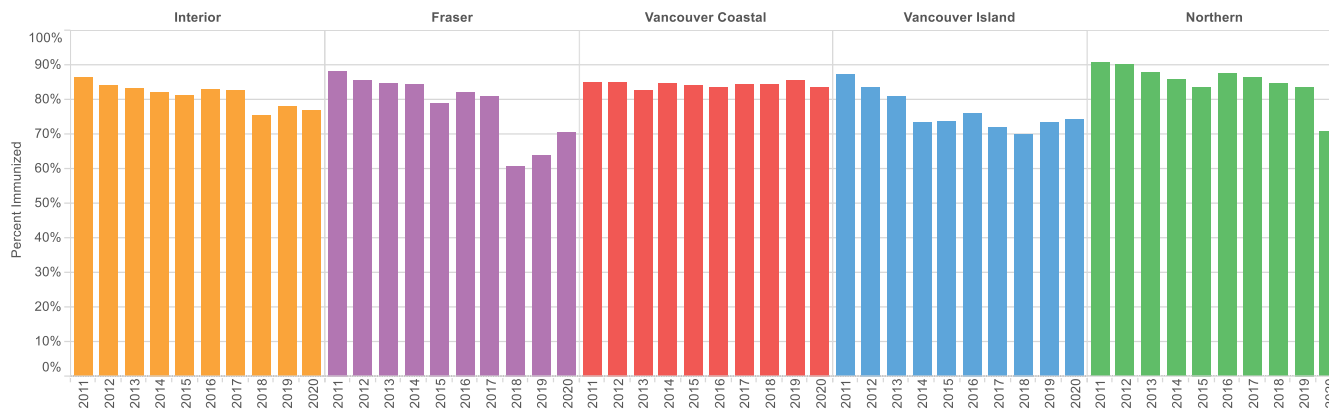
All British Columbia, by Year



By Health Service Delivery Area, 2020



By Health Authority and Year



## Grade 9 Students with Up-to-date Immunizations: Pertussis

HEALTH AUTHORITY / HEALTH SERVICE DELIVERY AREA	YEAR									
	2011	2012	2013	2014*	2015*	2016*	2017*	2018*	2019*	2020*
<b>INTERIOR *</b>	<b>85.6%</b>	<b>82.8%</b>	<b>81.4%</b>	<b>80.5%</b>	<b>80.3%</b>	<b>79.8%</b>	<b>80.5%</b>	<b>75.3%</b>	<b>77.7%</b>	<b>76.7%</b>
East Kootenay	88.5%	89.8%	84.3%	81.5%	84.6%	85.0%	85.9%	78.2%	80.3%	82.9%
Kootenay Boundary	80.8%	78.6%	79.6%	73.7%	72.2%	73.8%	72.1%	69.0%	72.3%	64.0%
Okanagan	83.4%	78.0%	77.1%	77.8%	77.7%	76.1%	79.4%	73.4%	76.7%	74.9%
Thompson Cariboo Shuswap	89.4%	89.3%	87.6%	86.4%	86.1%	86.2%	83.2%	79.7%	80.2%	81.5%
<b>FRASER *</b>	<b>85.1%</b>	<b>83.5%</b>	<b>81.6%</b>	<b>79.1%</b>	<b>78.4%</b>	<b>80.1%</b>	<b>79.4%</b>	<b>60.6%</b>	<b>63.8%</b>	<b>70.2%</b>
Fraser East	81.4%	78.5%	74.0%	73.8%	73.2%	73.8%	75.2%	66.8%	68.4%	68.0%
Fraser North	84.5%	82.9%	80.2%	77.5%	74.8%	78.6%	77.6%	57.7%	58.3%	68.7%
Fraser South	86.9%	85.8%	85.5%	82.1%	82.8%	83.5%	82.2%	60.4%	66.0%	72.1%
<b>VANCOUVER COASTAL</b>	<b>84.3%</b>	<b>84.5%</b>	<b>81.8%</b>	<b>84.0%</b>	<b>83.3%</b>	<b>82.9%</b>	<b>83.9%</b>	<b>83.9%</b>	<b>85.0%</b>	<b>83.3%</b>
Richmond	93.3%	93.3%	93.0%	94.7%	93.2%	90.0%	89.5%	91.1%	92.6%	92.4%
Vancouver	79.8%	83.3%	85.1%	86.2%	85.1%	84.1%	84.3%	84.1%	85.0%	81.8%
North Shore / Coast Garibaldi	86.5%	81.0%	68.8%	74.1%	74.5%	76.7%	79.9%	79.5%	80.6%	81.0%
<b>VANCOUVER ISLAND *</b>	<b>85.9%</b>	<b>82.4%</b>	<b>79.2%</b>	<b>72.9%</b>	<b>73.1%</b>	<b>75.4%</b>	<b>71.5%</b>	<b>69.9%</b>	<b>72.7%</b>	<b>73.9%</b>
South Vancouver Island	87.2%	84.1%	79.3%	71.0%	72.3%	78.4%	72.4%	68.8%	71.9%	73.9%
Central Vancouver Island	84.1%	81.1%	80.0%	75.2%	74.2%	72.5%	69.2%	70.2%	73.1%	74.2%
North Vancouver Island	86.6%	80.4%	77.1%	73.0%	73.1%	73.0%	73.9%	72.6%	73.9%	73.1%
<b>NORTHERN *</b>	<b>89.7%</b>	<b>88.9%</b>	<b>86.4%</b>	<b>84.7%</b>	<b>82.5%</b>	<b>82.3%</b>	<b>83.6%</b>	<b>82.5%</b>	<b>83.1%</b>	<b>70.6%</b>
Northwest	90.8%	90.5%	85.8%	84.3%	89.1%	81.6%	82.0%	83.7%	80.5%	69.7%
Northern Interior	89.5%	87.7%	89.8%	86.1%	83.2%	85.3%	86.0%	84.6%	83.9%	72.4%
Northeast	89.0%	89.9%	79.8%	81.9%	74.1%	77.1%	80.4%	76.9%	84.2%	68.5%
<b>BRITISH COLUMBIA *</b>	<b>85.5%</b>	<b>83.8%</b>	<b>81.6%</b>	<b>79.8%</b>	<b>79.3%</b>	<b>80.1%</b>	<b>79.6%</b>	<b>70.5%</b>	<b>72.9%</b>	<b>74.9%</b>

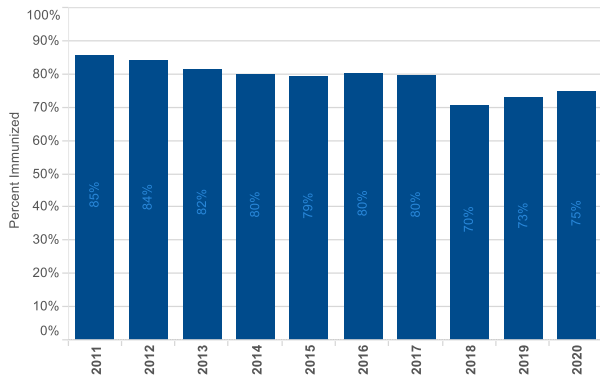
Pertussis uptake was assessed in 2004 onward. Data for 2005-2020 are available in the BCCDC [Childhood Immunization Coverage Dashboard](#). Data for 2004 are available in previous coverage reports.

\* The 2014-2020 estimates for BC and some of the Health Authorities are not directly comparable to previous years. See [Notes](#).

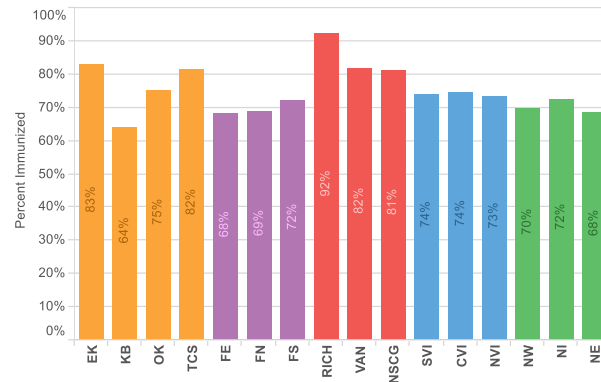
When compared to 2019 results, pertussis coverage in grade 9 students in 2020 increased dramatically in Fraser Health Authority. Vancouver Island Health Authority had a small increase, while decreases were observed in the Interior, Vancouver Coastal and Northern Health Authorities. Prior to 2018, Fraser Health was unable to routinely ascertain completion of the primary series and coverage results represented grade 9 students who received a dose of pertussis-containing vaccine in grade 9, regardless of whether a primary series had been completed. Starting in 2018, only grade 9 students who completed a primary series and received their grade 9 booster were counted. This likely explains the apparent drop in pertussis coverage in Fraser Health Authority in 2018. The increase in 2020 may reflect improved data on primary series completion. Redirection of public health resources from routine immunization programs to the COVID-19 pandemic response did not appear to impact pertussis coverage rates, likely because this booster dose was administered earlier in the school year, prior to the start of the pandemic. Rates and trends varied by Health Service Delivery Area, with 2020 pertussis coverage rates ranging from 64.0% to 92.4%.

### Grade 9 Students Immunized Pertussis Vaccine, British Columbia

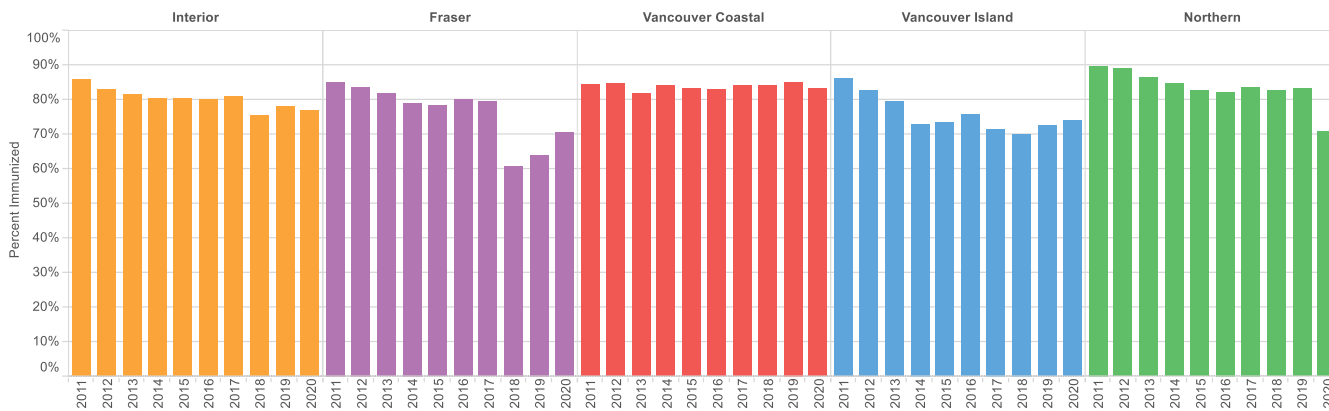
All British Columbia, by Year



By Health Service Delivery Area, 2020



By Health Authority and Year



## Grade 9 Students with Up-to-date Immunizations: Meningococcal Quadrivalent Conjugate Vaccine

HEALTH AUTHORITY / HEALTH SERVICE DELIVERY AREA	YEAR			
	2017	2018*	2019*	2020*
<b>INTERIOR *</b>	<b>80.0%</b>	<b>81.4%</b>	<b>80.2%</b>	<b>77.6%</b>
East Kootenay	86.0%	78.9%	81.2%	82.4%
Kootenay Boundary	70.4%	69.8%	74.5%	63.9%
Okanagan	79.0%	84.7%	80.1%	76.9%
Thompson Cariboo Shuswap	82.7%	81.0%	81.9%	81.7%
<b>FRASER *</b>	<b>76.2%</b>	<b>74.2%</b>	<b>76.2%</b>	<b>77.0%</b>
Fraser East	74.0%	72.3%	73.7%	70.6%
Fraser North	77.8%	75.2%	72.1%	75.9%
Fraser South	75.9%	74.2%	80.1%	80.3%
<b>VANCOUVER COASTAL</b>	<b>87.8%</b>	<b>86.8%</b>	<b>87.6%</b>	<b>83.6%</b>
Richmond	91.3%	92.4%	93.9%	92.2%
Vancouver	87.9%	87.4%	88.2%	82.6%
North Shore / Coast Garibaldi	85.3%	82.5%	83.2%	80.8%
<b>VANCOUVER ISLAND *</b>	<b>73.7%</b>	<b>71.3%</b>	<b>74.5%</b>	<b>74.8%</b>
South Vancouver Island	75.5%	70.4%	73.7%	75.4%
Central Vancouver Island	71.5%	71.8%	75.5%	76.1%
North Vancouver Island	73.7%	72.9%	74.9%	70.6%
<b>NORTHERN</b>	<b>83.9%</b>	<b>80.4%</b>	<b>82.2%</b>	<b>70.9%</b>
Northwest	86.4%	79.9%	79.2%	69.8%
Northern Interior	84.9%	83.8%	83.7%	72.5%
Northeast	79.2%	74.2%	81.9%	69.2%
<b>BRITISH COLUMBIA *</b>	<b>79.4%</b>	<b>77.8%</b>	<b>79.3%</b>	<b>77.8%</b>

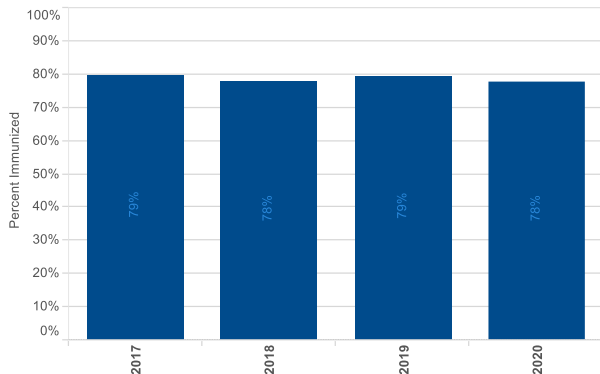
\* The 2018-2020 estimates for BC and some of the Health Authorities are not directly comparable to 2017 estimates. See [Notes](#).

In the fourth year of the meningococcal quadrivalent conjugate vaccine program for grade 9 students, coverage increased slightly in the Fraser and Vancouver Island Health Authorities, and decreased in the Interior, Vancouver Coastal and Northern Health Authorities. Decreases in some regions were due to redirection of public health resources to the COVID-19 pandemic response in the latter part of the school year. Rates and trends varied by Health Service Delivery Area. In 2020, grade 9 meningococcal quadrivalent conjugate vaccine coverage rates by Health Service Delivery Area ranged from 63.9% to 92.2%.

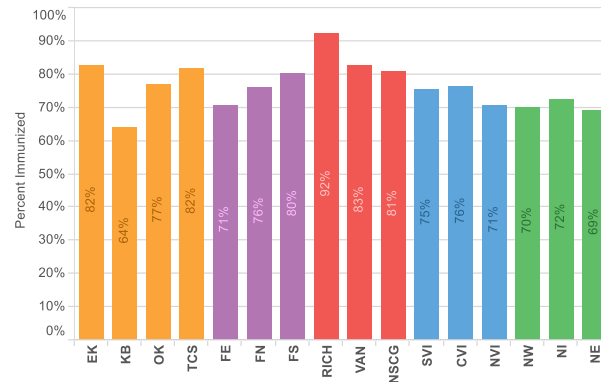


### Grade 9 Students Immunized Meningococcal Quadrivalent Conjugate Vaccine, British Columbia

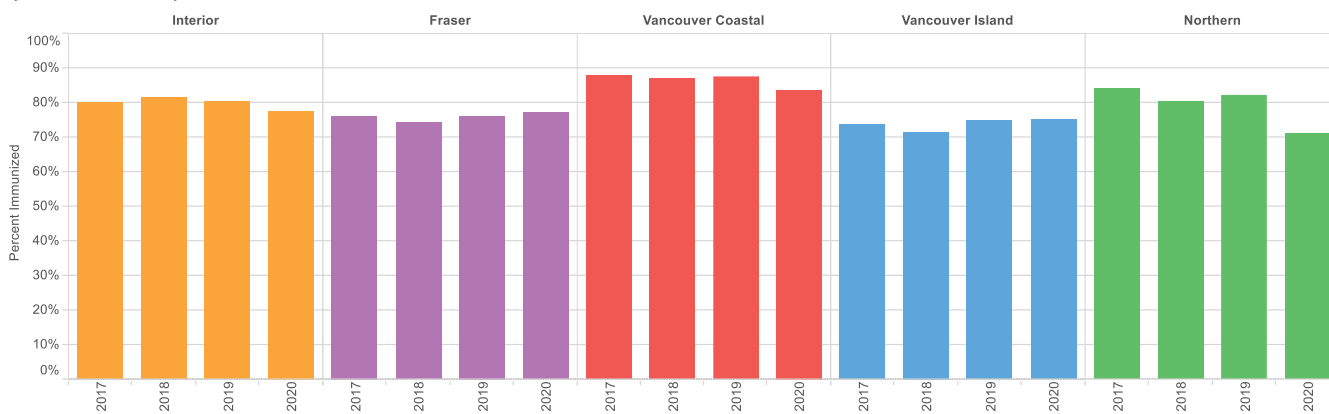
All British Columbia, by Year



By Health Service Delivery Area, 2020



By Health Authority and Year



## Grade 9 Female Students with Up-to-date Immunizations: Human Papillomavirus (HPV)

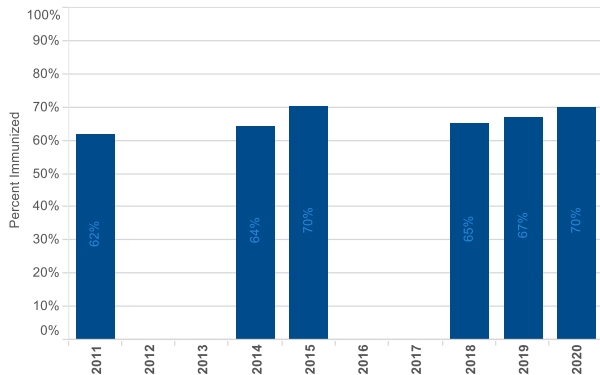
HEALTH AUTHORITY / HEALTH SERVICE DELIVERY AREA	YEAR									
	2011	2012	2013	2014*	2015*	2016	2017	2018*	2019*	2020*
<b>INTERIOR *</b>	<b>62.2%</b>			<b>59.0%</b>	<b>70.0%</b>			<b>62.4%</b>	<b>63.4%</b>	<b>66.7%</b>
East Kootenay	71.2%			67.5%	67.9%			66.7%	61.4%	70.2%
Kootenay Boundary	58.0%			55.4%	58.2%			52.4%	56.2%	49.6%
Okanagan	58.2%			51.6%	67.9%			60.8%	62.6%	64.6%
Thompson Cariboo Shuswap	66.7%			70.0%	77.2%			67.4%	67.7%	74.7%
<b>FRASER *</b>	<b>60.4%</b>			<b>60.7%</b>	<b>64.2%</b>			<b>61.4%</b>	<b>63.1%</b>	<b>71.4%</b>
Fraser East	50.4%			51.1%	63.0%			57.4%	59.5%	67.0%
Fraser North	60.8%			57.8%	60.9%			57.5%	60.4%	69.5%
Fraser South	64.0%			66.3%	68.0%			65.8%	66.4%	74.4%
<b>VANCOUVER COASTAL</b>	<b>66.3%</b>			<b>77.9%</b>	<b>76.7%</b>			<b>76.8%</b>	<b>78.6%</b>	<b>76.0%</b>
Richmond	76.3%			89.6%	77.9%			76.9%	86.2%	85.1%
Vancouver	63.8%			79.1%	80.1%			79.9%	80.2%	75.1%
North Shore / Coast Garibaldi	64.6%			68.6%	70.1%			71.9%	71.9%	72.5%
<b>VANCOUVER ISLAND *</b>	<b>60.8%</b>			<b>60.2%</b>	<b>74.1%</b>			<b>62.7%</b>	<b>64.9%</b>	<b>65.3%</b>
South Vancouver Island	67.8%			60.0%	73.3%			60.1%	63.8%	65.8%
Central Vancouver Island	53.4%			60.8%	74.2%			64.7%	65.4%	64.8%
North Vancouver Island	59.9%			59.6%	76.0%			66.5%	67.1%	65.0%
<b>NORTHERN *</b>	<b>56.6%</b>			<b>64.0%</b>	<b>72.1%</b>			<b>65.8%</b>	<b>67.3%</b>	<b>63.1%</b>
Northwest	62.6%			66.0%	79.6%			67.9%	65.8%	65.4%
Northern Interior	52.8%			63.0%	70.5%			66.7%	73.3%	69.6%
Northeast	58.3%			63.8%	67.3%			62.1%	57.3%	49.2%
<b>BRITISH COLUMBIA *</b>	<b>61.7%</b>			<b>64.3%</b>	<b>70.3%</b>			<b>65.2%</b>	<b>66.8%</b>	<b>70.1%</b>

\* The 2014-2020 estimates for BC and some of the Health Authorities are not directly comparable to previous years. Some schools are not included in the 2015 estimates. See [Notes](#).

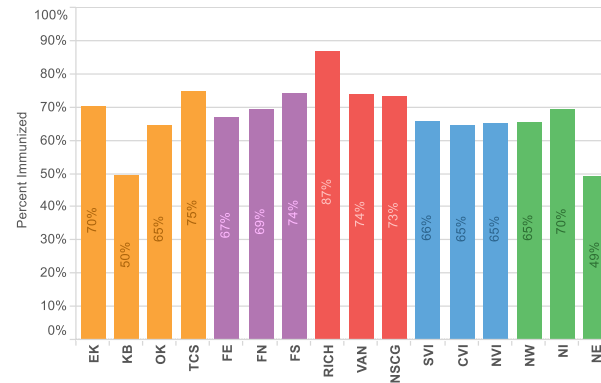
Girls who were in Grade 9 in 2008/09-2010/11 were offered 3 doses of HPV vaccine. Girls who were in Grade 9 in 2011/12 and 2012/13 were offered 3 doses of HPV vaccine in Grade 6 in 2008/09 and 2009/10, respectively. Uptake rates in these groups are included in the Grade 6 results for 2009 and 2010 and were not reassessed in Grade 9. Girls who were in Grade 9 in 2013/14 received 2 doses in Grade 6 and their final (3rd) dose in Grade 9. Completion of three doses was assessed at the end of the 2013/14 school year. In 2014, the HPV program changed such that girls receiving 2 doses at least 150 days apart, with the first dose given before 15 years old, are considered complete. HPV uptake as of the end of grade 9 was assessed in 2015, but not the following two years. This measure was re-implemented in 2018. In 2020, 70.1% of grade 9 girls in BC were up-to-date for HPV. This reflects grade 6 immunization that occurred during the 2016/17 school year (coverage was 66.5%) and catch-up immunization between the end of grade 6 and the end of grade 9. Rates varied by Health Service Delivery Area, ranging from 49.2% to 85.1%.

### Grade 9 Female Students Immunized Human Papillomavirus Vaccine, British Columbia

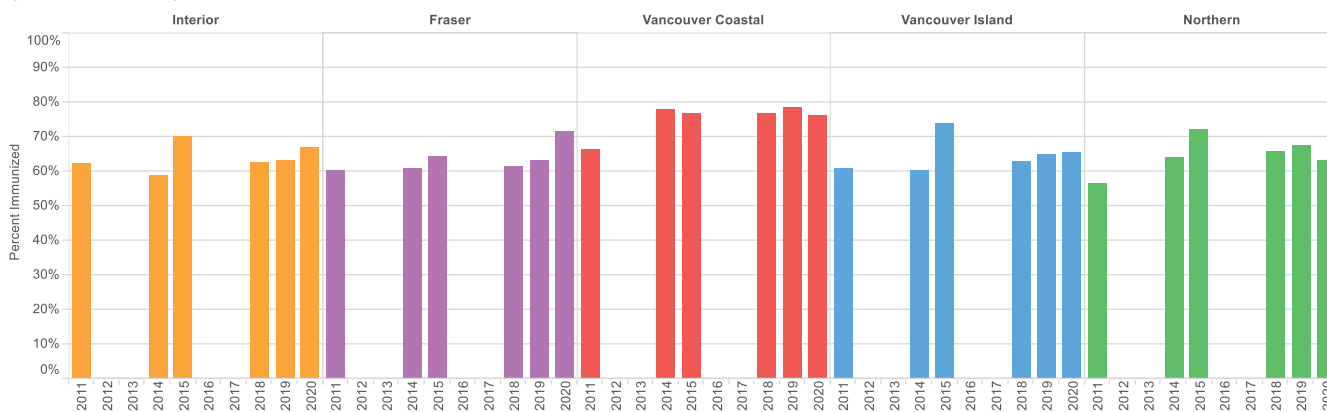
All British Columbia, by Year



By Health Service Delivery Area, 2020



By Health Authority and Year



## Notes

### 1. Changes in Data Sources:

The data sources used for each of the health authorities changed over time as follows:

Health Authority	Year								
	2012 and Earlier	2013	2014	2015	2016	2017	2018	2019	2020
IHA	Health Authority Summary Reports*						Pan-Grade*		
FHA	Health Authority Summary Reports						Pan-Grade		
VCHA	Health Authority Summary Reports								
VIHA	Health Authority Summary Reports	Pan-Year/MoE				Pan-Grade			
NHA	Health Authority Summary Reports								Pan-Grade

**Health Authority Summary Reports:** Health authorities provided summary reports including the number of students in grade 9 and, of those, the numbers up-to-date for each measure. These were usually based on class lists provided by schools and health authority records of immunizations given.

**Pan-Grade:** The Panorama immunization registry records were included for children with active Panorama records that indicated they were in grade 9 as of June 30 of the school year of interest.

**Pan-Year/MoE:** The numerator was the 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 Panorama immunization registry who were up-to-date for the specified agent. The denominator was the number of children in the birth cohort of interest attending grade 9 in schools within the health authority, based on estimates derived from BC Ministry of Education enrolment statistics.

\* In 2017, the Rutland Branch in the Okanagan Health Service Delivery Area used Pan-Grade, while the rest of the Interior Health Authority used Health Authority Summary Reports.

2. The numerator used to calculate percent uptake was the number of students enrolled in grade 9 as of June 30 of the specified year who were up-to-date for age for the vaccine in question (per up-to-date for age definitions).

### 3. Completion of primary series:

Some regions have been unable to routinely ascertain completion of the primary series for tetanus/diphtheria and pertussis. In these regions, 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. The regions unable to completely ascertain primary series completion in tetanus/diphtheria and pertussis were:

Years	Regions
2002-2011	IHA, FHA, VIHA, Northern Health Authority (NHA) and the North Shore Coast Garibaldi (NSCG) Health Service Delivery Area (HSDA)
2012	IHA, FHA, VIHA, and the rural coastal part of NSCG
2013-2014	IHA, FHA, VIHA
2015	FHA, VIHA
2016-2017	FHA

4. Unless otherwise indicated, the denominator used to calculate percent uptake was the number of students enrolled in grade 9 as of June 30 of the specified year, according to class lists. For HPV uptake, only the number of female students enrolled in grade 9 as of June 30 was used.

#### Exceptions:

- a. The Vancouver HSDA (2002-2019), Richmond HSDA (2002-2019), urban region of the North Shore/Coast Garibaldi HSDA (2012-2019) and rural region of the North Shore/Coast Garibaldi HSDA (2013-2019) used grade cohorts as identified in the PARIS immunization registry.
  - b. In 2014-2017, all HSDAs in VIHA used enrolment estimates from the BC MoE.
  - c. The Rutland branch in the Okanagan HSDA (2017) and all of FHA, VIHA and IHA in 2018-2020 and NHA in 2020 used the grade cohorts as identified in the Panorama immunization registry.
5. The COVID-19 pandemic was declared in March 2020. This pandemic initially resulted in a province-wide shut down, which impacted the provision of public health services as well as in-person clinical services by physician providers. As a result, some coverage rates were lower in 2020 than previous years, particularly for the doses scheduled to be received in the last few months of the 2019/20 school year.
  6. Due to the difference in methods used to calculate coverage in FHA, VIHA and IHA in 2018-2020 and NHA in 2020, the FHA, VIHA, IHA, NHA corresponding provincial data are not directly comparable to previous years.
  7. Starting in 2018 for FHA, IHA and VIHA and 2020 for NHA, school and grade information is attached to students' records in the Panorama immunization registry in two ways:
    - a. For schools using either the MyEdBC or the CIMS information systems and who have signed a letter of agreement, information is uploaded from a Ministry of Education extract into Panorama using a tool called STIX. Health authority staff reconciles the school information against the Panorama record.
    - b. For schools using other information systems, health authority staff either manually enters or uploads the school and grade information.

The following school types are included in the Panorama registry: 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.

8. Due to the difference in methods used to calculate coverage in the Rutland branch in the Okanagan HSDA in 2017, the Okanagan and IHA results, and corresponding provincial data for 2017 are not directly comparable to previous years.
9. Due to a difference in methods used for enumerating the numerator and denominator, the VIHA results, and corresponding provincial data for 2014 to 2017 are not directly comparable to previous or later years. Related to implementation of the new public health information system (Panorama) in July 2013, VIHA was unable to reconcile all records of students enrolled in schools; therefore coverage was calculated 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 VIHA. This change has led to inaccurate ascertainment of coverage rates, which may be artefactually higher or lower than true coverage rates depending on the antigen.

School district boundaries do not directly line up with health region boundaries. The BC MoE enrolment data are based on a process that requires the Health Authority to identify schools corresponding to each HSDA. The BC MoE enrolment data exclude youth custody and continuing education schools.

Ideally, numerators and denominators should be taken from the same data source. Using different data sources for numerators and denominators can result in inaccurate results, including coverage calculations exceeding 100%.

As an example of these limitations, when the 2011-2013 coverage estimates for the VIHA HSDAs that were calculated using class list enrolment reconciled against immunization registry for the numerator data and class lists for denominator data were compared to estimates obtained using the methods used in 2014-2017, large differences were identified. For instance, pertussis coverage estimates were 11-21% higher by HSDA and year using the routine methods.

10. In 2017, the first year of the meningococcal quadrivalent conjugate vaccine program for grade 9 students, some parents are believed to have refused the vaccine for their children, thinking it was the same as the meningococcal C conjugate vaccine their children received in grade 6.
11. In 2015, one school in the Kootenay Boundary Health Service Delivery Area 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.
12. Due to HPV program changes in the 2014/15 school year, HPV coverage statistics could not be obtained for three schools in the Fraser East, eleven schools in the Fraser South, and three schools in the Okanagan Health Service Delivery Areas. These schools account for approximately 13%, 27%, and 36% of grade 9 girls in Fraser East, Fraser South, and Okanagan, respectively.
13. While all grade 9 students attending BC schools are intended to be included in this report, some students may be under-represented. This includes home-schooled students and international students. It also includes students who attend schools that do not receive services from regional public health, including some schools serviced by First Nations Health Services Organizations, some distance/distributed learning schools and schools refusing any contact with public health due to religious or philosophical reasons.
14. 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.

## 15. Abbreviations

### Health Authorities:

FHA	Fraser Health Authority	VCHA	Vancouver Coastal Health Authority
IHA	Interior Health Authority	VIHA	Vancouver Island Health Authority
NHA	Northern Health Authority		

### Health Service Delivery Areas:

EK	East Kootenay	VAN	Vancouver
KB	Kootenay Boundary	NSCG	North Shore / Coast Garibaldi
OK	Okanagan	SVI	South Vancouver Island
TCS	Thompson Cariboo Shuswap	CVI	Central Vancouver Island
FE	Fraser East	NVI	North Vancouver Island
FN	Fraser North	NW	Northwest
FS	Fraser South	NI	Northern Interior
RICH	Richmond	NE	Northeast

For an explanation of BC Health Authorities, please visit: <http://www.health.gov.bc.ca/socsec/index.html>

16. The BCCDC Immunization Coverage Dashboard is available online at <http://www.bccdc.ca/health-professionals/data-reports/childhood-immunization-coverage-dashboard>.

## Minimum Intervals Between Doses

Antigen/Agent	Minimum Age or Minimum Time Interval Between Eligible Doses			
	Dose 1 <sup>A</sup>	Dose 2	Dose 3	Dose 4
Tetanus/Diphtheria and Pertussis				
Series started at any age	42 days	28 days	28 days	24 weeks <sup>B</sup>
Dose 1 received after 1 year and dose 3 after 10 years of age	1 year	28 days	24 weeks <sup>C</sup>	
Meningococcal Quadrivalent Conjugate	11 years + 8 months			
Human Papillomavirus				
2 Dose schedule	9 years	150 days		
3 Dose schedule	9 years	28 days	12 weeks <sup>D</sup>	

- 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.