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An agency of the Provincial Health Services Authority

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Pertussis Vaccine Uptake in the First Year of Life 2018-2022

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Abbreviations

Health Authorities

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

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

Additional abbreviations

BC	British Columbia	PIR	Provincial Immunization Registry
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For an explanation of BC Health Authorities, please visit this [website](#).

Executive Summary

Pertussis is a contagious respiratory disease with most hospitalizations occurring in infants under one year of age.^a Infants in BC are currently recommended to receive three doses of pertussis vaccine with recommended age milestones for vaccine receipt at 2, 4, and 6 months. Pertussis vaccine uptake in the first year of life is routinely assessed for infants in BC. As a signatory to Canada's [Vaccination Coverage Goals and Vaccine Preventable Disease Reduction Targets by 2025](#), BC aims to achieve 95% vaccination coverage for the first three doses of pertussis vaccine for infants.

In 2022, 82% of one-year-olds in BC received at least one dose of pertussis vaccine by three months (Figure 1). By twelve months of age, 80% had received all three pertussis doses, however only 58% had received all three doses by seven months of age, indicating suboptimal on-time receipt of pertussis vaccine. Up-to-date coverage by twelve months of age remained stable from 2021 to 2022, however this follows a 3% decline in 2021 (Figure 2). On-time receipt of pertussis vaccines declined due to the COVID-19 pandemic impacting the provision of public health services as well as in-person clinical services by physician providers, with infants born in 2020 (2021 report) being the first cohort to have their early infancy vaccines impacted by the pandemic. From 2020 to 2021, the largest declines were seen at the three and seven-month milestones which represent measures of delayed vaccine receipt. Coverage by these milestone ages was comparable to 2021 and has not recovered to pre-pandemic rates.

At the health authority level, 1-dose coverage by three months ranged from 77% to 87% in 2022; 3-dose coverage by seven months ranged from 52% to 63%; and 3-dose coverage by twelve months ranged from 74% to 85% (Table 2). Island Health had the highest coverage by twelve months (85%), while the rate was lowest in Northern Health (74%). In Interior Health, coverage at the three, seven, and twelve-month milestones were 4%, 8%, and 2% lower, respectively, than 2021. In Fraser, on-time receipt was generally higher in 2022 than 2021, with coverage at the three and seven-month milestones increasing by 3% and 5%, respectively. Island Health has observed stable coverage by twelve months, while three-month coverage increased by 1% and seven-month coverage declined by 2%. Northern Health had a 3% decline in 1-dose coverage by three months and a 2% decline in 3-dose coverage by twelve months. Notably, three dose coverage at seven months declined by 9% in 2022 compared to 2021.

At the three, seven, and twelve-month milestones, South Vancouver Island had the highest pertussis coverage among the health service delivery areas (HSDAs) (Table 3). Northeast had the lowest coverage across all measures excluding the seven-month milestone which was lowest in Fraser East. Within each health authority, there was generally variation among HSDAs with areas of higher and lower coverage. In Interior Health, Kootenay Boundary typically had the lowest coverage for all three milestones. The other three HSDAs had similar coverage across all measures except for the seven-month milestone in Thompson Cariboo Shuswap which was approximately 10% lower than Okanagan and East Kootenay. In Fraser Health, Fraser East had the lowest coverage for all three milestones, with Fraser North and South observing comparable rates in 2022. In Island Health, South Vancouver Island had the highest coverage, while Central and North Vancouver Island had similar rates. In Northern Health, Northern Interior had the highest coverage at all three milestones.

Limitations

Due to different methodology, VCH is excluded from provincial coverage estimates. All calculations are based on vaccine doses recorded in PIR. Doses administered by providers other than public health and not reported to public health or PIR may not be reported in the registry. There may be lag times in data entry. Data should be interpreted with caution. Please refer to the [Notes](#) for additional information.

The BCCDC Immunization Coverage Dashboard is available online [here](#).

^a [Vaccination Coverage Goals and Vaccine Preventable Disease Reduction Targets by 2025](#)

Percent of Children Up-to-date for Pertussis

Up-to-date for Pertussis, British Columbia^b

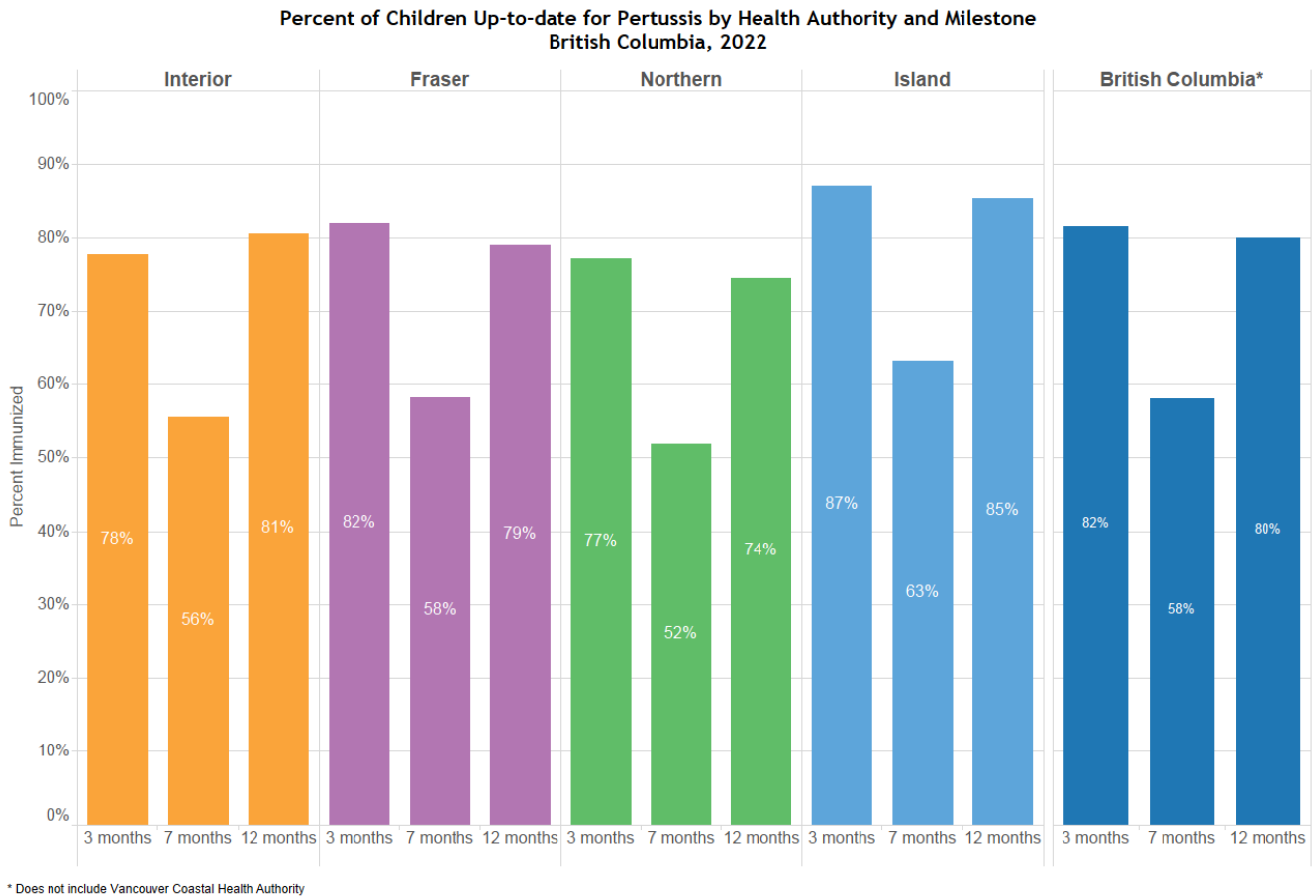
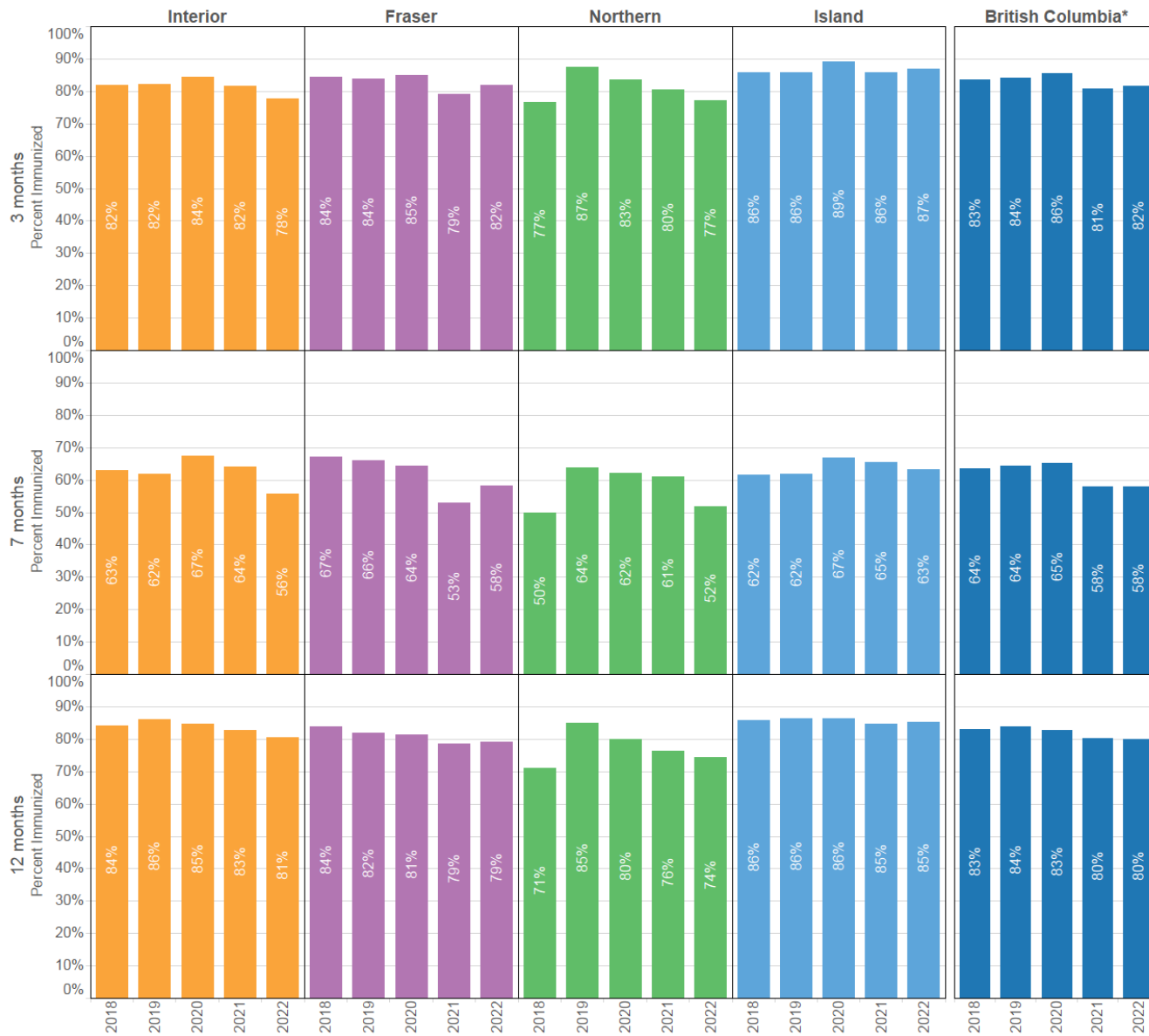


Figure 1. Percent of one-year-olds up-to-date for pertussis by age milestone and health authority, 2022

^b Provincial estimates do not include Vancouver Coastal Health (see [Notes](#))

Percent of Children Up-to-date for Pertussis by Health Authority, Year and Milestone
British Columbia, 2018-2022



*Does not include Vancouver Coastal Health Authority

Figure 2. Percent of one-year-olds up-to-date for pertussis by age milestone, health authority, and year

Table 1. Percent of one-year-olds up-to-date for pertussis by age milestone, BC

Province	Milestone	Year				
		2018	2019	2020	2021	2022
British Columbia BC	3 months	83%	84%	86%	81%	82%
	7 months	64%	64%	65%	58%	58%
	12 months	83%	84%	83%	80%	80%

Up-to-date for Pertussis by Health Authority

Table 2. Percent of one-year-olds up-to-date for pertussis by age milestone and health authority, BC

Health Authority	Milestone	Year				
		2018	2019	2020	2021	2022
Interior Health IH	3 months	82%	82%	84%	82%	78%
	7 months	63%	62%	67%	64%	56%
	12 months	84%	86%	85%	83%	81%
Fraser Health FH	3 months	84%	84%	85%	79%	82%
	7 months	67%	66%	64%	53%	58%
	12 months	84%	82%	81%	79%	79%
Island Health ISLH	3 months	86%	86%	89%	86%	87%
	7 months	62%	62%	67%	65%	63%
	12 months	86%	86%	86%	85%	85%
Northern Health NH	3 months	77%	87%	83%	80%	77%
	7 months	50%	64%	62%	61%	52%
	12 months	71%	85%	80%	76%	74%

Up-to-date for Pertussis by Health Service Delivery Area (HSDA)

Percent of Children Up-to-date for Pertussis by Health Service Delivery Area and Milestone
British Columbia, 2022

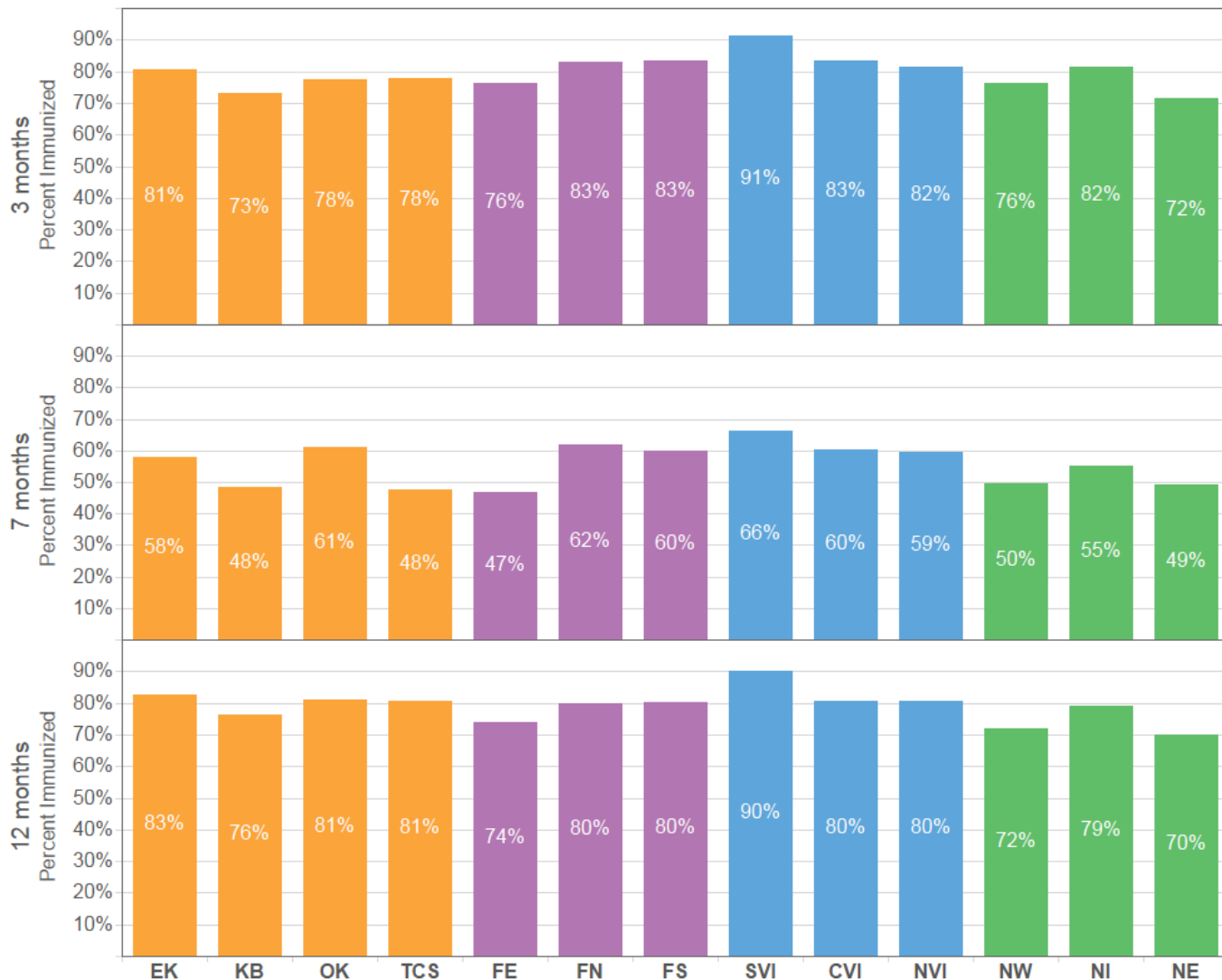


Figure 3. Percent of one-year-olds up-to-date for pertussis by age milestone and HSDA, 2022

Table 3. Percent of one-year-olds up-to-date for pertussis by age milestone and HSDA, BC

Health Authority	Health Service Delivery Area	Milestone	Year				
			2018	2019	2020	2021	2022
Interior Health IH	East Kootenay EK	3 months	82%	85%	85%	84%	81%
		7 months	64%	66%	67%	67%	58%
		12 months	86%	88%	88%	87%	83%
	Kootenay Boundary KB	3 months	80%	78%	76%	76%	73%
		7 months	55%	59%	58%	60%	49%
		12 months	79%	80%	76%	77%	76%
	Okanagan OK	3 months	82%	83%	84%	81%	78%
		7 months	66%	66%	69%	66%	61%
		12 months	84%	87%	85%	82%	81%
	Thompson Cariboo Shuswap TCS	3 months	83%	81%	86%	84%	78%
		7 months	59%	54%	68%	61%	48%
		12 months	85%	86%	85%	83%	81%
Fraser Health FH	Fraser East FE	3 months	82%	83%	85%	73%	76%
		7 months	64%	64%	62%	40%	47%
		12 months	83%	84%	82%	76%	74%
	Fraser North FN	3 months	84%	82%	84%	79%	83%
		7 months	66%	66%	66%	57%	62%
		12 months	82%	79%	79%	77%	80%
	Fraser South FS	3 months	86%	85%	86%	82%	83%
		7 months	69%	67%	65%	55%	60%
		12 months	85%	83%	82%	81%	80%
Island Health ISLH	South Vancouver Island SVI	3 months	89%	91%	92%	88%	92%
		7 months	67%	70%	74%	69%	66%
		12 months	90%	90%	90%	88%	90%
	Central Vancouver Island CVI	3 months	83%	81%	86%	83%	83%
		7 months	56%	54%	57%	60%	60%
		12 months	81%	81%	81%	81%	81%
	North Vancouver Island NVI	3 months	82%	80%	88%	85%	82%
		7 months	58%	56%	66%	66%	59%
		12 months	83%	85%	86%	85%	80%

Health Authority	Health Service Delivery Area	Milestone	Year				
			2018	2019	2020	2021	2022
Northern Health NH	Northwest NW	3 months	77%	88%	82%	80%	76%
		7 months	52%	67%	59%	58%	50%
		12 months	70%	84%	76%	76%	72%
	Northern Interior NI	3 months	79%	89%	88%	85%	82%
		7 months	51%	65%	66%	66%	55%
		12 months	74%	86%	85%	81%	79%
	Northeast NE	3 months	72%	84%	78%	73%	72%
		7 months	47%	60%	59%	56%	49%
		12 months	68%	85%	76%	70%	70%

Data Sources

Coverage estimates are based on immunization and client records in the Provincial Immunization Registry (PIR). Results for 2020 onwards are based on reporting to PIR as of January 15 of the subsequent year (i.e., 2022 results are based on reporting to January 15, 2023. Results for 2019 were based on reporting to January 16, 2020 and 2018 results included data to February 27, 2019 for Fraser Health, Interior Health and Island Health and March 18, 2019 for Northern Health.

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.

Up-to-date for pertussis definitions

Estimates reported for any given year reflect coverage among children who turned 1 year old during that calendar year (e.g., 2022 results are for children born in 2021).

Numerators: Number of children with active records in PIR who were born in the previous calendar year and are up-to-date for pertussis by the specified age milestone in Interior Health, Island Health, Fraser Health, and Northern Health.

Denominators: Number of children with active records in PIR who were born in the previous calendar year in Interior Health, Island Health, Fraser Health, and Northern Health.

Milestone	Definition
3 months	Received at least one valid dose of pertussis-containing vaccine by 3 months of age
7 months	Received at least three valid doses of pertussis-containing vaccine by 7 months of age
12 months	Received at least three valid doses of pertussis-containing vaccine by 12 months of age

Each dose is 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. The earliest age at which a child can receive a valid dose of pertussis-containing vaccine is 42 days. The shortest valid interval between consecutive doses is 28 days.

Notes

1. VCH provides their early childhood coverage data through a separate mechanism. While immunizations provided to infants by public health in VCH are captured in the health authority's electronic information system (called PARIS), the majority of VCH infants are immunized by physicians. BC's public health legislation does not require reporting of immunizations administered by physicians to public health; thus, immunizations delivered by physicians are not captured systematically in the PARIS. VCH examines early childhood immunization coverage data through periodic coverage studies. Pertussis uptake in the first year of life will be assessed as part of the survey of the immunization status of children born in 2020. From 2018 to 2022, VCH represented approximately 21% of the 1-year-old population in BC (Source: BC Stats Population Estimates and PEOPLE projections).
2. In each cohort, there is generally a small number of children with PIR records indicating that they lived in BC but did not have a specific health authority assigned (i.e., the client health region was missing/unknown). These children are excluded from the analysis. A small number of clients with a health region assigned but unknown HSDA are included in health authority-level estimates.
3. Data need to be interpreted with caution for the following reasons:
 - a. To be considered up-to-date for age, documentation of every dose in PIR is required. Some children may have received doses that have not been documented in the immunization registry. Most regions make their best efforts to obtain vaccination records pertaining to physician-delivered immunizations. There can be a delay in obtaining these records from physicians, which can result in delay of data entry. Both these issues will artificially lower the rates of vaccine coverage.
 - b. Data completeness with respect to children residing in the Health Authority may vary. Some regions enter all children born in their region into the registry while other regions only enter children that present for service into the system. In addition, First Nations children may not be completely captured in the registry system, as on-reserve birth records and immunizations may not be entered into PIR. In spring 2020, PIR was updated to include all clients from the Ministry of Health (MoH) Client Roster. The population is maintained via regular feeds from MoH's Registration and Premium Information Determination (RAPID) system for new clients eligible for Medical Services Plan (MSP) coverage and Enterprise Master Patient Index (EMPI) for births and deaths. This should provide more complete information on the entire BC population in PIR.
 - c. Client records with no or inadequate immunizations recorded may reflect children who have moved out of the province or died. When public health is not aware of these events, they cannot update the Panorama records to reflect the status of these children. Records reported by provinces with reciprocal agreements with MSP for individuals who have moved out of BC and established health insurance in other Canadian jurisdictions are inactivated through the RAPID system process outlined above.

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