



**BC Centre for Disease Control**

An agency of the Provincial Health Services Authority

Immunization Programs  
and Vaccine Preventable  
Diseases Service

655 West 12th Avenue  
Vancouver, BC V5Z 4R4

Tel 604.707.2519  
Fax 604.707.2515

[www.bccdc.ca](http://www.bccdc.ca)

# Immunization Coverage in Children by the Second Birthday

## 2012-2022

April 2024

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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
DTaP	Diphtheria, tetanus, acellular pertussis	DTaP-IPV-Hib	Diphtheria, tetanus, acellular pertussis, polio, <i>Haemophilus influenzae</i> type b
DTaP-IPV	Diphtheria, tetanus, acellular pertussis, polio	MMR	Measles, mumps, rubella

For an explanation of BC Health Authorities, please visit this [website](#).

## Executive Summary

Infants in BC are currently recommended to receive thirteen doses of seven different vaccines that protect against thirteen diseases: diphtheria, tetanus, pertussis, polio, *Haemophilus influenzae* type b (Hib), hepatitis B, measles, mumps, rubella, varicella, pneumococcal disease, meningococcal serogroup C disease, and rotavirus. For most doses, the recommended age milestones for receipt are 2, 4, 6, or 12 months with a booster dose of DTaP-IPV-Hib at 18 months.

Childhood immunization coverage is routinely assessed at milestone ages in BC. This report outlines coverage among two-year-olds from 2012 to 2022 including indicators of whether infants received specific antigens/agents by the second birthday, all routine immunizations by the second birthday, and all routine immunizations except the 18-month booster dose by the second birthday. As a signatory to Canada's Vaccination Coverage Goals and Vaccine Preventable Disease Reduction Targets by 2025, BC aims to achieve 95% vaccination coverage by two years for the following vaccines: diphtheria, tetanus, pertussis and Hib, polio, hepatitis B, MMR, varicella, pneumococcal conjugate, and meningococcal C conjugate.

Following a period of stable coverage from 2016 to 2020, the proportion of two-year-olds in BC who were up-to-date for all routine immunizations declined from 73% in 2020 to 70% in 2021 and remained at 70% in 2022 (Figure 1). The percentage of infants who received all routine vaccines excluding the 18-month booster peaked at 83-84% in 2019/2020 before declining by 4% in 2021 (Figure 3). This year, the rate declined by a further 1% to 78% (Figure 3). These declines in coverage coincide with the COVID-19 pandemic as the 2019 birth cohort (2021 report) was scheduled to receive their 12- and 18-month vaccine doses starting in 2020. BC initially implemented a province-wide shut down, which impacted the provision of public health services as well as in-person clinical services by physician providers. The pandemic response continued through 2022; routine childhood immunization may have been affected in some regions due to rescheduled appointments or longer wait times. Up-to-date coverage has not rebounded to pre-pandemic rates with only 70% of two-year-olds in 2022 having received all recommended routine immunizations by their second birthday, which also remains well below the 95% coverage target.

In the health authorities, 2022 up-to-date coverage ranged from 61% to 74% (Figure 1); coverage was highest in Island Health (74%), with comparable rates in Interior Health and Fraser Health (69% and 71%, respectively), and the lowest coverage in Northern Health (61%). Up-to-date coverage increased by 1% and 2% from 2021 to 2022 in Fraser and Island Health, respectively. Coverage in Interior and Northern Health declined by 1% and 4% in 2022, respectively. Most health authorities had lower up-to-date coverage compared to pre-pandemic (2019 report), excluding Northern Health which had equivalent coverage. At the health service delivery area level, there was a notable decline in up-to-date coverage from 2021 to 2022 in all Northern Health regions, particularly in Northern Interior (5%) and Northeast (4%). Up-to-date minus booster coverage also declined by 5% in both HSDAs (Table 6).

The percentage of two-year-olds who were up-to-date for all routine immunizations except the 18-month booster ranged from 72% to 82% at the health authority level in 2022 (Figure 3). From 2019-2022, up-to-date minus booster coverage has steadily declined in Interior and Fraser Health, following increases that occurred from 2015-2019. Northern Health had a 3% decline in up-to-date minus booster coverage from 2021 to 2022, but the current rate is comparable to pre-pandemic (2019 and earlier). The gap between the proportion of infants fully up-to-date and up-to-date minus the booster was 8% provincially (Table 1) and ranged from 7-11% at the health authority level (Table 2). While this indicates that many infants are receiving immunizations recommended in the first year of life, there is an opportunity to improve uptake of the 18-month booster vaccines.

Compared to 2021, provincial coverage was stable for DTaP-IPV, DTaP-IPV-Hib, MMR, and polio, and declined by 1-2% for hepatitis B, varicella, pneumococcal conjugate, meningococcal conjugate, and rotavirus (Figure 2). Hib was the only antigen to increase by 1% from 2021. Rates in 2022 were lowest for DTaP-containing agents at 73% and highest for hepatitis B and MMR (83%). Across the health authorities, coverage was within 1-2% of the 2021 rate for most antigens/agents, however, in Northern Health DTaP-IPV, DTaP-IPV-Hib, Hib, and polio declined by 5%, while hepatitis B, pneumococcal conjugate, and rotavirus coverage declined by 3% (Table 2). Island Health had coverage rates that were equivalent to or 1-2% higher than 2021 for most antigens, except for rotavirus which had a 1% decline (Table 5). Approximately 10% of two-year-olds in BC had no routine immunizations recorded prior to their second birthday, which is comparable to the rate in 2021 (Table 1); at the health authority level, this measure ranged from 8% (Island) to 13% (Northern).

### **Limitations**

Due to different methodology, VCH data is excluded from provincial coverage estimates and their coverage is reported separately (see [Two-year-olds with Up-to-date Immunizations by Health Authority and Health Service Delivery Area, Vancouver Coastal Health](#)).<sup>a</sup> 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](#).

<sup>a</sup> Provincial estimates do not include Vancouver Coastal Health (see [Notes](#))

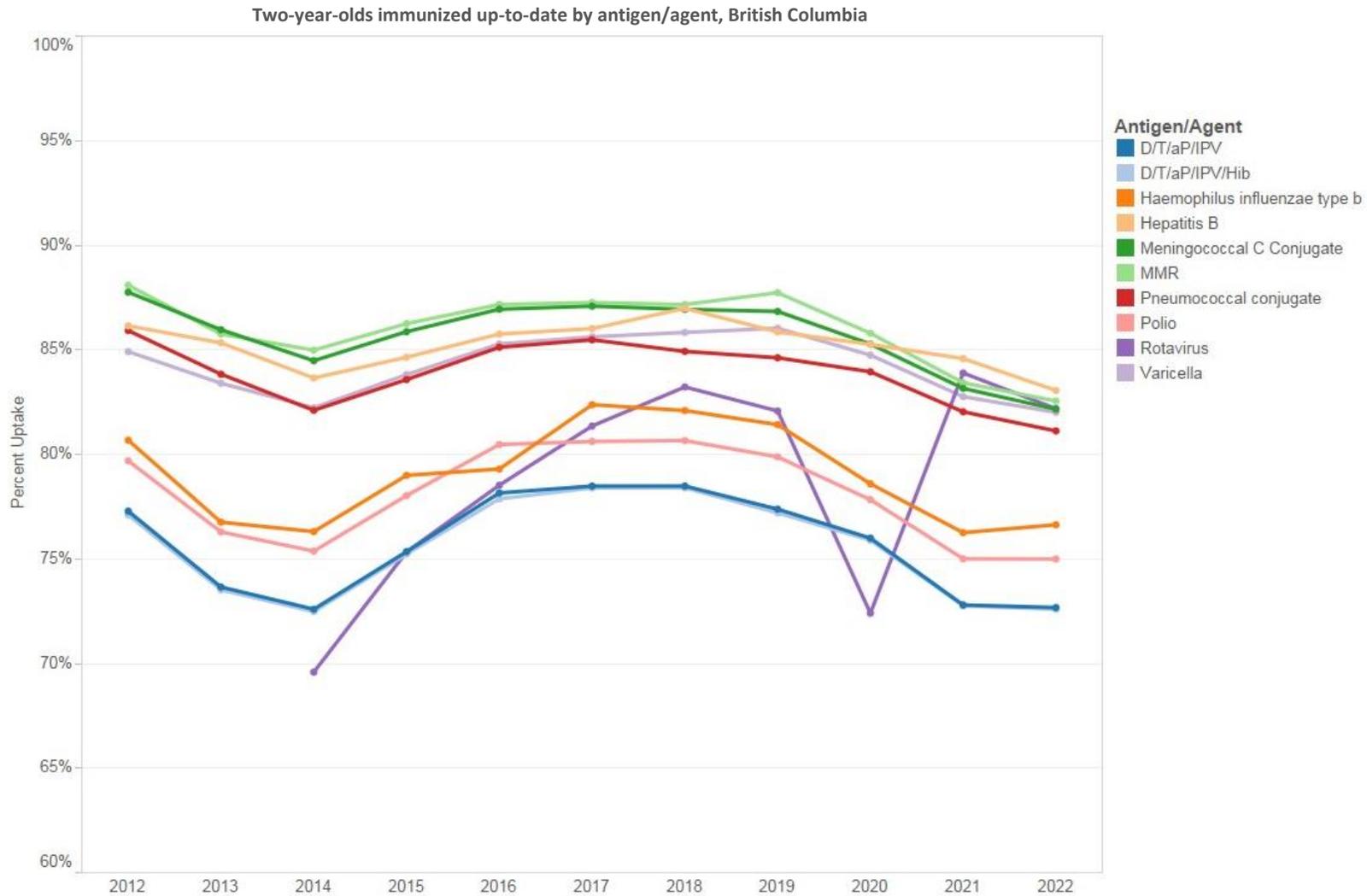
## Up-to-date for age

### Up-to-date for age in British Columbia

Two-year-olds immunized up-to-date for age, British Columbia



Figure 1. Percent of two-year-olds immunized up-to-date for age, British Columbia<sup>a</sup>



Note: Axis ranges from 60% to 100%

Figure 2. Percent of two-year-olds up-to-date by antigen/agent, British Columbia<sup>a</sup>

**Table 1. Percent of two-year-olds with up-to-date immunizations, British Columbia<sup>a</sup>**

Vaccination Details	Year										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Up-to-date for age</b>	<b>71%</b>	<b>68%</b>	<b>67%</b>	<b>70%</b>	<b>73%</b>	<b>74%</b>	<b>74%</b>	<b>74%</b>	<b>73%</b>	<b>70%</b>	<b>70%</b>
<b>Up-to-date minus the booster</b>	<b>79%</b>	<b>78%</b>	<b>76%</b>	<b>78%</b>	<b>80%</b>	<b>81%</b>	<b>81%</b>	<b>84%</b>	<b>83%</b>	<b>79%</b>	<b>78%</b>
<i>Specific Agents</i>											
DTaP-IPV	77%	74%	73%	75%	78%	78%	78%	77%	76%	73%	73%
DTaP-IPV-Hib	77%	74%	72%	75%	78%	78%	78%	77%	76%	73%	73%
Hepatitis B	86%	85%	84%	85%	86%	86%	87%	86%	85%	85%	83%
Hib	81%	77%	76%	79%	79%	82%	82%	81%	79%	76%	77%
MMR	88%	86%	85%	86%	87%	87%	87%	88%	86%	83%	83%
Polio	80%	76%	75%	78%	80%	81%	81%	80%	78%	75%	75%
Varicella	85%	83%	82%	84%	85%	86%	86%	86%	85%	83%	82%
Pneumococcal conjugate	86%	84%	82%	83%	85%	85%	85%	85%	84%	82%	81%
Meningococcal C	88%	86%	84%	86%	87%	87%	87%	87%	85%	83%	82%
Rotavirus <sup>b</sup>	n/a	n/a	70%	75%	79%	81%	83%	82%	72%	84%	82%
No immunizations recorded	n/a	n/a	n/a	7%	7%	6%	6%	6%	8%	9%	10%
Refusal to all <sup>c</sup>	n/a	n/a	n/a	2%	2%	2%	1%	1%	1%	0%	1%

<sup>b</sup> Rotavirus was added to BC's routine infant immunization schedule in January 2012; therefore the 2012 birth cohort (2014 report) was the first cohort eligible for this series. Three doses of rotavirus were required for the 2020 report. See [Notes](#).

<sup>c</sup> PIR does not contain complete supplementary information on refusals for FH and refusal rates will be underestimated. See [Notes](#).

### Up-to-date for age minus booster in British Columbia

Two-year-olds immunized up-to-date for age minus the booster, British Columbia



Figure 3. Percent of two-year-olds immunized up-to-date for age minus the booster, British Columbia

## Up-to-date for age by Health Authority

Table 2. Percent of two-year-olds with up-to date immunizations by Health Authority

Health Authority	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Interior Health IH	<b>Up-to-date for age</b>	<b>75%</b>	<b>71%</b>	<b>68%</b>	<b>68%</b>	<b>72%</b>	<b>73%</b>	<b>73%</b>	<b>75%</b>	<b>72%</b>	<b>70%</b>	<b>69%</b>
	<b>Up-to-date minus the booster</b>	<b>82%</b>	<b>80%</b>	<b>77%</b>	<b>77%</b>	<b>79%</b>	<b>79%</b>	<b>80%</b>	<b>83%</b>	<b>81%</b>	<b>79%</b>	<b>77%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	80%	76%	73%	73%	76%	77%	77%	78%	75%	72%	71%
	DTaP-IPV-Hib	80%	75%	73%	73%	76%	77%	77%	78%	74%	72%	70%
	Hep B	88%	87%	84%	84%	85%	85%	86%	85%	85%	85%	83%
	Hib	83%	78%	76%	76%	78%	80%	80%	81%	76%	75%	74%
	MMR	89%	87%	85%	84%	86%	86%	86%	87%	85%	82%	81%
	Polio	82%	77%	75%	75%	78%	79%	78%	79%	76%	74%	72%
	Varicella	86%	84%	81%	81%	83%	83%	84%	85%	83%	81%	80%
	Pneumococcal conjugate	89%	86%	83%	83%	84%	85%	85%	85%	84%	82%	80%
	Meningococcal C	90%	88%	85%	84%	86%	86%	86%	87%	84%	82%	81%
	Rotavirus	n/a	n/a	69%	70%	73%	77%	80%	81%	72%	82%	80%
No immunizations recorded	n/a	n/a	n/a	9%	9%	8%	8%	8%	10%	10%	11%	
Refusal to all	n/a	n/a	n/a	3%	2%	3%	2%	2%	1%	1%	1%	
Fraser Health <sup>C</sup> FH	<b>Up-to-date for age</b>	<b>71%</b>	<b>68%</b>	<b>68%</b>	<b>72%</b>	<b>76%</b>	<b>77%</b>	<b>78%</b>	<b>75%</b>	<b>74%</b>	<b>70%</b>	<b>71%</b>
	<b>Up-to-date minus the booster</b>	<b>78%</b>	<b>76%</b>	<b>76%</b>	<b>79%</b>	<b>82%</b>	<b>82%</b>	<b>84%</b>	<b>85%</b>	<b>84%</b>	<b>79%</b>	<b>78%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	78%	74%	74%	77%	81%	82%	82%	79%	78%	73%	74%
	DTaP-IPV-Hib	77%	74%	74%	77%	80%	82%	82%	79%	78%	73%	74%
	Hep B	85%	84%	83%	85%	87%	88%	89%	87%	86%	84%	83%
	Hib	82%	77%	77%	81%	82%	85%	86%	83%	81%	77%	78%
	MMR	88%	85%	85%	87%	89%	89%	89%	88%	87%	84%	83%
	Polio	80%	77%	76%	80%	83%	84%	84%	81%	80%	76%	77%
	Varicella	86%	84%	83%	86%	88%	88%	89%	87%	86%	84%	83%
	Pneumococcal conjugate	85%	83%	82%	84%	86%	87%	87%	86%	85%	82%	82%
	Meningococcal C	88%	85%	84%	87%	88%	89%	89%	88%	86%	84%	83%
	Rotavirus	n/a	n/a	69%	79%	83%	85%	86%	85%	74%	85%	84%
No immunizations recorded	n/a	n/a	n/a	6%	6%	5%	5%	5%	7%	8%	9%	
Refusal to all <sup>C</sup>	n/a	n/a	n/a	1%	1%	2%	1%	1%	0%	0%	0%	

Health Authority	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Island Health ISLH	<b>Up-to-date for age</b>	<b>68%</b>	<b>67%</b>	<b>65%</b>	<b>70%</b>	<b>74%</b>	<b>73%</b>	<b>71%</b>	<b>75%</b>	<b>73%</b>	<b>72%</b>	<b>74%</b>
	<b>Up-to-date minus the booster</b>	<b>78%</b>	<b>79%</b>	<b>76%</b>	<b>79%</b>	<b>81%</b>	<b>81%</b>	<b>80%</b>	<b>86%</b>	<b>83%</b>	<b>81%</b>	<b>82%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	73%	71%	70%	74%	78%	77%	75%	79%	75%	75%	76%
	DTaP-IPV-Hib	73%	71%	70%	74%	77%	76%	75%	78%	75%	74%	76%
	Hep B	86%	86%	84%	85%	87%	87%	86%	88%	86%	86%	86%
	Hib	76%	75%	75%	79%	79%	81%	80%	83%	78%	78%	80%
	MMR	86%	85%	85%	87%	88%	88%	86%	90%	86%	85%	85%
	Polio	75%	74%	74%	78%	80%	79%	78%	81%	77%	76%	78%
	Varicella	83%	83%	82%	84%	86%	86%	85%	88%	85%	84%	85%
	Pneumococcal conjugate	85%	84%	83%	84%	86%	86%	84%	88%	84%	84%	84%
	Meningococcal C	86%	86%	85%	86%	88%	87%	86%	89%	85%	85%	85%
	Rotavirus	n/a	n/a	70%	73%	76%	81%	81%	82%	72%	84%	83%
No immunizations recorded	n/a	n/a	n/a	6%	6%	5%	6%	5%	8%	8%	8%	
Refusal to all	n/a	n/a	n/a	1%	1%	2%	1%	1%	1%	1%	1%	
Northern Health NH	<b>Up-to-date for age</b>	<b>72%</b>	<b>68%</b>	<b>65%</b>	<b>63%</b>	<b>63%</b>	<b>63%</b>	<b>63%</b>	<b>61%</b>	<b>67%</b>	<b>65%</b>	<b>61%</b>
	<b>Up-to-date minus the booster</b>	<b>79%</b>	<b>77%</b>	<b>75%</b>	<b>72%</b>	<b>70%</b>	<b>72%</b>	<b>72%</b>	<b>73%</b>	<b>78%</b>	<b>75%</b>	<b>72%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	78%	73%	70%	70%	69%	68%	68%	65%	70%	68%	63%
	DTaP-IPV-Hib	78%	73%	70%	69%	69%	68%	68%	65%	70%	68%	63%
	Hepatitis B	88%	86%	84%	82%	79%	80%	82%	74%	81%	82%	79%
	Hib	81%	76%	74%	73%	70%	73%	72%	74%	74%	72%	67%
	MMR	88%	85%	84%	81%	80%	79%	79%	80%	82%	80%	76%
	Polio	80%	76%	73%	72%	72%	71%	70%	70%	73%	70%	65%
	Varicella	83%	80%	80%	77%	77%	77%	77%	78%	80%	78%	75%
	Pneumococcal conjugate	86%	84%	81%	78%	78%	77%	77%	72%	79%	78%	75%
	Meningococcal C	87%	85%	84%	81%	80%	79%	79%	79%	81%	80%	76%
	Rotavirus	n/a	n/a	71%	69%	72%	75%	79%	71%	68%	80%	77%
No immunizations recorded	n/a	n/a	n/a	8%	9%	11%	8%	10%	11%	10%	13%	
Refusal to all	n/a	n/a	n/a	2%	2%	2%	1%	1%	0%	0%	0%	

## Up-to-date for age by Health Service Delivery Area

### Interior Health

**Table 3. Percent of two-year-olds with up-to-date immunizations by Health Service Delivery Area, Interior Health**

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
East Kootenay EK	<b>Up-to-date for age</b>	<b>74%</b>	<b>67%</b>	<b>71%</b>	<b>72%</b>	<b>78%</b>	<b>78%</b>	<b>78%</b>	<b>76%</b>	<b>78%</b>	<b>77%</b>	<b>74%</b>
	<b>Up-to-date minus the booster</b>	<b>82%</b>	<b>79%</b>	<b>78%</b>	<b>80%</b>	<b>83%</b>	<b>82%</b>	<b>83%</b>	<b>84%</b>	<b>85%</b>	<b>84%</b>	<b>81%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	82%	74%	77%	78%	84%	82%	83%	81%	81%	78%	75%
	DTaP-IPV-Hib	81%	74%	77%	78%	84%	82%	83%	81%	81%	78%	75%
	Hepatitis B	89%	87%	86%	86%	89%	87%	90%	85%	89%	88%	87%
	Hib	84%	77%	81%	82%	85%	86%	86%	84%	84%	82%	78%
	MMR	92%	89%	89%	89%	91%	89%	91%	90%	89%	88%	84%
	Polio	83%	76%	80%	80%	85%	84%	85%	82%	83%	80%	76%
	Varicella	88%	86%	84%	85%	88%	86%	87%	88%	87%	86%	83%
	Pneumococcal conjugate	91%	87%	86%	87%	90%	88%	88%	87%	87%	86%	84%
	Meningococcal C	92%	89%	88%	89%	91%	89%	91%	89%	88%	87%	85%
	Rotavirus	n/a	n/a	71%	71%	77%	80%	86%	83%	75%	85%	83%
No immunizations recorded	n/a	n/a	n/a	6%	5%	7%	5%	6%	8%	8%	8%	
Refusal to all	n/a	n/a	n/a	4%	2%	4%	3%	2%	2%	2%	2%	
Kootenay Boundary KB	<b>Up-to-date for age</b>	<b>56%</b>	<b>57%</b>	<b>51%</b>	<b>58%</b>	<b>60%</b>	<b>58%</b>	<b>66%</b>	<b>66%</b>	<b>62%</b>	<b>59%</b>	<b>62%</b>
	<b>Up-to-date minus the booster</b>	<b>64%</b>	<b>65%</b>	<b>63%</b>	<b>65%</b>	<b>68%</b>	<b>67%</b>	<b>72%</b>	<b>76%</b>	<b>73%</b>	<b>69%</b>	<b>72%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	65%	67%	60%	66%	67%	66%	71%	71%	65%	61%	65%
	DTaP-IPV-Hib	65%	67%	60%	66%	66%	66%	71%	71%	65%	61%	65%
	Hepatitis B	76%	79%	74%	76%	76%	77%	79%	81%	79%	78%	79%
	Hib	67%	71%	64%	71%	68%	71%	76%	76%	68%	67%	69%
	MMR	76%	79%	76%	77%	77%	80%	81%	83%	79%	75%	76%
	Polio	67%	69%	62%	68%	69%	68%	73%	74%	66%	63%	67%
	Varicella	68%	70%	68%	69%	72%	74%	77%	78%	76%	72%	75%
	Pneumococcal conjugate	76%	77%	72%	75%	76%	77%	79%	80%	77%	73%	74%
	Meningococcal C	77%	79%	75%	77%	78%	79%	80%	82%	78%	75%	76%
	Rotavirus	n/a	n/a	54%	51%	59%	62%	68%	69%	64%	71%	75%
No immunizations recorded	n/a	n/a	n/a	6%	15%	13%	13%	10%	14%	15%	15%	
Refusal to all	n/a	n/a	n/a	4%	3%	3%	3%	2%	2%	1%	2%	

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Okanagan OK	<b>Up-to-date for age</b>	<b>78%</b>	<b>72%</b>	<b>67%</b>	<b>70%</b>	<b>73%</b>	<b>74%</b>	<b>73%</b>	<b>75%</b>	<b>72%</b>	<b>71%</b>	<b>69%</b>
	<b>Up-to-date minus the booster</b>	<b>84%</b>	<b>81%</b>	<b>76%</b>	<b>78%</b>	<b>80%</b>	<b>81%</b>	<b>80%</b>	<b>83%</b>	<b>81%</b>	<b>78%</b>	<b>76%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	83%	76%	72%	74%	77%	78%	76%	78%	75%	73%	70%
	DTaP-IPV-Hib	83%	76%	72%	74%	77%	78%	76%	78%	75%	73%	70%
	Hepatitis B	88%	88%	83%	84%	85%	86%	85%	86%	85%	84%	81%
	Hib	85%	78%	74%	77%	79%	81%	79%	80%	76%	75%	73%
	MMR	90%	87%	83%	85%	86%	86%	86%	87%	84%	81%	79%
	Polio	84%	78%	74%	76%	79%	80%	77%	79%	76%	74%	71%
	Varicella	88%	85%	80%	82%	83%	84%	84%	85%	82%	80%	78%
	Pneumococcal conjugate	90%	87%	82%	83%	85%	86%	84%	85%	83%	81%	78%
	Meningococcal C	91%	88%	83%	84%	86%	86%	86%	86%	83%	81%	79%
	Rotavirus	n/a	n/a	69%	73%	74%	79%	80%	81%	73%	82%	78%
	No immunizations recorded	n/a	n/a	n/a	8%	8%	8%	9%	8%	10%	11%	13%
Refusal to all	n/a	n/a	n/a	3%	2%	3%	2%	2%	1%	1%	1%	
Thompson Cariboo Shuswap TCS	<b>Up-to-date for age</b>	<b>77%</b>	<b>76%</b>	<b>74%</b>	<b>69%</b>	<b>72%</b>	<b>73%</b>	<b>74%</b>	<b>77%</b>	<b>73%</b>	<b>70%</b>	<b>70%</b>
	<b>Up-to-date minus the booster</b>	<b>85%</b>	<b>86%</b>	<b>83%</b>	<b>79%</b>	<b>80%</b>	<b>80%</b>	<b>82%</b>	<b>85%</b>	<b>84%</b>	<b>81%</b>	<b>80%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	82%	78%	78%	72%	76%	76%	77%	79%	75%	72%	71%
	DTaP-IPV-Hib	82%	78%	78%	72%	76%	76%	77%	79%	75%	72%	71%
	Hepatitis B	90%	90%	89%	86%	85%	85%	87%	87%	86%	87%	85%
	Hib	83%	81%	80%	75%	77%	80%	80%	82%	77%	75%	75%
	MMR	91%	91%	89%	85%	86%	86%	87%	88%	86%	84%	84%
	Polio	83%	80%	80%	75%	79%	78%	79%	80%	77%	74%	73%
	Varicella	89%	89%	86%	83%	85%	84%	86%	86%	85%	83%	83%
	Pneumococcal conjugate	90%	90%	88%	84%	84%	85%	86%	86%	85%	84%	82%
	Meningococcal C	92%	91%	89%	85%	86%	86%	88%	88%	86%	84%	84%
	Rotavirus	n/a	n/a	75%	73%	75%	76%	80%	82%	71%	84%	84%
	No immunizations recorded	n/a	n/a	n/a	8%	9%	9%	8%	7%	8%	8%	9%
Refusal to all	n/a	n/a	n/a	2%	2%	2%	2%	2%	1%	1%	1%	

## Fraser Health

**Table 4. Percent of two-year-olds with up-to-date immunizations by Health Service Delivery Area, Fraser Health<sup>c</sup>**

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Fraser East FE	Up-to-date for age	72%	67%	68%	71%	75%	77%	78%	75%	73%	68%	66%
	Up-to-date minus the booster	81%	77%	77%	80%	82%	82%	84%	84%	83%	78%	76%
	<i>Specific Agents</i>											
	DTaP-IPV	77%	71%	71%	75%	78%	80%	80%	78%	75%	70%	68%
	DTaP-IPV-Hib	76%	71%	71%	75%	78%	80%	80%	78%	75%	70%	68%
	Hepatitis B	87%	85%	84%	86%	87%	87%	88%	87%	85%	84%	80%
	Hib	81%	74%	75%	79%	80%	85%	83%	82%	78%	74%	75%
	MMR	88%	84%	84%	86%	87%	88%	88%	88%	85%	82%	80%
	Polio	79%	73%	74%	78%	80%	82%	82%	80%	77%	73%	72%
	Varicella	85%	81%	81%	83%	85%	86%	86%	86%	84%	82%	80%
	Pneumococcal conjugate	86%	82%	81%	84%	86%	87%	87%	86%	83%	81%	79%
	Meningococcal C	88%	84%	84%	86%	87%	88%	88%	87%	85%	82%	81%
	Rotavirus	n/a	n/a	70%	73%	77%	80%	81%	81%	73%	82%	77%
No immunizations recorded	n/a	n/a	n/a	7%	7%	7%	7%	7%	9%	8%	11%	
Refusal to all	n/a	n/a	n/a	3%	3%	4%	2%	2%	2%	0%	0%	
Fraser North FN	Up-to-date for age	69%	66%	67%	71%	74%	76%	78%	74%	73%	70%	70%
	Up-to-date minus the booster	75%	74%	74%	77%	80%	81%	83%	83%	83%	78%	76%
	<i>Specific Agents</i>											
	DTaP-IPV	76%	74%	74%	77%	80%	81%	83%	79%	77%	73%	74%
	DTaP-IPV-Hib	75%	73%	73%	77%	80%	81%	83%	78%	77%	73%	74%
	Hepatitis B	83%	83%	81%	84%	85%	86%	89%	86%	84%	84%	82%
	Hib	80%	77%	77%	80%	81%	85%	86%	82%	80%	77%	78%
	MMR	87%	84%	84%	86%	87%	88%	90%	87%	86%	83%	82%
	Polio	79%	76%	76%	80%	82%	83%	85%	81%	79%	75%	77%
	Varicella	84%	83%	82%	85%	86%	87%	90%	86%	85%	83%	82%
	Pneumococcal conjugate	83%	81%	80%	83%	85%	86%	87%	84%	83%	81%	81%
	Meningococcal C	85%	84%	83%	86%	87%	88%	90%	86%	85%	83%	81%
	Rotavirus	n/a	n/a	66%	79%	83%	85%	87%	84%	73%	85%	84%
No immunizations recorded	n/a	n/a	n/a	7%	6%	6%	5%	6%	8%	9%	10%	
Refusal to all	n/a	n/a	n/a	1%	1%	1%	1%	0%	0%	0%	0%	
Fraser South FS	Up-to-date for age	72%	69%	69%	74%	77%	78%	79%	76%	76%	72%	73%
	Up-to-date minus the booster	80%	78%	77%	81%	83%	84%	84%	86%	86%	80%	80%
	<i>Specific Agents</i>											

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	DTaP-IPV	79%	75%	75%	79%	82%	83%	83%	80%	79%	75%	77%
	DTaP-IPV-Hib	79%	75%	75%	79%	82%	83%	83%	80%	79%	75%	76%
	Hepatitis B	87%	85%	85%	86%	88%	89%	89%	88%	87%	85%	85%
	Hib	83%	79%	79%	83%	83%	86%	86%	83%	82%	79%	80%
	MMR	90%	87%	87%	89%	90%	90%	89%	90%	88%	85%	85%
	Polio	82%	78%	78%	82%	85%	85%	85%	82%	81%	77%	79%
	Varicella	87%	86%	85%	88%	89%	90%	89%	89%	88%	85%	85%
	Pneumococcal conjugate	87%	84%	83%	86%	88%	88%	87%	87%	87%	84%	84%
	Meningococcal C	89%	87%	86%	88%	90%	90%	89%	89%	88%	85%	85%
	Rotavirus	n/a	n/a	72%	82%	84%	87%	87%	87%	74%	87%	86%
	No immunizations recorded	n/a	n/a	n/a	5%	4%	4%	5%	4%	6%	7%	8%
	Refusal to all	n/a	n/a	n/a	1%	1%	1%	0%	1%	0%	0%	0%

## Island Health

**Table 5. Percent of two-year-olds with up-to-date immunizations by Health Service Delivery Area, Island Health**

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
South Vancouver Island SVI	<b>Up-to-date for age</b>	<b>70%</b>	<b>69%</b>	<b>68%</b>	<b>74%</b>	<b>76%</b>	<b>76%</b>	<b>76%</b>	<b>79%</b>	<b>78%</b>	<b>77%</b>	<b>79%</b>
	<b>Up-to-date minus the booster</b>	<b>80%</b>	<b>81%</b>	<b>78%</b>	<b>81%</b>	<b>82%</b>	<b>83%</b>	<b>83%</b>	<b>89%</b>	<b>85%</b>	<b>84%</b>	<b>84%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	75%	73%	74%	79%	80%	81%	80%	83%	81%	79%	81%
	DTaP-IPV-Hib	75%	73%	74%	79%	80%	80%	80%	83%	81%	79%	80%
	Hepatitis B	87%	88%	86%	87%	88%	89%	89%	90%	88%	88%	88%
	Hib	78%	77%	77%	82%	81%	83%	83%	85%	82%	81%	83%
	MMR	87%	87%	87%	89%	89%	89%	89%	92%	88%	87%	87%
	Polio	77%	76%	77%	81%	82%	82%	82%	84%	82%	81%	82%
	Varicella	85%	84%	83%	86%	86%	88%	87%	90%	87%	87%	87%
	Pneumococcal conjugate	87%	86%	85%	87%	87%	87%	86%	90%	87%	87%	86%
	Meningococcal C	88%	88%	86%	89%	88%	89%	88%	91%	87%	87%	87%
	Rotavirus	n/a	n/a	73%	77%	79%	84%	84%	86%	78%	86%	85%
No immunizations recorded	n/a	n/a	n/a	5%	5%	4%	5%	4%	7%	7%	8%	
Refusal to all	n/a	n/a	n/a	1%	1%	1%	0%	0%	0%	0%	1%	
Central Vancouver Island CVI	<b>Up-to-date for age</b>	<b>64%</b>	<b>62%</b>	<b>58%</b>	<b>64%</b>	<b>69%</b>	<b>67%</b>	<b>64%</b>	<b>69%</b>	<b>67%</b>	<b>65%</b>	<b>67%</b>
	<b>Up-to-date minus the booster</b>	<b>76%</b>	<b>76%</b>	<b>73%</b>	<b>75%</b>	<b>79%</b>	<b>78%</b>	<b>76%</b>	<b>83%</b>	<b>79%</b>	<b>77%</b>	<b>79%</b>
	<i>Specific Agents</i>											
	DTaP-IPV	69%	66%	63%	68%	74%	71%	68%	72%	69%	67%	69%
	DTaP-IPV-Hib	69%	66%	63%	68%	73%	71%	68%	72%	69%	67%	69%
	Hepatitis B	85%	84%	82%	83%	85%	83%	83%	86%	84%	83%	85%
	Hib	73%	71%	69%	75%	75%	78%	74%	78%	72%	72%	74%
	MMR	84%	83%	82%	84%	87%	85%	83%	88%	83%	81%	83%
	Polio	72%	70%	68%	73%	77%	75%	72%	77%	72%	70%	72%
	Varicella	82%	80%	79%	81%	84%	83%	81%	86%	81%	80%	82%
	Pneumococcal conjugate	83%	81%	79%	81%	84%	82%	80%	85%	81%	79%	81%
	Meningococcal C	85%	83%	82%	83%	86%	85%	83%	87%	82%	81%	83%
	Rotavirus	n/a	n/a	67%	68%	72%	76%	77%	78%	65%	81%	81%
No immunizations recorded	n/a	n/a	n/a	6%	6%	7%	7%	6%	9%	9%	9%	
Refusal to all	n/a	n/a	n/a	2%	2%	3%	2%	1%	2%	3%	2%	
	<b>Up-to-date for age</b>	<b>66%</b>	<b>69%</b>	<b>69%</b>	<b>70%</b>	<b>75%</b>	<b>73%</b>	<b>73%</b>	<b>75%</b>	<b>72%</b>	<b>73%</b>	<b>74%</b>
	<b>Up-to-date minus the booster</b>	<b>75%</b>	<b>78%</b>	<b>78%</b>	<b>79%</b>	<b>84%</b>	<b>82%</b>	<b>80%</b>	<b>84%</b>	<b>81%</b>	<b>81%</b>	<b>81%</b>
	<i>Specific Agents</i>											

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
North Vancouver Island NVI	DTaP-IPV	73%	75%	74%	75%	78%	77%	77%	79%	74%	75%	76%
	DTaP-IPV-Hib	73%	75%	74%	75%	78%	76%	77%	79%	74%	75%	76%
	Hepatitis B	83%	85%	85%	83%	89%	87%	85%	87%	84%	87%	85%
	Hib	78%	79%	79%	80%	80%	81%	83%	85%	77%	79%	79%
	MMR	85%	87%	86%	87%	90%	88%	87%	90%	87%	85%	84%
	Polio	77%	78%	77%	79%	81%	79%	81%	82%	77%	77%	78%
	Varicella	81%	83%	82%	84%	87%	86%	85%	87%	84%	84%	84%
	Pneumococcal conjugate	83%	85%	85%	85%	88%	87%	85%	87%	84%	84%	83%
	Meningococcal C	85%	86%	86%	87%	89%	88%	87%	89%	86%	85%	84%
	Rotavirus	n/a	n/a	68%	70%	76%	81%	80%	79%	67%	83%	82%
	No immunizations recorded	n/a	n/a	n/a	7%	5%	5%	6%	6%	8%	8%	8%
	Refusal to all	n/a	n/a	n/a	1%	1%	1%	1%	1%	1%	1%	0%

## Northern Health

**Table 6. Percent of two-year-olds with up-to-date immunizations by Health Service Delivery Area, Northern Health**

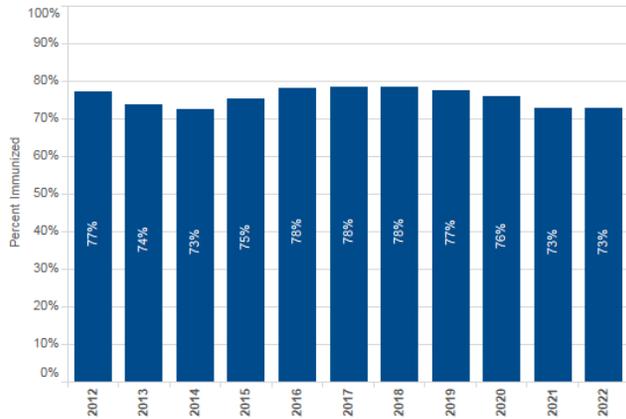
HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Northwest NW	Up-to-date for age	68%	60%	56%	56%	58%	57%	57%	61%	62%	62%	59%
	Up-to-date minus the booster	78%	74%	71%	65%	67%	67%	68%	73%	75%	73%	74%
	<i>Specific Agents</i>											
	DTaP-IPV	75%	67%	62%	62%	64%	61%	63%	64%	65%	65%	61%
	DTaP-IPV-Hib	75%	67%	62%	62%	64%	61%	63%	64%	65%	65%	61%
	Hepatitis B	86%	86%	80%	75%	77%	74%	79%	75%	79%	81%	80%
	Hib	79%	72%	68%	66%	66%	67%	68%	74%	69%	71%	67%
	MMR	88%	85%	82%	76%	76%	75%	76%	81%	79%	79%	78%
	Polio	78%	71%	67%	66%	67%	64%	66%	70%	68%	68%	64%
	Varicella	84%	79%	79%	73%	73%	72%	74%	79%	77%	76%	78%
	Pneumococcal conjugate	86%	84%	78%	72%	73%	73%	74%	73%	76%	76%	76%
	Meningococcal C	88%	86%	82%	76%	76%	75%	77%	80%	78%	78%	78%
	Rotavirus	n/a	n/a	66%	66%	72%	69%	76%	72%	66%	77%	77%
No immunizations recorded	n/a	n/a	n/a	11%	10%	13%	10%	8%	12%	10%	10%	
Refusal to all	n/a	n/a	n/a	1%	1%	1%	1%	0%	0%	0%	0%	
Northern Interior NI	Up-to-date for age	77%	76%	75%	72%	71%	71%	68%	65%	74%	72%	67%
	Up-to-date minus the booster	82%	83%	84%	79%	78%	79%	76%	76%	83%	81%	76%
	<i>Specific Agents</i>											
	DTaP-IPV	84%	79%	79%	78%	77%	77%	72%	68%	76%	74%	69%
	DTaP-IPV-Hib	83%	79%	79%	78%	76%	77%	72%	68%	76%	74%	69%
	Hepatitis B	91%	91%	90%	89%	85%	87%	86%	77%	85%	86%	83%
	Hib	85%	81%	81%	81%	78%	80%	75%	77%	80%	77%	73%
	MMR	91%	89%	90%	88%	87%	86%	82%	81%	87%	85%	80%
	Polio	85%	81%	81%	80%	79%	79%	73%	72%	79%	76%	71%
	Varicella	85%	86%	87%	85%	84%	83%	81%	79%	86%	84%	79%
	Pneumococcal conjugate	90%	88%	89%	85%	85%	84%	80%	74%	83%	83%	79%
	Meningococcal C	90%	89%	90%	88%	87%	86%	82%	80%	87%	85%	80%
	Rotavirus	n/a	n/a	80%	77%	78%	82%	85%	75%	74%	85%	84%
No immunizations recorded	n/a	n/a	n/a	4%	5%	6%	5%	8%	7%	8%	9%	
Refusal to all	n/a	n/a	n/a	1%	1%	2%	1%	0%	0%	0%	0%	
Northeast	Up-to-date for age	67%	63%	57%	60%	55%	57%	61%	56%	62%	58%	54%
	Up-to-date minus the booster	74%	71%	66%	69%	62%	66%	69%	70%	73%	68%	63%

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NE	<i>Specific Agents</i>											
	DTaP-IPV	72%	69%	64%	66%	62%	62%	66%	60%	66%	61%	56%
	DTaP-IPV-Hib	72%	69%	63%	66%	62%	62%	66%	60%	66%	61%	56%
	Hepatitis B	84%	81%	78%	79%	74%	74%	79%	71%	76%	76%	72%
	Hib	76%	72%	68%	70%	63%	65%	71%	70%	68%	64%	59%
	MMR	82%	80%	76%	78%	73%	72%	77%	77%	76%	73%	68%
	Polio	74%	71%	66%	69%	65%	64%	69%	67%	67%	63%	58%
	Varicella	78%	74%	71%	74%	69%	70%	74%	75%	75%	71%	66%
	Pneumococcal conjugate	80%	79%	74%	75%	70%	71%	75%	69%	74%	72%	67%
	Meningococcal C	82%	80%	76%	78%	73%	73%	77%	77%	75%	73%	68%
	Rotavirus	n/a	n/a	63%	64%	62%	70%	73%	64%	61%	73%	68%
	No immunizations recorded	n/a	n/a	n/a	11%	14%	15%	12%	14%	15%	16%	20%
	Refusal to all	n/a	n/a	n/a	3%	3%	3%	1%	1%	0%	0%	0%

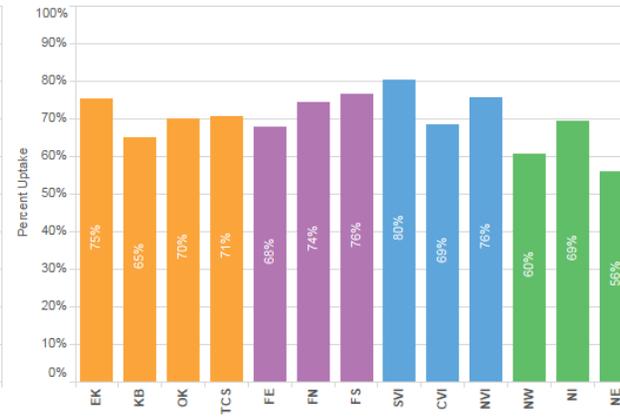
## Diphtheria, Tetanus, Pertussis and Polio (DTaP-IPV)

Two-year-olds immunized up-to-date, DTaP-IPV, British Columbia

All British Columbia (excluding VCH), by Year



By Health Service Delivery Area, 2022



By Health Authority and Year

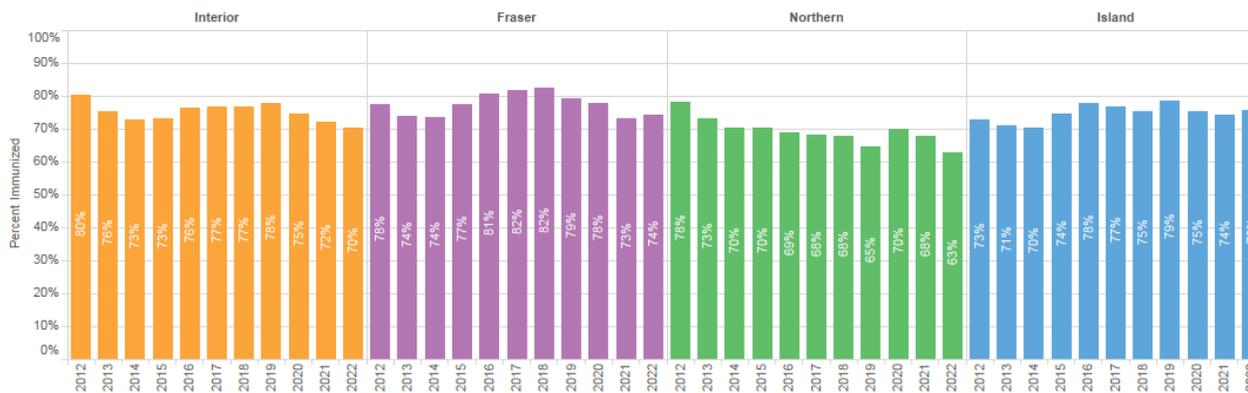


Figure 4. Percent of two-year-olds immunized up-to-date, DTaP-IPV, British Columbia

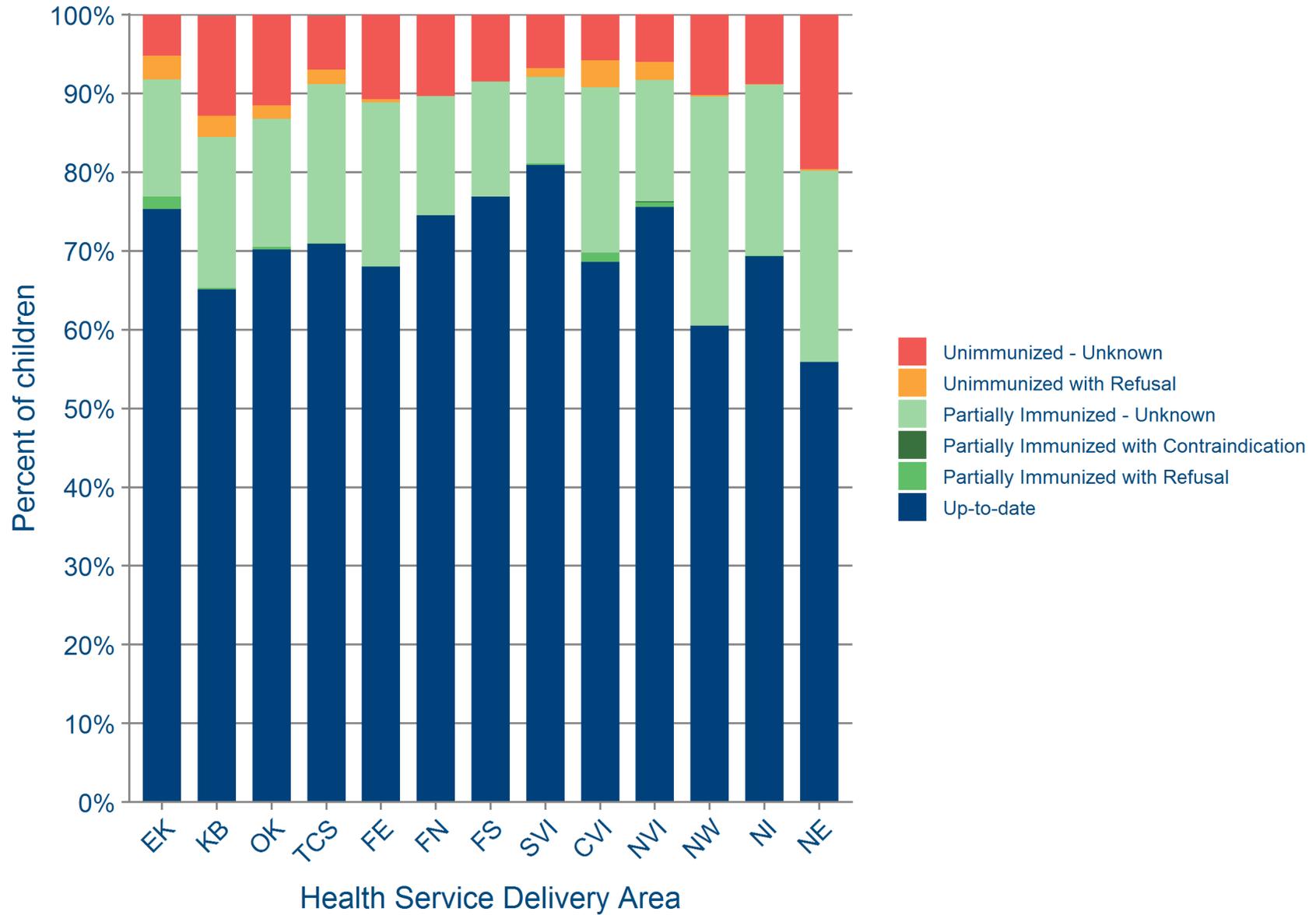


Figure 5. Reasons for non-immunization by Health Service Delivery Area, DTaP, British Columbia, 2022

**Table 7. Reasons for non-immunization, DTaP, British Columbia, 2022**

Region	Population	Count					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>64</b>	<b>1</b>	<b>6,022</b>	<b>276</b>	<b>0</b>	<b>3,278</b>
<b>Interior Health</b>	<b>6,530</b>	<b>24</b>	<b>0</b>	<b>1,151</b>	<b>128</b>	<b>0</b>	<b>618</b>
East Kootenay	770	12	0	115	23	0	40
Kootenay Boundary	582	1	0	112	16	0	74
Okanagan	3,177	8	0	519	53	0	366
Thompson Cariboo Shuswap	2,001	3	0	405	36	0	138
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0</b>	<b>0</b>	<b>3,109</b>	<b>15</b>	<b>0</b>	<b>1,849</b>
Fraser East	3,601	0	0	753	13	0	387
Fraser North	6,429	0	0	980	1	0	661
Fraser South	9,430	0	0	1,376	1	0	801
<b>Island Health</b>	<b>6,196</b>	<b>39</b>	<b>1</b>	<b>936</b>	<b>127</b>	<b>0</b>	<b>393</b>
South Vancouver Island	3,061	7	0	336	33	0	208
Central Vancouver Island	2,087	26	0	439	70	0	121
North Vancouver Island	1,048	6	1	161	24	0	64
<b>Northern Health</b>	<b>3,382</b>	<b>1</b>	<b>0</b>	<b>826</b>	<b>6</b>	<b>0</b>	<b>418</b>
Northwest	896	0	0	261	2	0	91
Northern Interior	1,481	1	0	321	2	0	130
Northeast	1,005	0	0	244	2	0	197

<sup>d</sup> Unknown includes all children who are partially immunized or unimmunized who do not have a documented refusal or contraindication. See [Notes](#).

<sup>e</sup> PIR does not contain complete supplementary information on reasons for non-immunization for FH. See [Notes](#).

Table 7 (continued).

Region	Population	Percent					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>0%</b>	<b>0%</b>	<b>17%</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
<b>Interior Health</b>	<b>6,530</b>	<b>0%</b>	<b>0%</b>	<b>18%</b>	<b>2%</b>	<b>0%</b>	<b>9%</b>
East Kootenay	770	2%	0%	15%	3%	0%	5%
Kootenay Boundary	582	0%	0%	19%	3%	0%	13%
Okanagan	3,177	0%	0%	16%	2%	0%	12%
Thompson Cariboo Shuswap	2,001	0%	0%	20%	2%	0%	7%
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0%</b>	<b>0%</b>	<b>16%</b>	<b>0%</b>	<b>0%</b>	<b>10%</b>
Fraser East	3,601	0%	0%	21%	0%	0%	11%
Fraser North	6,429	0%	0%	15%	0%	0%	10%
Fraser South	9,430	0%	0%	15%	0%	0%	8%
<b>Island Health</b>	<b>6,196</b>	<b>1%</b>	<b>0%</b>	<b>15%</b>	<b>2%</b>	<b>0%</b>	<b>6%</b>
South Vancouver Island	3,061	0%	0%	11%	1%	0%	7%
Central Vancouver Island	2,087	1%	0%	21%	3%	0%	6%
North Vancouver Island	1,048	1%	0%	15%	2%	0%	6%
<b>Northern Health</b>	<b>3,382</b>	<b>0%</b>	<b>0%</b>	<b>24%</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>
Northwest	896	0%	0%	29%	0%	0%	10%
Northern Interior	1,481	0%	0%	22%	0%	0%	9%
Northeast	1,005	0%	0%	24%	0%	0%	20%

## Diphtheria, Tetanus, Pertussis, Polio, *Haemophilus influenzae* type b (DTaP-IPV-Hib)

Two-year-olds immunized up-to-date, DTaP-IPV-Hib, British Columbia

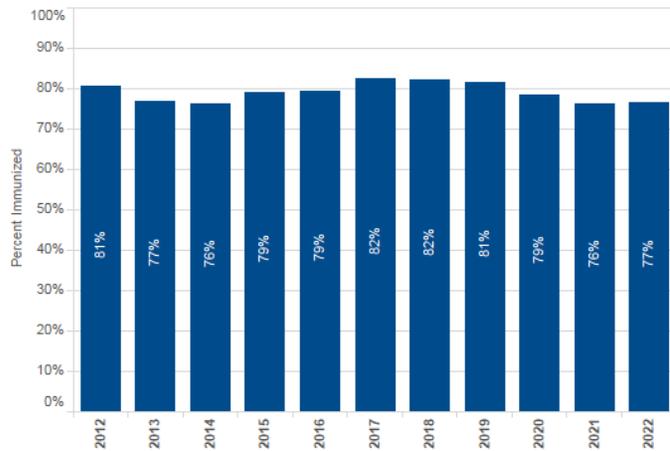


Figure 6. Percent of two-year-olds immunized up-to-date, DTaP-IPV-Hib, British Columbia

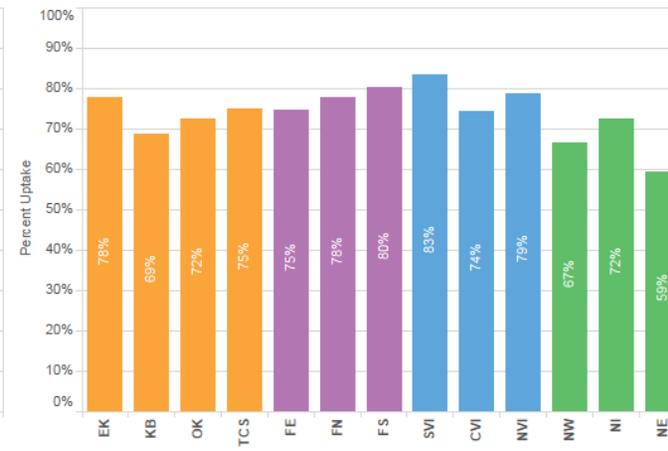
## Haemophilus influenzae type b (Hib)

### Two-year-olds immunized up-to-date, Hib, British Columbia

All British Columbia (excluding VCH), by Year



By Health Service Delivery Area, 2022



By Health Authority and Year

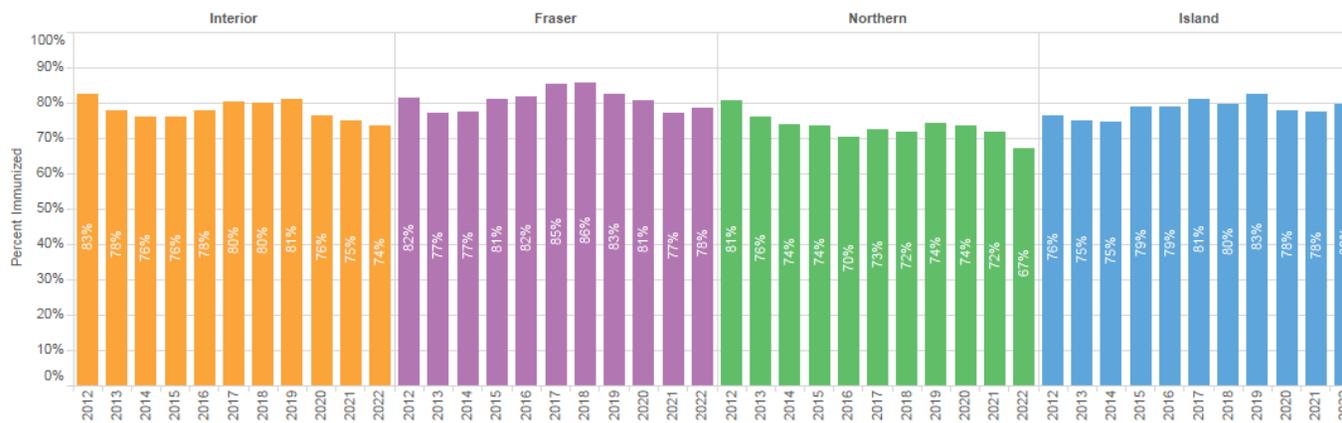


Figure 7. Percent of two-year-olds immunized up-to-date, Hib, British Columbia

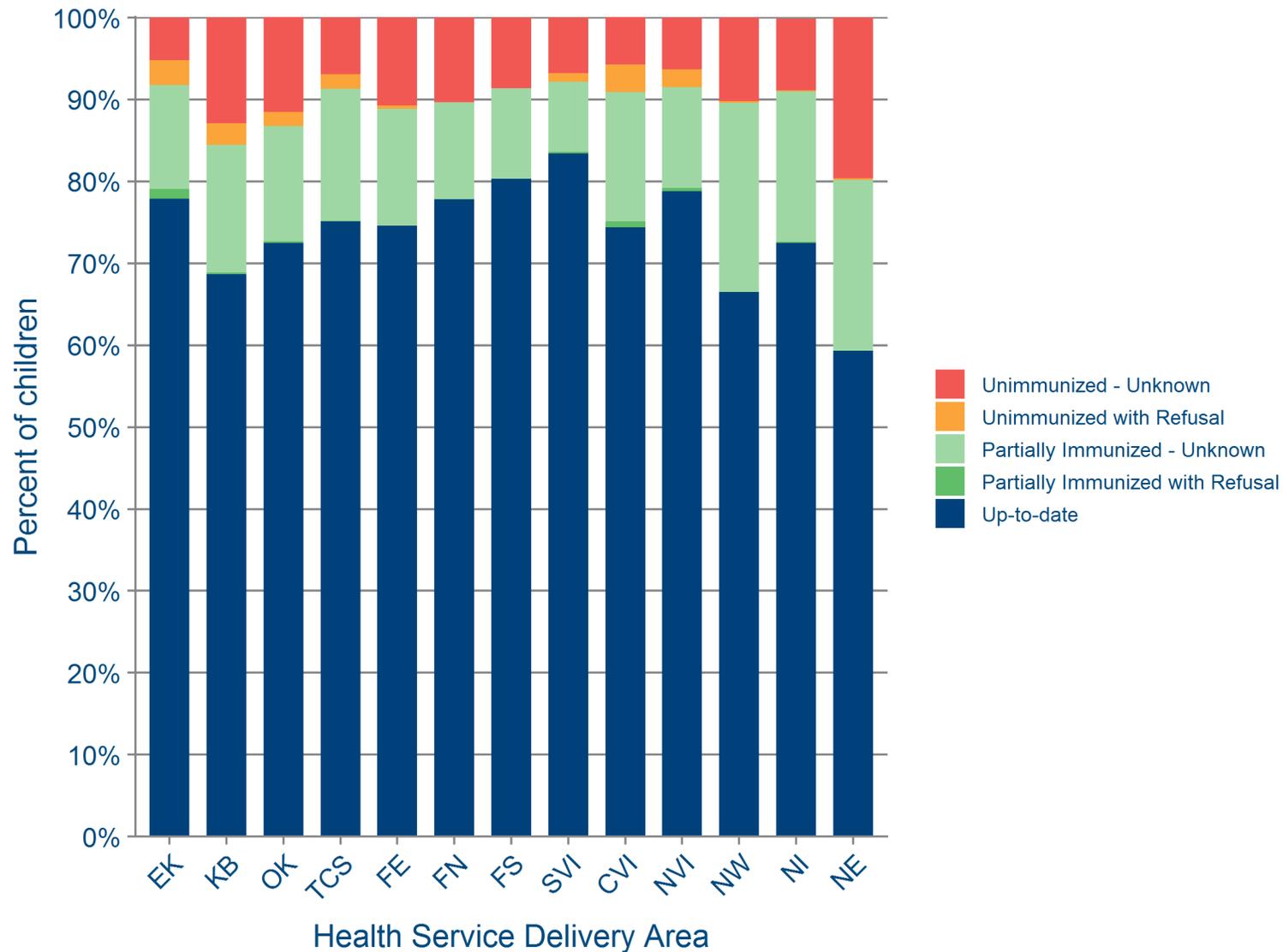


Figure 8. Reasons for non-immunization by Health Service Delivery Area, Hib, British Columbia, 2022

**Table 8. Reasons for non-immunization, Hib, British Columbia, 2022**

Region	Population	Count					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>43</b>	<b>0</b>	<b>4,703</b>	<b>273</b>	<b>0</b>	<b>3,292</b>
<b>Interior Health</b>	<b>6,530</b>	<b>18</b>	<b>0</b>	<b>960</b>	<b>127</b>	<b>0</b>	<b>620</b>
East Kootenay	770	9	0	98	23	0	40
Kootenay Boundary	582	1	0	91	15	0	75
Okanagan	3,177	6	0	448	53	0	367
Thompson Cariboo Shuswap	2,001	2	0	323	36	0	138
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0</b>	<b>0</b>	<b>2,330</b>	<b>15</b>	<b>0</b>	<b>1,858</b>
Fraser East	3,601	0	0	516	13	0	386
Fraser North	6,429	0	0	763	1	0	665
Fraser South	9,430	0	0	1,051	1	0	807
<b>Island Health</b>	<b>6,196</b>	<b>23</b>	<b>0</b>	<b>723</b>	<b>125</b>	<b>0</b>	<b>395</b>
South Vancouver Island	3,061	5	0	264	32	0	208
Central Vancouver Island	2,087	14	0	330	70	0	121
North Vancouver Island	1,048	4	0	129	23	0	66
<b>Northern Health</b>	<b>3,382</b>	<b>2</b>	<b>0</b>	<b>690</b>	<b>6</b>	<b>0</b>	<b>419</b>
Northwest	896	0	0	207	2	0	91
Northern Interior	1,481	2	0	273	2	0	131
Northeast	1,005	0	0	210	2	0	197

Table 8 (continued).

Region	Population	Percent					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>0%</b>	<b>0%</b>	<b>13%</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
<b>Interior Health</b>	<b>6,530</b>	<b>0%</b>	<b>0%</b>	<b>15%</b>	<b>2%</b>	<b>0%</b>	<b>9%</b>
East Kootenay	770	1%	0%	13%	3%	0%	5%
Kootenay Boundary	582	0%	0%	16%	3%	0%	13%
Okanagan	3,177	0%	0%	14%	2%	0%	12%
Thompson Cariboo Shuswap	2,001	0%	0%	16%	2%	0%	7%
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>0%</b>	<b>0%</b>	<b>10%</b>
Fraser East	3,601	0%	0%	14%	0%	0%	11%
Fraser North	6,429	0%	0%	12%	0%	0%	10%
Fraser South	9,430	0%	0%	11%	0%	0%	9%
<b>Island Health</b>	<b>6,196</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>2%</b>	<b>0%</b>	<b>6%</b>
South Vancouver Island	3,061	0%	0%	9%	1%	0%	7%
Central Vancouver Island	2,087	1%	0%	16%	3%	0%	6%
North Vancouver Island	1,048	0%	0%	12%	2%	0%	6%
<b>Northern Health</b>	<b>3,382</b>	<b>0%</b>	<b>0%</b>	<b>20%</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>
Northwest	896	0%	0%	23%	0%	0%	10%
Northern Interior	1,481	0%	0%	18%	0%	0%	9%
Northeast	1,005	0%	0%	21%	0%	0%	20%

## Hepatitis B

Two-year-olds immunized up-to-date, Hepatitis B, British Columbia

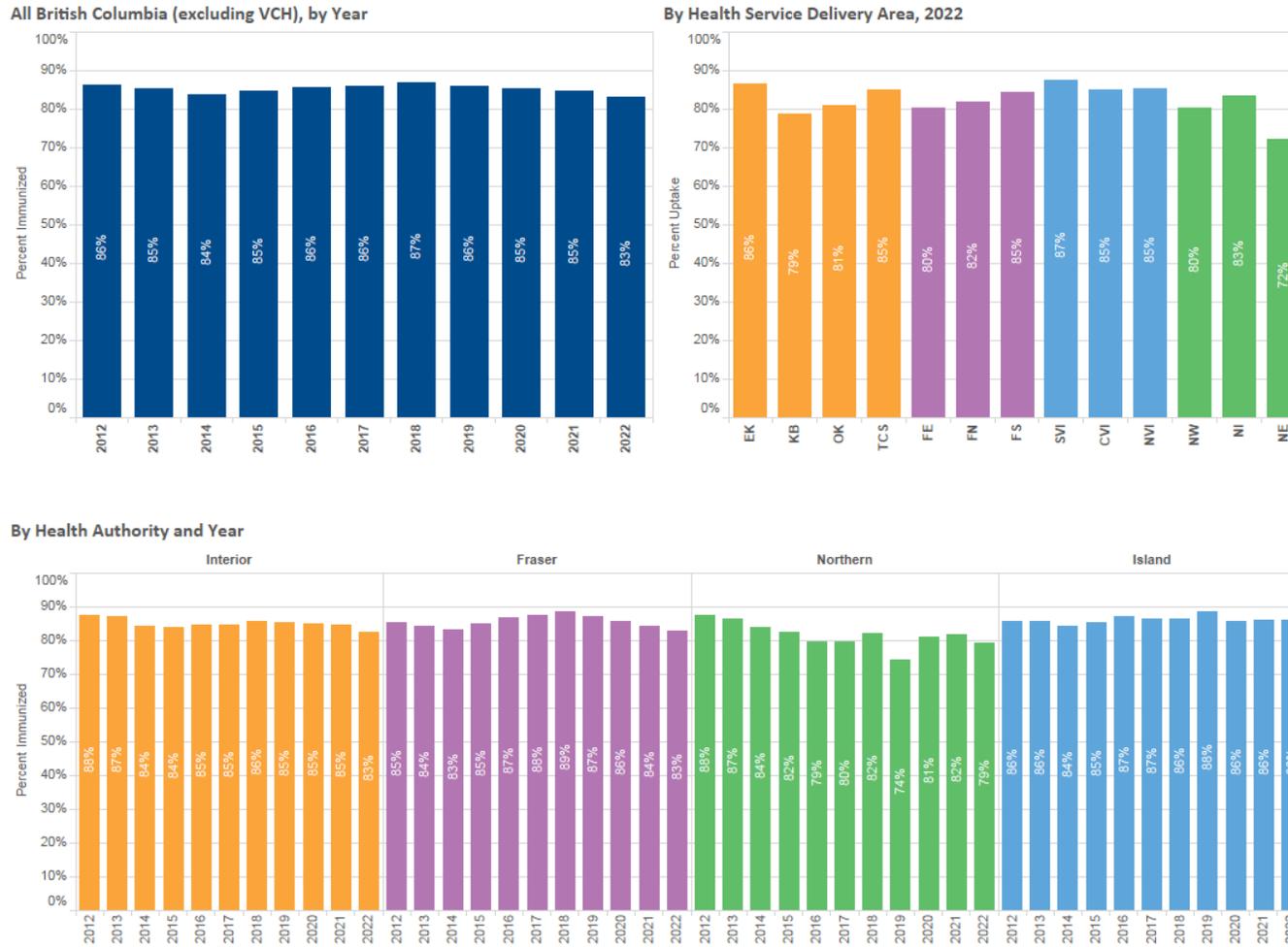


Figure 9. Percent of two-year-olds immunized up-to-date, Hepatitis B, British Columbia

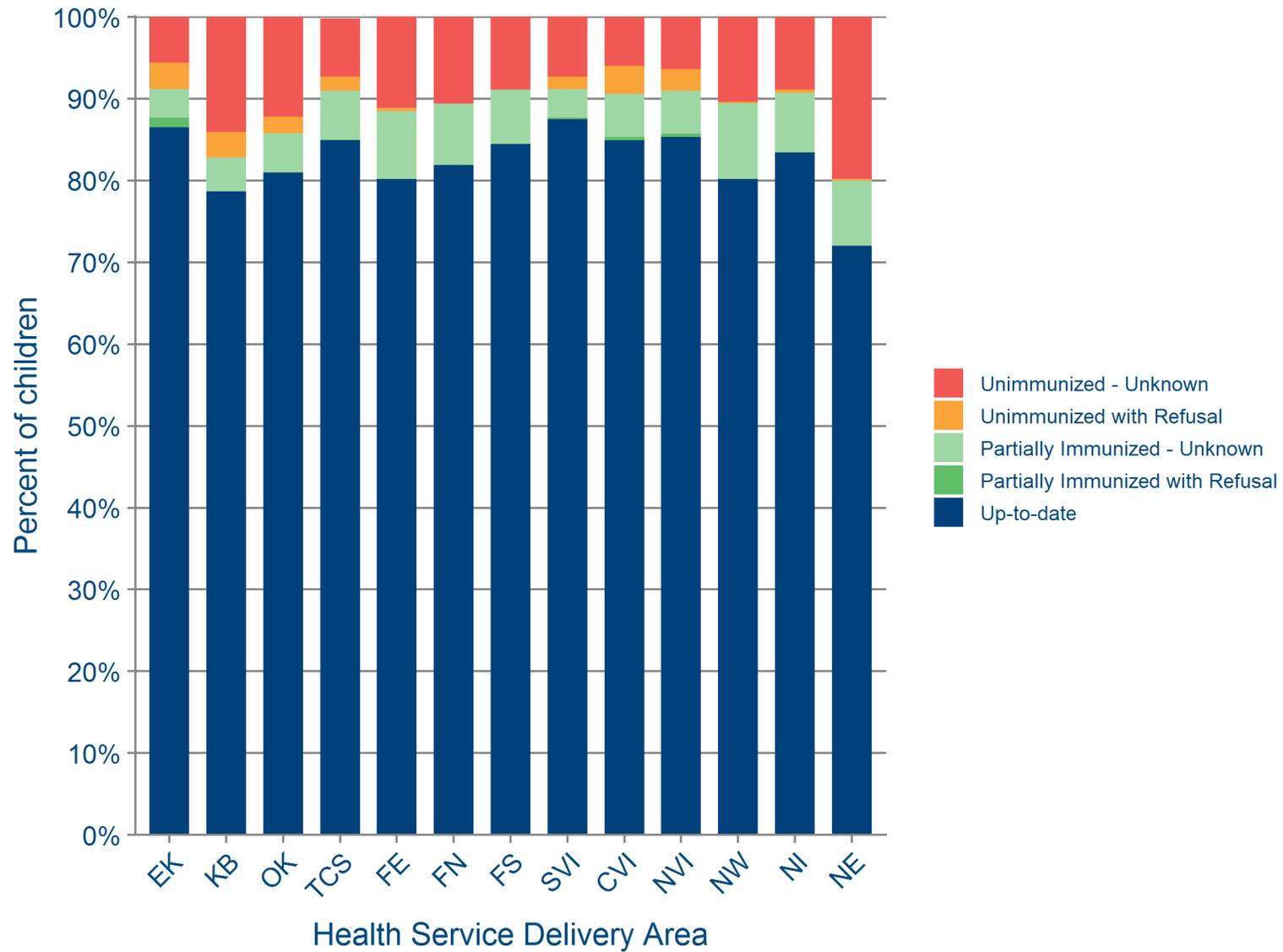


Figure 10. Reasons for non-immunization by Health Service Delivery Area, Hepatitis B, British Columbia, 2022

**Table 9. Reasons for non-immunization, Hepatitis B, British Columbia, 2022**

Region	Population	Count					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>32</b>	<b>0</b>	<b>2,266</b>	<b>310</b>	<b>0</b>	<b>3,419</b>
<b>Interior Health</b>	<b>6,530</b>	<b>13</b>	<b>0</b>	<b>324</b>	<b>141</b>	<b>0</b>	<b>656</b>
East Kootenay	770	9	0	27	25	0	43
Kootenay Boundary	582	0	0	24	18	0	82
Okanagan	3,177	1	0	152	63	0	388
Thompson Cariboo Shuswap	2,001	3	0	121	35	0	143
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0</b>	<b>0</b>	<b>1,398</b>	<b>15</b>	<b>0</b>	<b>1,922</b>
Fraser East	3,601	0	0	298	13	0	403
Fraser North	6,429	0	0	479	1	0	681
Fraser South	9,430	0	0	621	1	0	838
<b>Island Health</b>	<b>6,196</b>	<b>18</b>	<b>0</b>	<b>274</b>	<b>145</b>	<b>0</b>	<b>417</b>
South Vancouver Island	3,061	6	0	107	46	0	225
Central Vancouver Island	2,087	8	0	111	72	0	125
North Vancouver Island	1,048	4	0	56	27	0	67
<b>Northern Health</b>	<b>3,382</b>	<b>1</b>	<b>0</b>	<b>270</b>	<b>9</b>	<b>0</b>	<b>424</b>
Northwest	896	0	0	83	1	0	93
Northern Interior	1,481	1	0	107	6	0	132
Northeast	1,005	0	0	80	2	0	199

Table 9 (continued).

Region	Population	Percent					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>0%</b>	<b>0%</b>	<b>6%</b>	<b>1%</b>	<b>0%</b>	<b>10%</b>
<b>Interior Health</b>	<b>6,530</b>	<b>0%</b>	<b>0%</b>	<b>5%</b>	<b>2%</b>	<b>0%</b>	<b>10%</b>
East Kootenay	770	1%	0%	4%	3%	0%	6%
Kootenay Boundary	582	0%	0%	4%	3%	0%	14%
Okanagan	3,177	0%	0%	5%	2%	0%	12%
Thompson Cariboo Shuswap	2,001	0%	0%	6%	2%	0%	7%
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0%</b>	<b>0%</b>	<b>7%</b>	<b>0%</b>	<b>0%</b>	<b>10%</b>
Fraser East	3,601	0%	0%	8%	0%	0%	11%
Fraser North	6,429	0%	0%	8%	0%	0%	11%
Fraser South	9,430	0%	0%	7%	0%	0%	9%
<b>Island Health</b>	<b>6,196</b>	<b>0%</b>	<b>0%</b>	<b>4%</b>	<b>2%</b>	<b>0%</b>	<b>7%</b>
South Vancouver Island	3,061	0%	0%	4%	2%	0%	7%
Central Vancouver Island	2,087	0%	0%	5%	3%	0%	6%
North Vancouver Island	1,048	0%	0%	5%	3%	0%	6%
<b>Northern Health</b>	<b>3,382</b>	<b>0%</b>	<b>0%</b>	<b>8%</b>	<b>0%</b>	<b>0%</b>	<b>13%</b>
Northwest	896	0%	0%	9%	0%	0%	10%
Northern Interior	1,481	0%	0%	7%	0%	0%	9%
Northeast	1,005	0%	0%	8%	0%	0%	20%

## Measles, Mumps, and Rubella (MMR)

Two-year-olds immunized up-to-date, MMR, British Columbia

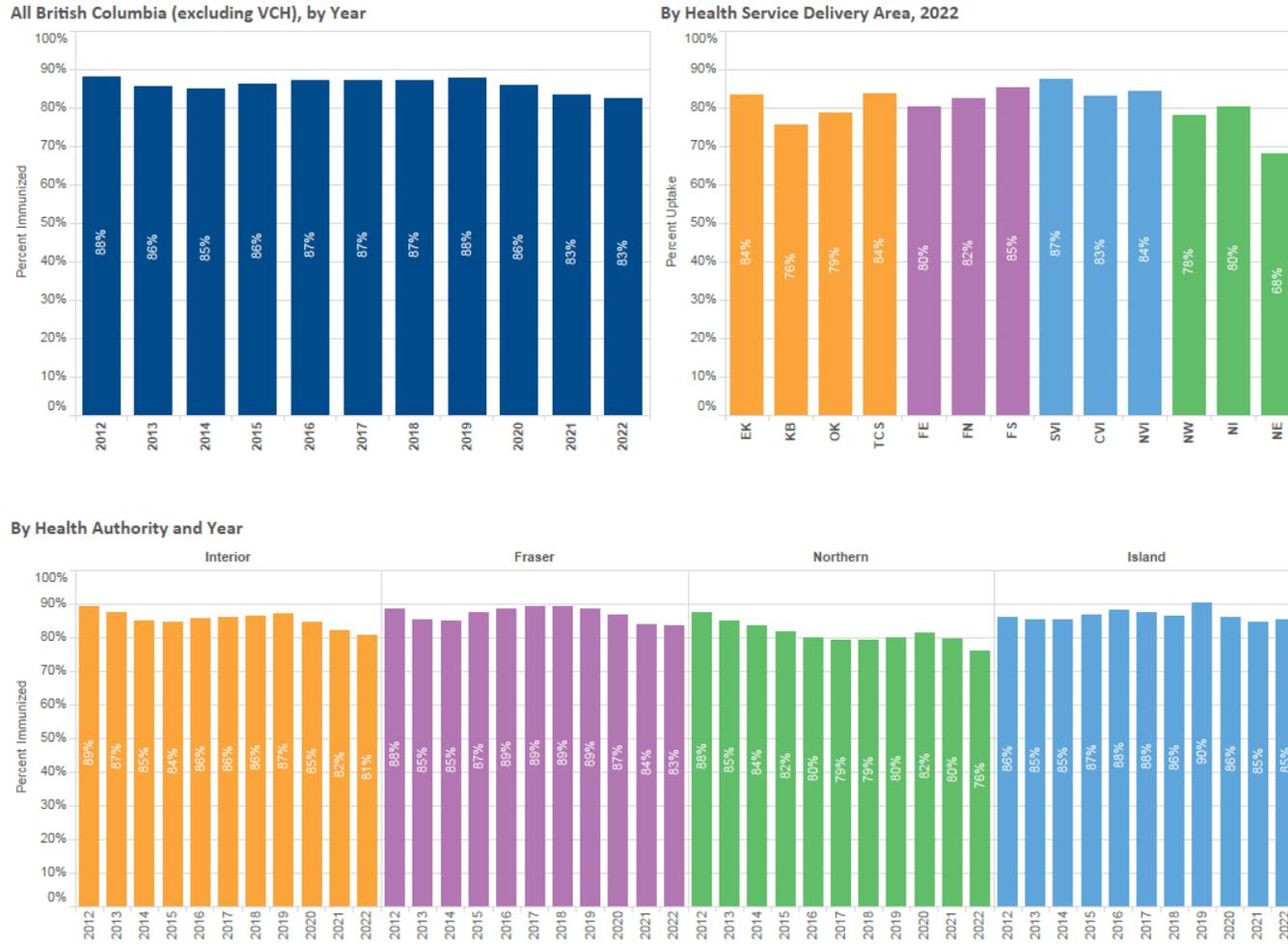


Figure 11. Percent of two-year-olds immunized up-to-date, MMR, British Columbia

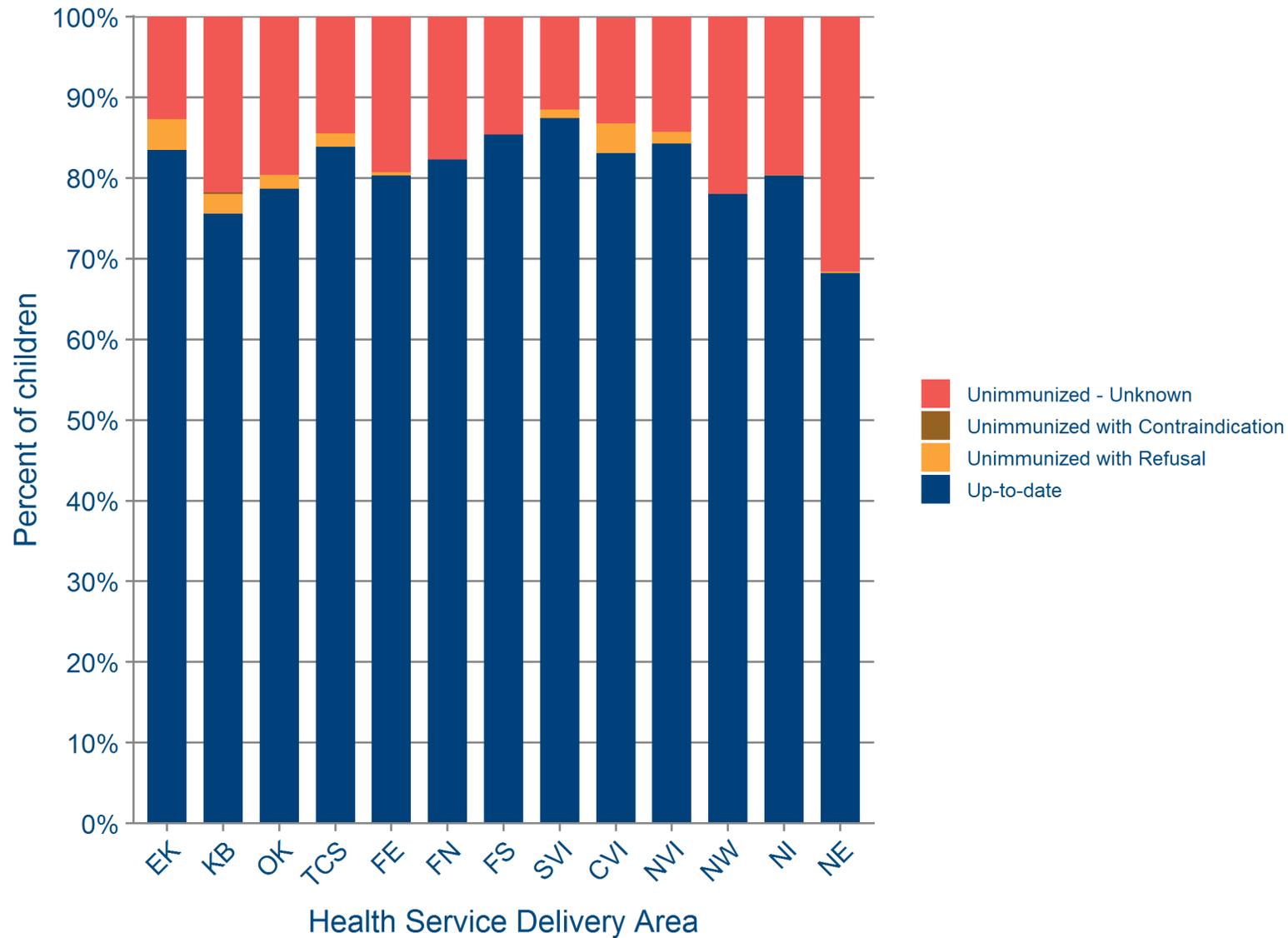


Figure 12. Reasons for non-immunization by Health Service Delivery Area, MMR, British Columbia, 2022

**Table 10. Reasons for non-immunization, MMR, British Columbia, 2022**

Region	Population	Count			Percent		
		Unimmunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>273</b>	<b>2</b>	<b>5,932</b>	<b>1%</b>	<b>0%</b>	<b>17%</b>
<b>Interior Health</b>	<b>6,530</b>	<b>129</b>	<b>1</b>	<b>1,138</b>	<b>2%</b>	<b>0%</b>	<b>17%</b>
East Kootenay	770	29	0	98	4%	0%	13%
Kootenay Boundary	582	14	1	127	2%	0%	22%
Okanagan	3,177	54	0	622	2%	0%	20%
Thompson Cariboo Shuswap	2,001	32	0	291	2%	0%	14%
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>14</b>	<b>0</b>	<b>3,212</b>	<b>0%</b>	<b>0%</b>	<b>17%</b>
Fraser East	3,601	13	0	697	0%	0%	19%
Fraser North	6,429	0	0	1,135	0%	0%	18%
Fraser South	9,430	1	0	1,380	0%	0%	15%
<b>Island Health</b>	<b>6,196</b>	<b>126</b>	<b>1</b>	<b>777</b>	<b>2%</b>	<b>0%</b>	<b>13%</b>
South Vancouver Island	3,061	33	0	353	1%	0%	12%
Central Vancouver Island	2,087	78	1	274	4%	0%	13%
North Vancouver Island	1,048	15	0	150	1%	0%	14%
<b>Northern Health</b>	<b>3,382</b>	<b>4</b>	<b>0</b>	<b>805</b>	<b>0%</b>	<b>0%</b>	<b>24%</b>
Northwest	896	0	0	197	0%	0%	22%
Northern Interior	1,481	2	0	290	0%	0%	20%
Northeast	1,005	2	0	318	0%	0%	32%

## Meningococcal C Conjugate

Two-year-olds immunized up-to-date, Meningococcal C, British Columbia

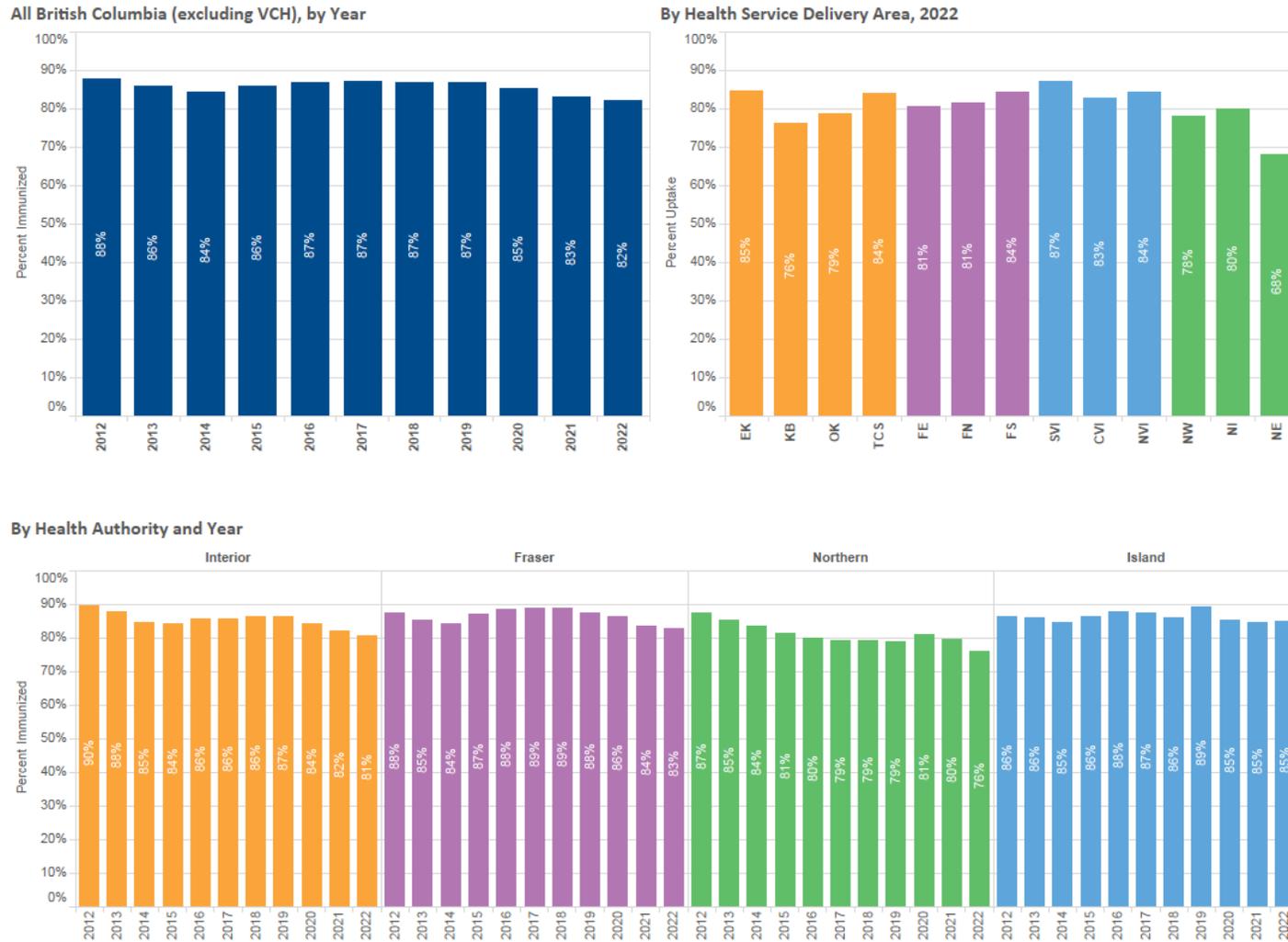


Figure 13. Percent of two-year-olds immunized up-to-date, Meningococcal C, British Columbia

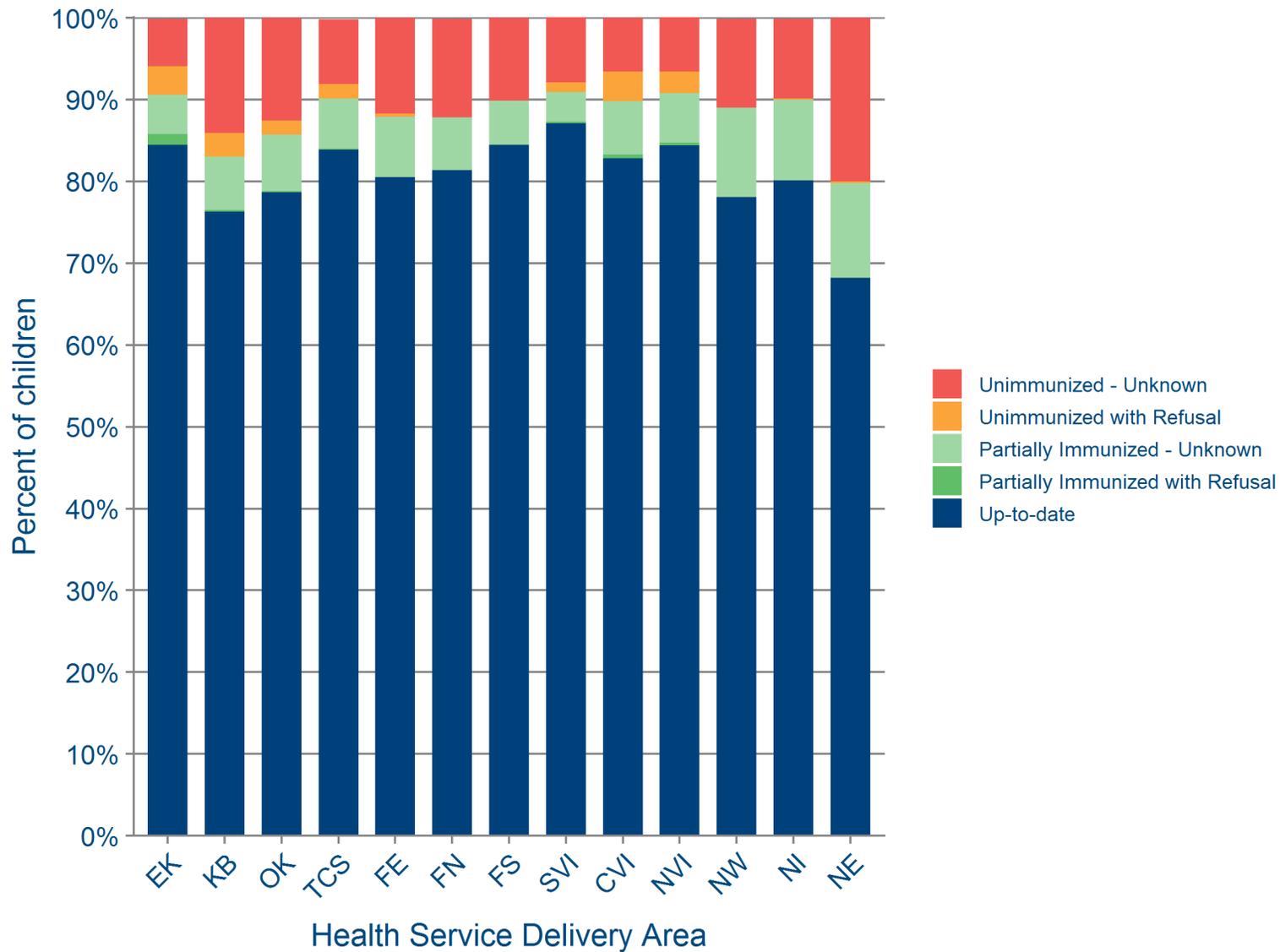


Figure 14. Reasons for non-immunization by Health Service Delivery Area, Meningococcal C, British Columbia, 2022

**Table 11. Reasons for non-immunization, Meningococcal C, British Columbia, 2022**

Region	Population	Count					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>37</b>	<b>0</b>	<b>2,280</b>	<b>293</b>	<b>0</b>	<b>3,736</b>
<b>Interior Health</b>	<b>6,530</b>	<b>18</b>	<b>0</b>	<b>417</b>	<b>135</b>	<b>0</b>	<b>686</b>
East Kootenay	770	10	0	37	27	0	45
Kootenay Boundary	582	1	0	38	17	0	82
Okanagan	3,177	4	0	219	54	0	400
Thompson Cariboo Shuswap	2,001	3	0	123	37	0	159
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0</b>	<b>0</b>	<b>1,191</b>	<b>15</b>	<b>0</b>	<b>2,154</b>
Fraser East	3,601	0	0	266	13	0	422
Fraser North	6,429	0	0	412	1	0	780
Fraser South	9,430	0	0	513	1	0	952
<b>Island Health</b>	<b>6,196</b>	<b>19</b>	<b>0</b>	<b>310</b>	<b>139</b>	<b>0</b>	<b>452</b>
South Vancouver Island	3,061	5	0	110	37	0	244
Central Vancouver Island	2,087	11	0	136	75	0	138
North Vancouver Island	1,048	3	0	64	27	0	70
<b>Northern Health</b>	<b>3,382</b>	<b>0</b>	<b>0</b>	<b>362</b>	<b>4</b>	<b>0</b>	<b>444</b>
Northwest	896	0	0	98	0	0	98
Northern Interior	1,481	0	0	147	2	0	145
Northeast	1,005	0	0	117	2	0	201

Table 11 (continued).

Region	Population	Percent					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>0%</b>	<b>0%</b>	<b>6%</b>	<b>1%</b>	<b>0%</b>	<b>10%</b>
<b>Interior Health</b>	<b>6,530</b>	<b>0%</b>	<b>0%</b>	<b>6%</b>	<b>2%</b>	<b>0%</b>	<b>11%</b>
East Kootenay	770	1%	0%	5%	4%	0%	6%
Kootenay Boundary	582	0%	0%	6%	3%	0%	14%
Okanagan	3,177	0%	0%	7%	2%	0%	13%
Thompson Cariboo Shuswap	2,001	0%	0%	6%	2%	0%	8%
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0%</b>	<b>0%</b>	<b>6%</b>	<b>0%</b>	<b>0%</b>	<b>11%</b>
Fraser East	3,601	0%	0%	7%	0%	0%	12%
Fraser North	6,429	0%	0%	6%	0%	0%	12%
Fraser South	9,430	0%	0%	5%	0%	0%	10%
<b>Island Health</b>	<b>6,196</b>	<b>0%</b>	<b>0%</b>	<b>5%</b>	<b>2%</b>	<b>0%</b>	<b>7%</b>
South Vancouver Island	3,061	0%	0%	4%	1%	0%	8%
Central Vancouver Island	2,087	0%	0%	6%	4%	0%	7%
North Vancouver Island	1,048	0%	0%	6%	3%	0%	7%
<b>Northern Health</b>	<b>3,382</b>	<b>0%</b>	<b>0%</b>	<b>11%</b>	<b>0%</b>	<b>0%</b>	<b>13%</b>
Northwest	896	0%	0%	11%	0%	0%	11%
Northern Interior	1,481	0%	0%	10%	0%	0%	10%
Northeast	1,005	0%	0%	12%	0%	0%	20%

## Polio

Two-year-olds immunized up-to-date, Polio, British Columbia



Figure 15. Percent of two-year-olds immunized up-to-date, Polio, British Columbia

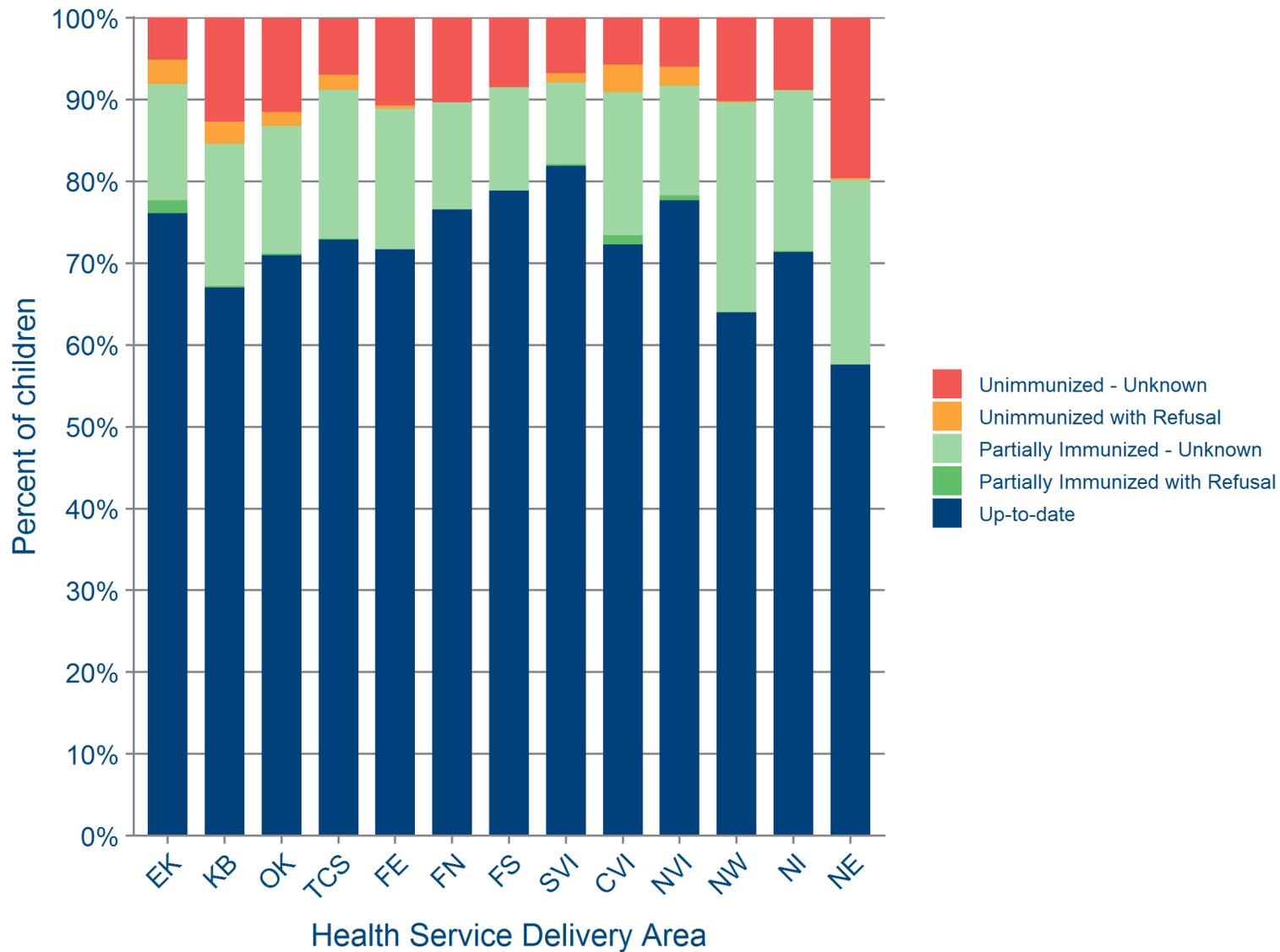


Figure 16. Reasons for non-immunization by Health Service Delivery Area, Polio, British Columbia, 2022

**Table 12. Reasons for non-immunization, Polio, British Columbia, 2022**

Region	Population	Count					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>59</b>	<b>0</b>	<b>5,274</b>	<b>275</b>	<b>0</b>	<b>3,285</b>
<b>Interior Health</b>	<b>6,530</b>	<b>22</b>	<b>0</b>	<b>1,070</b>	<b>128</b>	<b>0</b>	<b>619</b>
East Kootenay	770	12	0	109	23	0	40
Kootenay Boundary	582	1	0	101	16	0	74
Okanagan	3,177	6	0	495	53	0	366
Thompson Cariboo Shuswap	2,001	3	0	365	36	0	139
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0</b>	<b>0</b>	<b>2,644</b>	<b>15</b>	<b>0</b>	<b>1,855</b>
Fraser East	3,601	0	0	619	13	0	388
Fraser North	6,429	0	0	840	1	0	663
Fraser South	9,430	0	0	1,185	1	0	804
<b>Island Health</b>	<b>6,196</b>	<b>36</b>	<b>0</b>	<b>812</b>	<b>127</b>	<b>0</b>	<b>392</b>
South Vancouver Island	3,061	7	0	306	33	0	208
Central Vancouver Island	2,087	23	0	366	70	0	120
North Vancouver Island	1,048	6	0	140	24	0	64
<b>Northern Health</b>	<b>3,382</b>	<b>1</b>	<b>0</b>	<b>748</b>	<b>5</b>	<b>0</b>	<b>419</b>
Northwest	896	0	0	230	1	0	92
Northern Interior	1,481	1	0	291	2	0	130
Northeast	1,005	0	0	227	2	0	197

Table 12 (continued).

Region	Population	Percent					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>0%</b>	<b>0%</b>	<b>15%</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
<b>Interior Health</b>	<b>6,530</b>	<b>0%</b>	<b>0%</b>	<b>16%</b>	<b>2%</b>	<b>0%</b>	<b>9%</b>
East Kootenay	770	2%	0%	14%	3%	0%	5%
Kootenay Boundary	582	0%	0%	17%	3%	0%	13%
Okanagan	3,177	0%	0%	16%	2%	0%	12%
Thompson Cariboo Shuswap	2,001	0%	0%	18%	2%	0%	7%
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0%</b>	<b>0%</b>	<b>14%</b>	<b>0%</b>	<b>0%</b>	<b>10%</b>
Fraser East	3,601	0%	0%	17%	0%	0%	11%
Fraser North	6,429	0%	0%	13%	0%	0%	10%
Fraser South	9,430	0%	0%	13%	0%	0%	8%
<b>Island Health</b>	<b>6,196</b>	<b>1%</b>	<b>0%</b>	<b>13%</b>	<b>2%</b>	<b>0%</b>	<b>6%</b>
South Vancouver Island	3,061	0%	0%	10%	1%	0%	7%
Central Vancouver Island	2,087	1%	0%	18%	3%	0%	6%
North Vancouver Island	1,048	1%	0%	13%	2%	0%	6%
<b>Northern Health</b>	<b>3,382</b>	<b>0%</b>	<b>0%</b>	<b>22%</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>
Northwest	896	0%	0%	26%	0%	0%	10%
Northern Interior	1,481	0%	0%	20%	0%	0%	9%
Northeast	1,005	0%	0%	23%	0%	0%	20%

## Pneumococcal Conjugate

Two-year-olds immunized up-to-date, Pneumococcal Conjugate, British Columbia

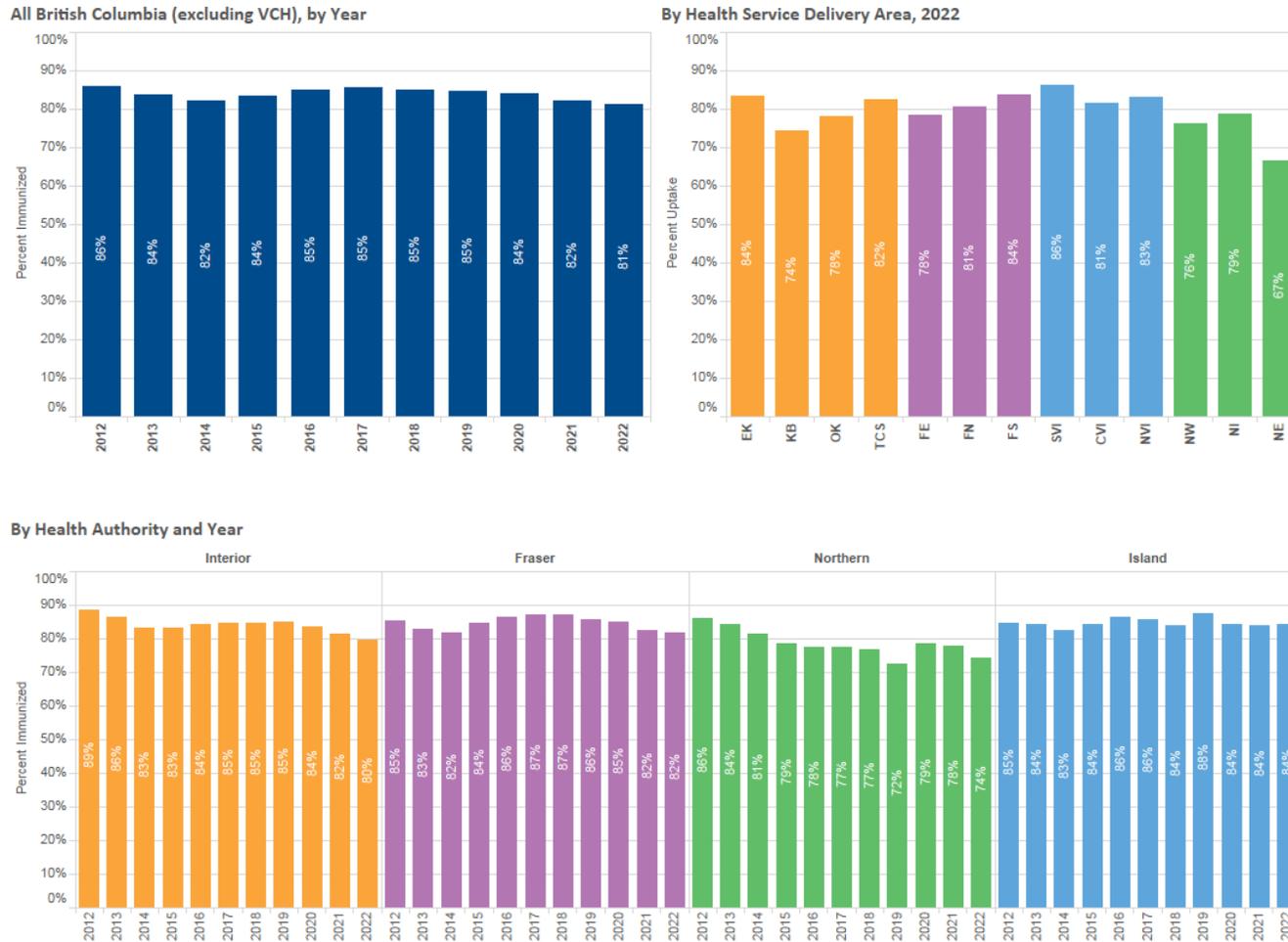


Figure 17. Percent of two-year-olds immunized up-to-date, Pneumococcal Conjugate, British Columbia

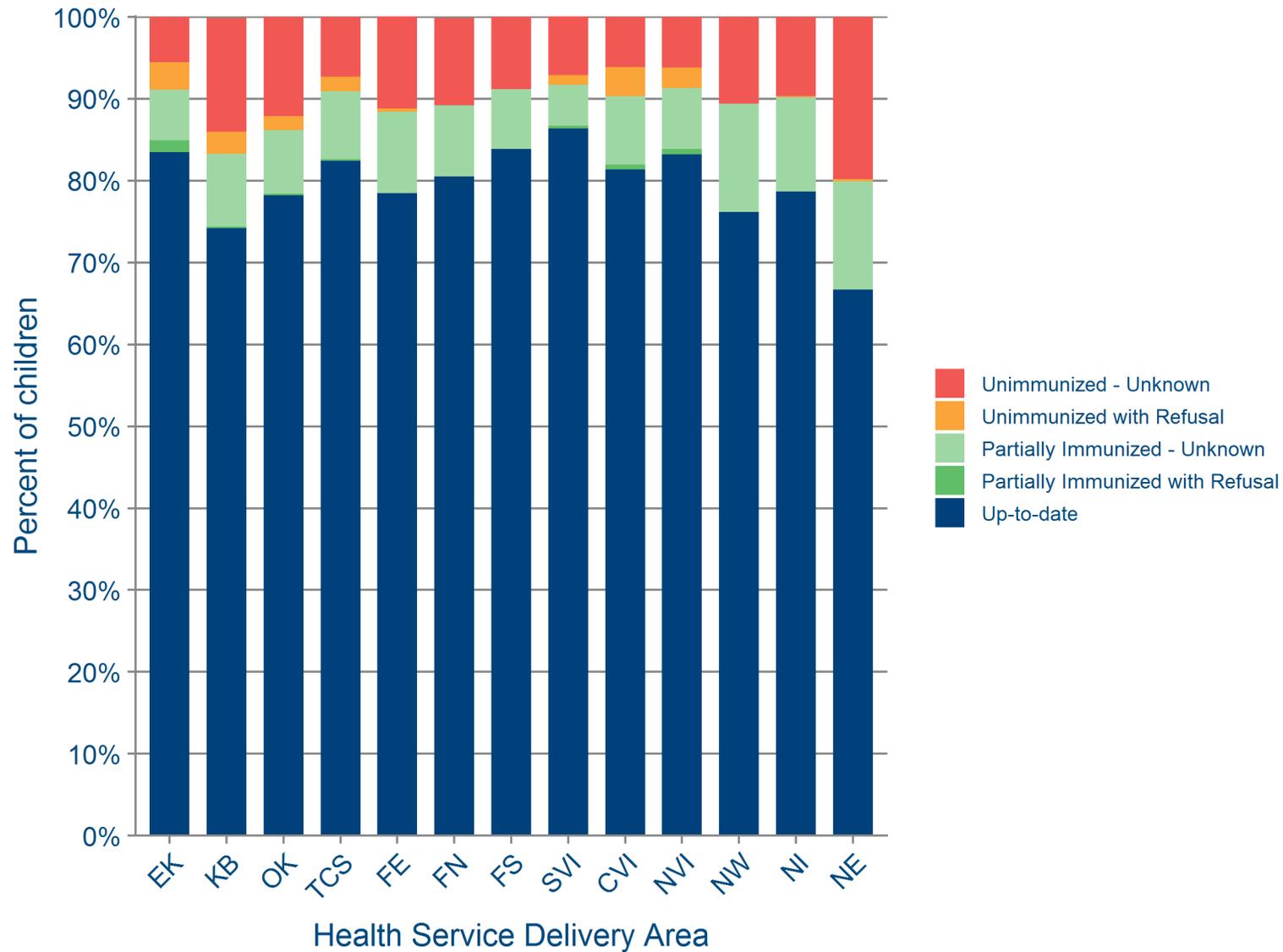


Figure 18. Reasons for non-immunization by Health Service Delivery Area, Pneumococcal Conjugate, British Columbia, 2022

**Table 13. Reasons for non-immunization, Pneumococcal Conjugate, British Columbia, 2022**

Region	Population	Count					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>50</b>	<b>0</b>	<b>2,948</b>	<b>289</b>	<b>0</b>	<b>3,428</b>
<b>Interior Health</b>	<b>6,530</b>	<b>22</b>	<b>0</b>	<b>515</b>	<b>132</b>	<b>0</b>	<b>655</b>
East Kootenay	770	11	0	48	26	0	42
Kootenay Boundary	582	1	0	52	16	0	81
Okanagan	3,177	5	0	249	54	0	386
Thompson Cariboo Shuswap	2,001	5	0	166	36	0	146
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0</b>	<b>0</b>	<b>1,608</b>	<b>14</b>	<b>0</b>	<b>1,924</b>
Fraser East	3,601	0	0	357	13	0	406
Fraser North	6,429	0	0	559	1	0	691
Fraser South	9,430	0	0	692	0	0	827
<b>Island Health</b>	<b>6,196</b>	<b>28</b>	<b>0</b>	<b>404</b>	<b>138</b>	<b>0</b>	<b>411</b>
South Vancouver Island	3,061	8	0	153	37	0	219
Central Vancouver Island	2,087	13	0	173	75	0	127
North Vancouver Island	1,048	7	0	78	26	0	65
<b>Northern Health</b>	<b>3,382</b>	<b>0</b>	<b>0</b>	<b>421</b>	<b>5</b>	<b>0</b>	<b>438</b>
Northwest	896	0	0	118	0	0	95
Northern Interior	1,481	0	0	170	2	0	144
Northeast	1,005	0	0	133	3	0	199

Table 13 (continued).

Region	Population	Percent					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>0%</b>	<b>0%</b>	<b>8%</b>	<b>1%</b>	<b>0%</b>	<b>10%</b>
<b>Interior Health</b>	<b>6,530</b>	<b>0%</b>	<b>0%</b>	<b>8%</b>	<b>2%</b>	<b>0%</b>	<b>10%</b>
East Kootenay	770	1%	0%	6%	3%	0%	6%
Kootenay Boundary	582	0%	0%	9%	3%	0%	14%
Okanagan	3,177	0%	0%	8%	2%	0%	12%
Thompson Cariboo Shuswap	2,001	0%	0%	8%	2%	0%	7%
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0%</b>	<b>0%</b>	<b>8%</b>	<b>0%</b>	<b>0%</b>	<b>10%</b>
Fraser East	3,601	0%	0%	10%	0%	0%	11%
Fraser North	6,429	0%	0%	9%	0%	0%	11%
Fraser South	9,430	0%	0%	7%	0%	0%	9%
<b>Island Health</b>	<b>6,196</b>	<b>0%</b>	<b>0%</b>	<b>7%</b>	<b>2%</b>	<b>0%</b>	<b>7%</b>
South Vancouver Island	3,061	0%	0%	5%	1%	0%	7%
Central Vancouver Island	2,087	1%	0%	8%	4%	0%	6%
North Vancouver Island	1,048	1%	0%	7%	2%	0%	6%
<b>Northern Health</b>	<b>3,382</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>0%</b>	<b>0%</b>	<b>13%</b>
Northwest	896	0%	0%	13%	0%	0%	11%
Northern Interior	1,481	0%	0%	12%	0%	0%	10%
Northeast	1,005	0%	0%	13%	0%	0%	20%

## Rotavirus<sup>b</sup>

### Two-year-olds immunized up-to-date, Rotavirus, British Columbia

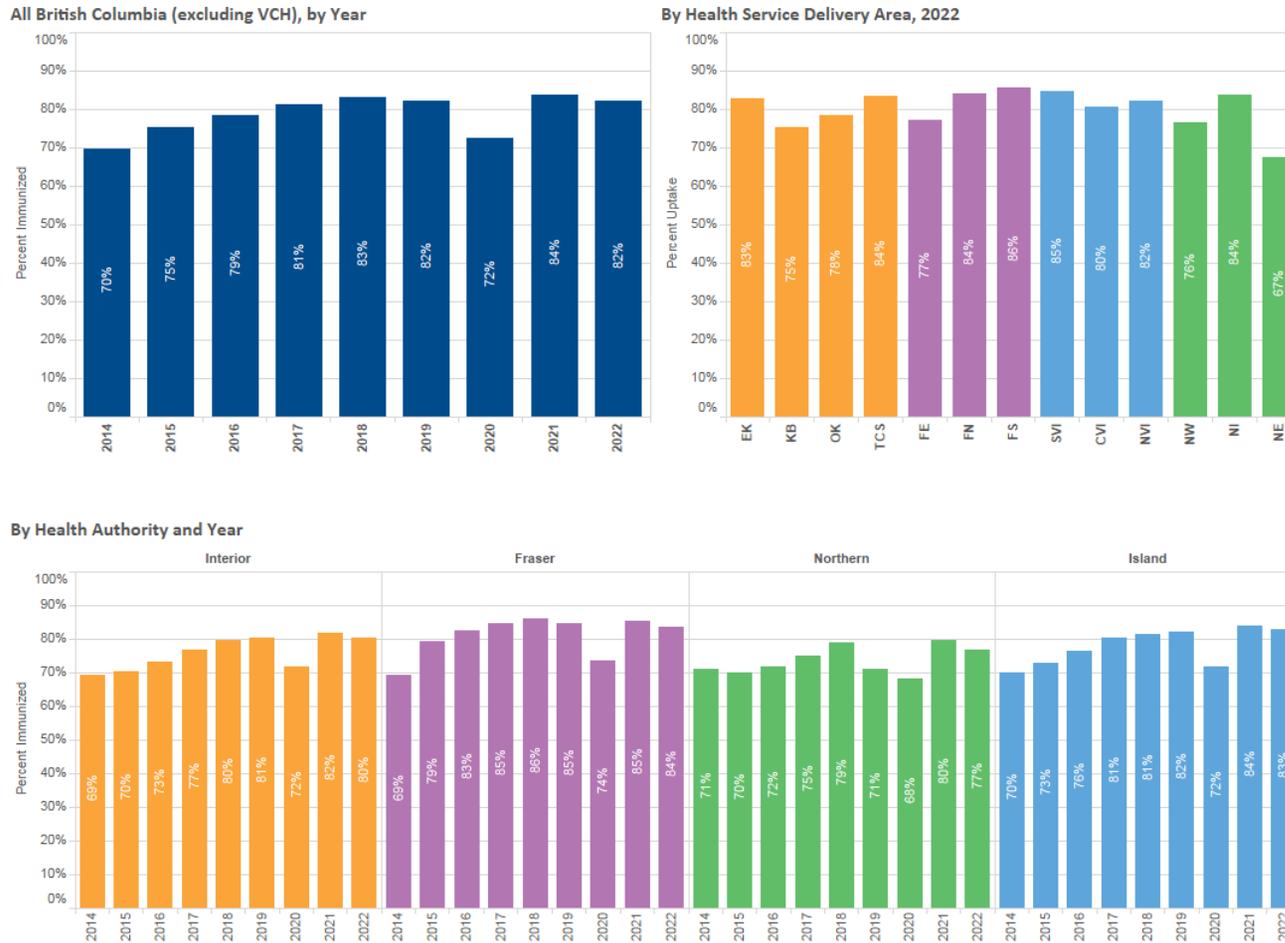


Figure 19. Percent of two-year-olds immunized up-to-date, Rotavirus, British Columbia

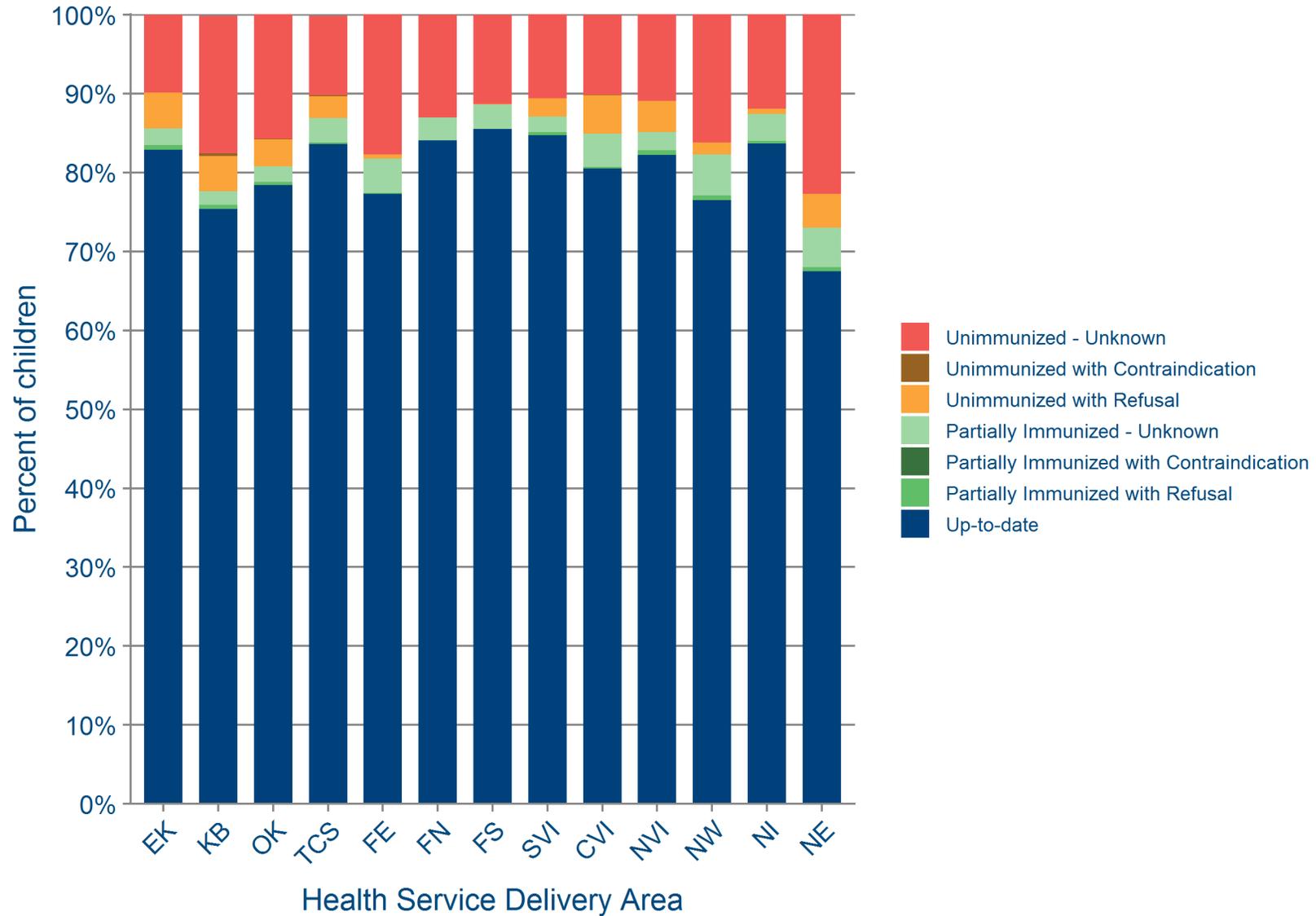


Figure 20. Reasons for non-immunization by Health Service Delivery Area, Rotavirus, British Columbia, 2022

**Table 14. Reasons for non-immunization, Rotavirus, British Columbia, 2022**

Region	Population	Count					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>66</b>	<b>2</b>	<b>1,106</b>	<b>529</b>	<b>9</b>	<b>4,625</b>
<b>Interior Health</b>	<b>6,530</b>	<b>25</b>	<b>1</b>	<b>151</b>	<b>224</b>	<b>6</b>	<b>883</b>
East Kootenay	770	5	0	16	35	0	76
Kootenay Boundary	582	3	0	10	26	2	102
Okanagan	3,177	12	0	62	107	2	503
Thompson Cariboo Shuswap	2,001	5	1	63	56	2	202
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>5</b>	<b>0</b>	<b>637</b>	<b>25</b>	<b>0</b>	<b>2,537</b>
Fraser East	3,601	3	0	157	17	0	640
Fraser North	6,429	0	0	184	2	0	834
Fraser South	9,430	2	0	296	6	0	1,063
<b>Island Health</b>	<b>6,196</b>	<b>22</b>	<b>1</b>	<b>171</b>	<b>213</b>	<b>3</b>	<b>653</b>
South Vancouver Island	3,061	11	1	60	69	1	327
Central Vancouver Island	2,087	5	0	87	102	2	211
North Vancouver Island	1,048	6	0	24	42	0	115
<b>Northern Health</b>	<b>3,382</b>	<b>14</b>	<b>0</b>	<b>147</b>	<b>67</b>	<b>0</b>	<b>552</b>
Northwest	896	5	0	47	13	0	146
Northern Interior	1,481	4	0	50	11	0	177
Northeast	1,005	5	0	50	43	0	229

Table 14 (continued).

Region	Population	Percent					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>d</sup>	Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>0%</b>	<b>0%</b>	<b>3%</b>	<b>1%</b>	<b>0%</b>	<b>13%</b>
<b>Interior Health</b>	<b>6,530</b>	<b>0%</b>	<b>0%</b>	<b>2%</b>	<b>3%</b>	<b>0%</b>	<b>14%</b>
East Kootenay	770	1%	0%	2%	4%	0%	10%
Kootenay Boundary	582	0%	0%	2%	4%	0%	18%
Okanagan	3,177	0%	0%	2%	3%	0%	16%
Thompson Cariboo Shuswap	2,001	0%	0%	3%	3%	0%	10%
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0%</b>	<b>0%</b>	<b>3%</b>	<b>0%</b>	<b>0%</b>	<b>13%</b>
Fraser East	3,601	0%	0%	4%	0%	0%	18%
Fraser North	6,429	0%	0%	3%	0%	0%	13%
Fraser South	9,430	0%	0%	3%	0%	0%	11%
<b>Island Health</b>	<b>6,196</b>	<b>0%</b>	<b>0%</b>	<b>3%</b>	<b>3%</b>	<b>0%</b>	<b>11%</b>
South Vancouver Island	3,061	0%	0%	2%	2%	0%	11%
Central Vancouver Island	2,087	0%	0%	4%	5%	0%	10%
North Vancouver Island	1,048	1%	0%	2%	4%	0%	11%
<b>Northern Health</b>	<b>3,382</b>	<b>0%</b>	<b>0%</b>	<b>4%</b>	<b>2%</b>	<b>0%</b>	<b>16%</b>
Northwest	896	1%	0%	5%	2%	0%	16%
Northern Interior	1,481	0%	0%	3%	1%	0%	12%
Northeast	1,005	0%	0%	5%	4%	0%	23%

## Varicella

Two-year-olds immunized up-to-date, Varicella, British Columbia

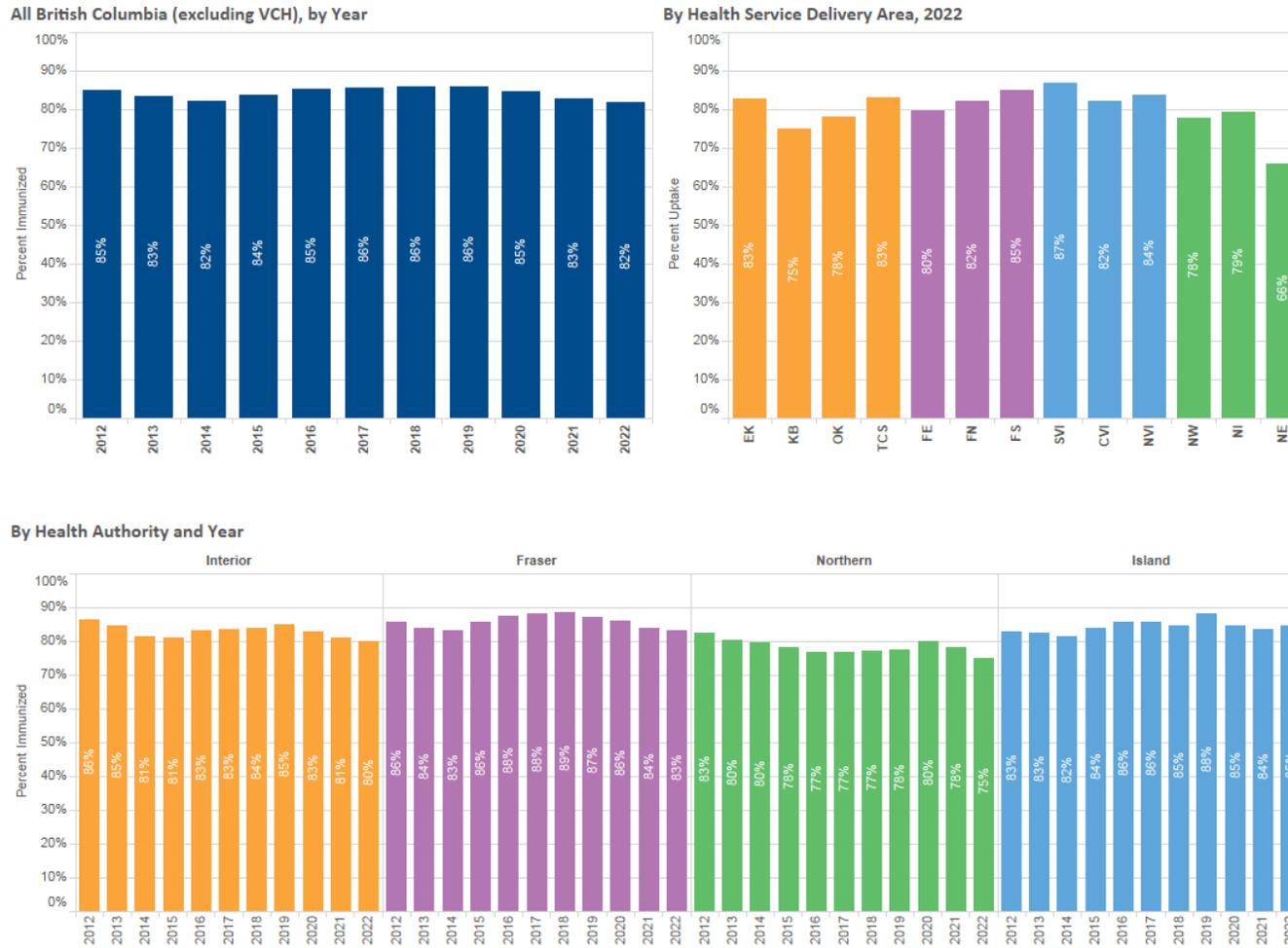


Figure 21. Percent of two-year-olds immunized up-to-date, Varicella, British Columbia

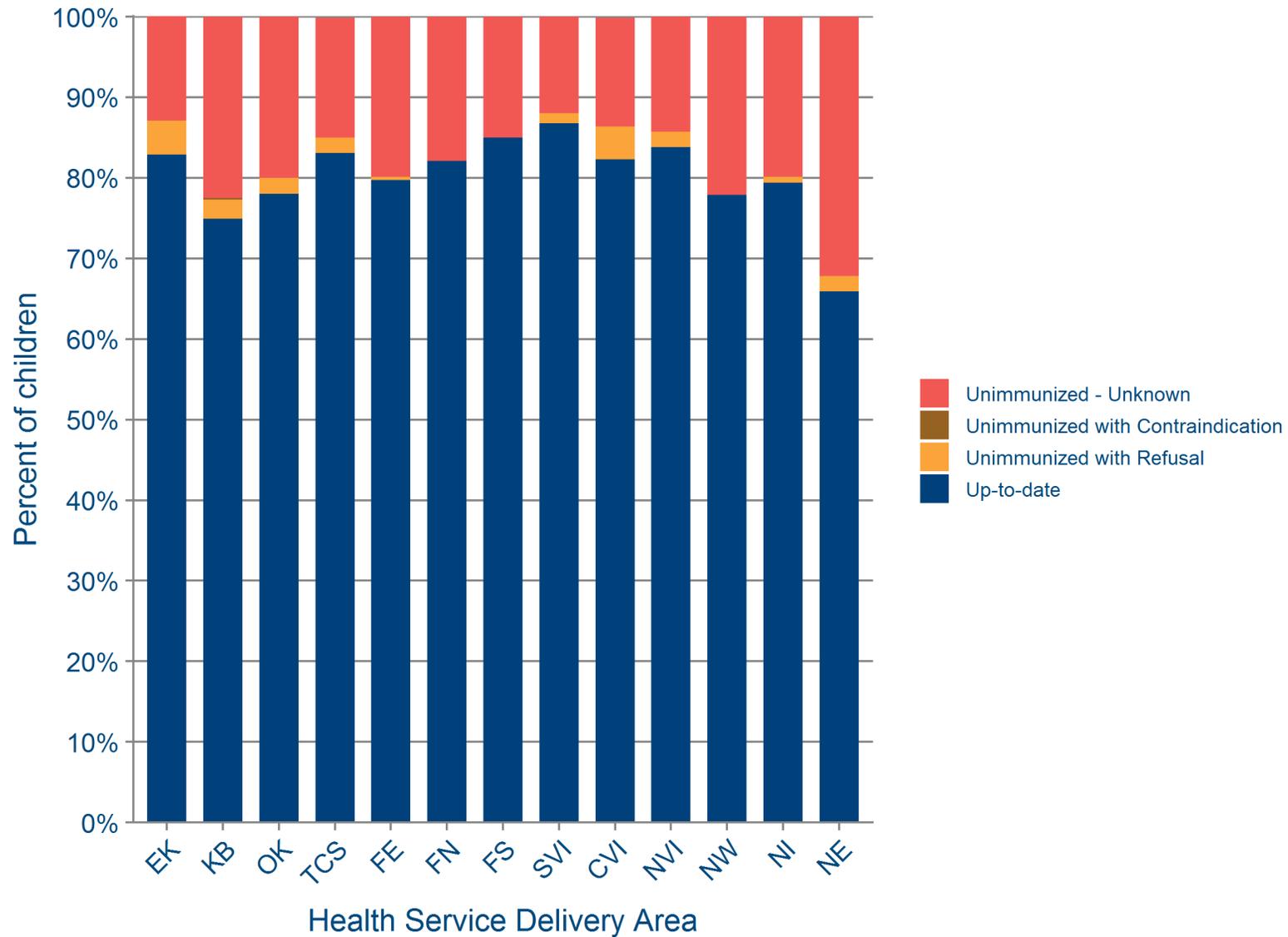


Figure 22. Reasons for non-immunization by Health Service Delivery Area, Varicella, British Columbia, 2022

**Table 15. Reasons for non-immunization, Varicella, British Columbia, 2022**

Region	Population	Count				
		Immune: Previous Disease	Immune: Lab Evidence	Unimmunized		
				Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>0</b>	<b>0</b>	<b>340</b>	<b>2</b>	<b>6,057</b>
<b>Interior Health</b>	<b>6,530</b>	<b>0</b>	<b>0</b>	<b>150</b>	<b>1</b>	<b>1,164</b>
East Kootenay	770	0	0	32	0	100
Kootenay Boundary	582	0	0	14	1	131
Okanagan	3,177	0	0	65	0	634
Thompson Cariboo Shuswap	2,001	0	0	39	0	299
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0</b>	<b>0</b>	<b>16</b>	<b>0</b>	<b>3,278</b>
Fraser East	3,601	0	0	14	0	716
Fraser North	6,429	0	0	0	0	1,151
Fraser South	9,430	0	0	2	0	1,411
<b>Island Health</b>	<b>6,196</b>	<b>0</b>	<b>0</b>	<b>144</b>	<b>1</b>	<b>799</b>
South Vancouver Island	3,061	0	0	38	0	367
Central Vancouver Island	2,087	0	0	86	1	282
North Vancouver Island	1,048	0	0	20	0	150
<b>Northern Health</b>	<b>3,382</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>0</b>	<b>816</b>
Northwest	896	0	0	0	0	198
Northern Interior	1,481	0	0	11	0	294
Northeast	1,005	0	0	19	0	324

Table 15 (continued).

Region	Population	Percent				
		Immune: Previous Disease	Immune: Lab Evidence	Unimmunized		
				Refusal	Contraindication	Unknown <sup>d</sup>
<b>British Columbia - excluding VCH</b>	<b>35,568</b>	<b>0%</b>	<b>0%</b>	<b>1%</b>	<b>0%</b>	<b>17%</b>
<b>Interior Health</b>	<b>6,530</b>	<b>0%</b>	<b>0%</b>	<b>2%</b>	<b>0%</b>	<b>18%</b>
East Kootenay	770	0%	0%	4%	0%	13%
Kootenay Boundary	582	0%	0%	2%	0%	22%
Okanagan	3,177	0%	0%	2%	0%	20%
Thompson Cariboo Shuswap	2,001	0%	0%	2%	0%	15%
<b>Fraser Health<sup>e</sup></b>	<b>19,460</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>17%</b>
Fraser East	3,601	0%	0%	0%	0%	20%
Fraser North	6,429	0%	0%	0%	0%	18%
Fraser South	9,430	0%	0%	0%	0%	15%
<b>Island Health</b>	<b>6,196</b>	<b>0%</b>	<b>0%</b>	<b>2%</b>	<b>0%</b>	<b>13%</b>
South Vancouver Island	3,061	0%	0%	1%	0%	12%
Central Vancouver Island	2,087	0%	0%	4%	0%	14%
North Vancouver Island	1,048	0%	0%	2%	0%	14%
<b>Northern Health</b>	<b>3,382</b>	<b>0%</b>	<b>0%</b>	<b>1%</b>	<b>0%</b>	<b>24%</b>
Northwest	896	0%	0%	0%	0%	22%
Northern Interior	1,481	0%	0%	1%	0%	20%
Northeast	1,005	0%	0%	2%	0%	32%

## Data Sources

Coverage estimates are based on immunization and client records in the Provincial Immunization Registry (PIR) (2013 onward) or Integrated Public Health Information System (iPHIS) (2012). Coverage presented in this report is based on reporting in PIR to January 15, 2023.

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 age definitions

Estimates reported for any given year reflect coverage among children who turned two years old during that calendar year (e.g., 2022 results are for children born in 2020). Only doses given prior to the second birthday are included in this assessment.

**Numerators:** Number of children with active records in PIR who turned two in the year reported and are up-to-date for the specified agent(s) by age two in Interior Health, Island Health, Fraser Health, and Northern Health

**Denominators:** Number of children with active records in PIR who turned two in the year reported in Interior Health, Island Health, Fraser Health, and Northern Health

Measure	Definition
Up to date for age (UTD) <sup>f</sup>	Meets the up-to-date definitions for DTaP-IPV-Hib, hepatitis B, meningococcal C, MMR, pneumococcal conjugate, and varicella outlined below.
Up-to-date for age minus booster (UTD-MB)	Meets the up-to-date definitions for hepatitis B, meningococcal C, MMR, pneumococcal conjugate, and varicella outlined below; 3 doses diphtheria/tetanus/pertussis, 2 doses polio, at least 1 dose of <i>Haemophilus influenzae</i> type b
DTaP-IPV	4 doses diphtheria/tetanus/pertussis, 3 doses polio
DTaP-IPV-Hib	4 doses diphtheria/tetanus/pertussis, 3 doses polio, up-to-date for <i>Haemophilus influenzae</i> type b as defined below
<i>Haemophilus influenzae</i> type b (Hib) <sup>g</sup>	If dose 1 before 15 months of age: at least 2 doses of Hib vaccine with last dose on or after 12 months of age. If dose 1 on or after 15 months of age: 1 dose of Hib vaccine.
Hepatitis B	3 doses hepatitis B vaccine with 3rd dose on or after 24 weeks of age
Meningococcal C	At least 1 dose of meningococcal C conjugate on or after 12 months of age. For children who receive quadrivalent meningococcal conjugate vaccine, 1-2 doses on or after 12 months of age depending on age at first dose.
MMR	1 dose measles/mumps/rubella
Pneumococcal conjugate	If dose 1 before 12 months of age: 3 doses pneumococcal conjugate with 3 <sup>rd</sup> dose on or after 12 months of age. If dose 1 between 12 and 23 months of age: 2 doses pneumococcal conjugate
Polio	3 doses polio

<sup>f</sup> Rotavirus is excluded from UTD definition as the last dose must be administered by 8 months plus 0 days of age, therefore there is no opportunity for catchup after this age.

<sup>g</sup> Starting in the 2015 report, a Hib booster dose is considered valid when given as early as 12 months of age. See [Notes](#).

Rotavirus <sup>h</sup>	2 doses of rotavirus vaccine
Varicella	<p>1 dose of varicella on or after 12 months of age or recorded exemption for varicella due to previous disease or protective antibody levels.</p> <p>The evidence required to be recorded as having a previous history of varicella disease or shingles has changed over time. Beginning in December 2013, a varicella susceptible person was defined as having no history of varicella disease or shingles after 1 year of age and no history of age-appropriate varicella vaccination. A self-reported history of disease was adequate for those born before 2004, while a health care provider diagnosed history was required for those born in 2004 or later. Since June 2018, a varicella susceptible person is defined as one without a history of lab confirmed varicella or shingles after 1 year of age and without a history of age-appropriate varicella vaccination. As such, the current definition requires lab evidence of prior disease on or after 1 year of age for proof of immunity. The date of varicella disease onset is not systematically entered into PIR therefore, for the purposes of this assessment, any child with a past history of varicella disease recorded in PIR is considered protected, regardless of their age at the time of illness.</p>
No immunizations recorded	No record of doses administered prior to 2 years of age for all of the following antigens: diphtheria/tetanus/pertussis, <i>Haemophilus influenzae</i> type b, hepatitis B, measles, meningococcal C, mumps, pneumococcal conjugate, polio, rotavirus, rubella, and varicella.
Refusal to all	Documented refusals to all of the following antigens: diphtheria/tetanus/pertussis, <i>Haemophilus influenzae</i> type b, hepatitis B, measles, meningococcal C, mumps, pneumococcal conjugate, polio, rotavirus, rubella, and varicella. Refusals effective any time on or before the 2 <sup>nd</sup> birthday are counted, regardless of a documented end date. As of 2018, only children with documented refusals <i>and</i> no immunizations recorded are counted.

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 Ages and Intervals Between Doses](#).

<sup>h</sup> 3 doses were required for the 2018 birth cohort (2020 report). See [Notes](#).

## Reasons for non-immunization definitions

Measure	Definition
Exemption: Lab Evidence of Immunity	<p><i>For varicella only.</i></p> <p>Does not meet criteria for Up-to-Date AND Type of Special Consideration = Exemption AND Reason for Special Consideration = Immunity - Lab Evidence AND Special Consideration Effective From Date &lt;= Milestone Date<sup>i</sup> AND Special Consideration Effective To Date &gt; Milestone Date<sup>i</sup> OR &lt;blank&gt;</p>
Exemption: Previous Disease (varicella)	<p><i>For varicella only</i></p> <p>Does not meet any of the previous definitions AND Type of Special Consideration = Exemption AND Reason for Special Consideration = Immunity - Previous Disease AND Special Consideration Effective From Date &lt;= Milestone Date<sup>i</sup> AND Special Consideration Effective To Date &gt; Milestone Date<sup>i</sup> OR &lt;blank&gt;</p>
Partially Immunized with Contraindication	<p><i>For agents/antigens requiring more than one dose.</i></p> <p>Does not meet any of the previous definitions AND Received at least one valid dose of the agent/antigen of interest AND Type of Special Consideration = Contraindication AND Reason for Special Consideration is valid for the agent/antigen of interest AND Special Consideration Effective From Date &lt;= Milestone Date<sup>i</sup> AND Special Consideration Effective To Date &gt; Milestone Date<sup>i</sup> OR &lt;blank&gt;</p>
Partially Immunized with Refusal	<p><i>For agents/antigens requiring more than one dose.</i></p> <p>Does not meet any of the previous definitions AND Received at least one valid dose of the agent/antigen of interest AND Type of Special Consideration = Exemption Reason for Special Consideration = Client Refusal OR Parental/Guardian Refusal Special Consideration Effective From Date &lt;= Milestone Date<sup>i</sup></p>
Partially Immunized - Unknown	<p><i>For agents/antigens requiring more than one dose.</i></p> <p>Does not meet any of the previous definitions AND Received at least one valid dose of the agent/antigen of interest</p> <p><b>Note:</b> This category will include children with at least one valid dose of the agent/antigen of interest. These children may have any of the following: invalid doses recorded; invalid refusals, exemptions, or contraindications for the agent/antigen of interest; valid refusals, exemptions, or contraindications that do not apply to agent/antigen of interest; or no recorded refusals, exemptions, or contraindications for any agent/antigen.</p>

<sup>i</sup> 2<sup>nd</sup> birthday minus one day

Measure	Definition
Unimmunized with Contraindication	Does not meet any of the previous definitions AND Has no recorded valid doses of the agent/antigen of interest AND Type of Special Consideration = Contraindication AND Reason for Special Consideration is valid for the agent/antigen of interest AND Special Consideration Effective From Date <= Milestone Date <sup>i</sup> AND Special Consideration Effective To Date > Milestone Date <sup>i</sup> OR <blank>
Unimmunized with Refusal	Does not meet any of the previous definitions AND Has no recorded valid doses of the agent/antigen of interest AND Type of Special Consideration = Exemption Reason for Special Consideration = Client Refusal OR Parental/Guardian Refusal Special Consideration Effective From Date <= Milestone Date <sup>i</sup>
Unimmunized - Unknown	Does not meet any of the previous definitions AND Has no recorded valid doses of the agent/antigen of interest  <b>Note:</b> This category will include children with no recorded valid dose(s) of the agent/antigen of interest. These children may have any of the following: invalid doses recorded; invalid refusals, exemptions, or contraindications for the agent/antigen of interest; valid 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.

## Minimum Ages and Intervals Between Doses

Antigen/Agent				
	Dose 1 <sup>A</sup>	Dose 2	Dose 3	Dose 4
Diphtheria, Tetanus, acellular Pertussis (DTaP)	42 days	28 days	28 days	24 weeks
Polio <sup>B</sup>	42 days	28 days	24 weeks	
Hepatitis B				
received 3rd dose between June 2007 and May 2014	0 days	28 days	56 days <sup>C</sup>	
received 3rd dose in June 2014 or later	0 days	28 days	56 days <sup>C,D</sup>	
Measles, Mumps, Rubella	12 months			
Varicella	12 months			
Meningococcal-C Conjugate				
meningococcal-C conjugate vaccine <sup>E</sup> or quadrivalent meningococcal vaccine (Nimenrix <sup>®</sup> )	12 months			
quadrivalent meningococcal vaccine (Menveo <sup>®</sup> ), initial dose before 12 months of age	8 weeks	8 weeks	8 weeks <sup>F</sup>	
quadrivalent meningococcal vaccine (Menveo <sup>®</sup> ), initial dose on or after 12 months of age	12 months	8 weeks		
<i>Haemophilus influenzae</i> , type b				
initial dose before 15 months of age	42 days	8 weeks <sup>G</sup>		
initial dose on or after 15 months of age	15 months			
Pneumococcal Conjugate				
initial dose before 12 months of age	42 days	28 days	56 days <sup>F</sup>	
initial dose between 12 and 23 months of age	12-23 months	56 days		
Rotavirus	42 days	28 days		

- A. Dose 1 refers to the earliest age a child can receive the initial dose.
- B. Schedule for DTaP should be followed when poliomyelitis provided in combination vaccine.
- C. Dose 3 must be given at least 16 weeks after dose 1 and 8 weeks after dose 2.
- D. Dose 3 must be given on or after 24 weeks of age.
- E. Dose must be given at least 8 weeks after any previous meningococcal C conjugate dose (if previous dose given).
- F. Dose 3 must be given on or after 12 months of age.
- G. The booster dose may be given as early as 12 months of age.

## Two-year-olds with Up-to-date Immunizations by Health Authority and Health Service Delivery Area, Vancouver Coastal Health

Health Authority / HSDA	Vaccination Details	Year			
		Children born in 2006	Children born in 2009	Children born in 2012	Children born in 2015
Vancouver Coastal Health VCH	<b>Up-to-date for age</b>	<b>77%</b>	<b>65%</b>	<b>69%</b>	<b>75%</b>
	<b>Up-to-date minus the booster</b>	<b>78%</b>	<b>72%</b>	<b>70%</b>	<b>77%</b>
	<i>Specific Agents</i>				
	DTaP-IPV	87%	80%	81%	84%
	DTaP-IPV-Hib	86%	80%	81%	84%
	Hepatitis B	93%	81%	85%	90%
	Hib	90%	84%	85%	88%
	MMR	87%	78%	93%	95%
	Polio	89%	83%	84%	88%
	Varicella	92%	87%	90%	94%
	Pneumococcal conjugate	88%	86%	88%	97%
	Meningococcal C	93%	89%	90%	94%
Rotavirus	n/a	n/a	84%	91%	
Richmond RICH	<b>Up-to-date for age</b>	<b>85%</b>	<b>71%</b>	<b>72%</b>	<b>76%</b>
	<b>Up-to-date minus the booster</b>	<b>85%</b>	<b>77%</b>	<b>72%</b>	<b>78%</b>
	<i>Specific Agents</i>				
	DTaP-IPV	93%	85%	87%	86%
	DTaP-IPV-Hib	93%	85%	86%	86%
	Hepatitis B	96%	86%	86%	90%
	Hib	95%	89%	89%	89%
	MMR	93%	83%	94%	96%
	Polio	94%	88%	89%	89%
	Varicella	94%	91%	92%	94%
	Pneumococcal conjugate	90%	88%	87%	97%
	Meningococcal C	94%	91%	90%	94%
Rotavirus	n/a	n/a	88%	94%	
Vancouver VAN	<b>Up-to-date for age</b>	<b>69%</b>	<b>63%</b>	<b>72%</b>	<b>76%</b>
	<b>Up-to-date minus the booster</b>	<b>71%</b>	<b>70%</b>	<b>73%</b>	<b>78%</b>
	<i>Specific Agents</i>				
	DTaP-IPV	80%	82%	84%	85%
	DTaP-IPV-Hib	79%	82%	83%	85%
	Hepatitis B	91%	79%	85%	91%
	Hib	85%	86%	86%	90%
	MMR	82%	79%	95%	95%
	Polio	83%	86%	85%	88%
	Varicella	90%	87%	91%	92%
	Pneumococcal conjugate	85%	84%	89%	96%
	Meningococcal C	92%	89%	90%	92%
Rotavirus	n/a	n/a	85%	90%	

Health Authority / HSDA	Vaccination Details	Year			
		Children born in 2006	Children born in 2009	Children born in 2012	Children born in 2015
North Shore (Coastal Urban)	Up-to-date for age	82%	61%	69%	69%
	Up-to-date minus the booster	83%	70%	70%	71%
	<i>Specific Agents</i>				
	DTaP-IPV	92%	76%	80%	83%
	DTaP-IPV-Hib	92%	76%	80%	82%
	Hepatitis B	94%	76%	85%	87%
	Hib	93%	80%	85%	87%
	MMR	90%	76%	95%	95%
	Polio	93%	80%	84%	87%
	Varicella	94%	86%	92%	94%
	Pneumococcal conjugate	91%	86%	88%	96%
Meningococcal C	94%	88%	93%	94%	
Rotavirus	n/a	n/a	85%	92%	
Coast Garibaldi (Coastal Rural)	Up-to-date for age	79%	65%	64%	78%
	Up-to-date minus the booster	79%	74%	65%	80%
	<i>Specific Agents</i>				
	DTaP-IPV	88%	74%	71%	83%
	DTaP-IPV-Hib	88%	74%	71%	83%
	Hepatitis B	88%	81%	82%	94%
	Hib	89%	80%	77%	87%
	MMR	87%	74%	87%	94%
	Polio	88%	77%	75%	87%
	Varicella	87%	83%	84%	93%
	Pneumococcal conjugate	88%	84%	86%	97%
Meningococcal C	90%	86%	88%	95%	
Rotavirus	n/a	n/a	77%	86%	

**Data sources:**

Vancouver Coastal Health Authority, Vaccine Evaluation Centre, 2015 Cohort Two-Year-Old Immunization Coverage Survey, Vancouver Coastal Health Authority and Fraser Health Authority, 2012 Cohort Two-Year-Old Immunization Coverage Survey, Vancouver Coastal Health Authority and Fraser Health Authority, 2009 Cohort Two-Year-Old Immunization Coverage Survey, Vancouver Coastal Health and Vaccine Evaluation Centre, 2006 Cohort Two-Year-Old Immunization Coverage Surveys.

**Prepared by:** Vancouver Coastal Health, Public Health Surveillance Unit, October 2012, September 2015 and February 2022.

2015 coverage rates are based on respondents from a random sample generated by the Ministry of Health. 2009 and 2012 coverage rates are based on a random sample from total surveys completed; and 2006 was based on a random sample generated by Ministry of Health but follow-up was prioritized for those with existing records in iPHIS or PARIS. This may have led to an overestimation of coverage for that birth cohort.

The following VCH coverage definitions differed from those applied for the other health authorities. See [Up-to-date for Age Definitions](#) for further information on the provincial coverage rules.

Varicella - 1 dose of varicella on or after 12 months of age.

*Haemophilus influenzae* – At least 1 dose *Haemophilus influenzae* type b on or after 15 months of age

Rotavirus – 2 doses of rotavirus where first dose is given on 42 - 139 days of age, and second dose given 28 days after the first dose and on or before 8 months of age.

The remaining up-to-date definitions for the 2015 birth cohort are consistent.

## Notes

1. VCH provides their early childhood coverage data through a separate mechanism. Two-year-old immunization coverage data for VCH have not been included with provincial data because VCH data (based on periodic surveys of a sample of the population) may not be comparable with population-based immunization data obtained from PIR for the rest of the province. 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 systematically captured in PARIS. VCH examines early childhood immunization coverage data through periodic coverage studies. Coverage studies have been conducted for the 2003, 2006, 2009, 2012 and 2015 birth cohorts. Due to the pandemic, the next coverage study is planned for the 2020 birth cohort. From 2012 to 2022, VCH represented approximately 21% of two-year-old population in BC (Source: BC Stats Population Estimates and PEOPLE projections). See: [Two-year-olds with Up-to-date Immunizations by Health Authority and Health Service Delivery Area, Vancouver Coastal Health](#).
2. Two errors in the code used to analyze two-year-old immunization coverage were identified in the spring of 2023. These errors affected the 2019-2022 reports (2017-2020 birth cohorts). The errors were rectified for the 2021 and 2022 reports but have not been corrected in the 2019 or 2020 reports.
  - a. The term "up-to-date minus booster" (UTDMB) is defined as a child who is up-to-date for all recommended routine immunizations by age two except for the 18-month booster dose of DTaP-IPV-Hib. The code erroneously assessed some children as UTDMB even if they were not up-to-date for non-booster antigens (hepatitis B, meningococcal C, MMR, pneumococcal conjugate, and varicella). However, since most vaccinated children are receiving all recommended vaccines, re-analysis after correcting the error for the 2022 report (2020 birth cohort) found that the UTDMB rate was only 2.4% lower at the provincial level.
  - b. *Haemophilus influenzae* type b coverage was miscalculated. This vaccine, like pneumococcal conjugate, requires a reduced dose schedule for children previously unvaccinated as they age through the first two years of life. These modifications for delayed commencement, with reduced dosing requirements, were not built into the code and stricter rules based on age at initial dose receipt were applied. Since most children were already considered up-to-date based on receipt of one dose on or after 15 months of age, re-analysis after correcting the error for the 2022 report (2020 birth cohort) found that Hib coverage was 1% higher at the provincial level.
3. Due to ongoing development of the interface between the FH information system and PIR, supplementary information on reasons for non-immunization (i.e., exemptions, refusals, and contraindications) is not complete. Therefore, the proportion of partially immunized and unimmunized children with unknown reasons for non-immunization is likely to be overestimated. The number of children partially immunized or unimmunized due to refusals or contraindications, as well as the number of children with protection against varicella due to previous infection and/or lab evidence of immunity would be underestimated.
4. Unknown includes all children who are partially immunized or unimmunized who do not have a documented refusal or contraindication, based on information in the immunization registry. This includes children who have deferred or inadvertently missed their immunizations, and those who have not had their refusal, contraindication, or immunization doses recorded.

5. Rotarix® (2-dose series) was the rotavirus vaccine product routinely given to infants from January 2012 until June 2018 when RotaTeq® (3-dose series) replaced it as the routine infant product. In June 2021, BC switched back to Rotarix® as the routine infant product. Since RotaTeq® requires a 3-dose series, it may have led to reduced coverage for the 2018 birth cohort (2020 report). Starting with the 2019 birth cohort (2021 report) only 2 doses were required to be considered up-to-date for rotavirus, regardless of product given, which likely explains the increase in coverage in 2021. See the [History of Immunization in BC](#).
6. In 2019, resources available to early childhood immunization may have been impacted by other public health immunization programs, including the measles catch-up immunization campaign for school-age children, the implementation of the Vaccination Status Reporting Regulation for school-age children, and the migration of public health information systems in FH. This may have resulted in decreases in two-year-old coverage rates.
7. In June-July 2013, several changes to immunization registry systems occurred. First, the health authorities using the iPHIS immunization registry migrated their data to the Panorama immunization registry. Second, NH began using the Community Medical Office Information System (cMOIS) to record immunizations at point of care, with secondary data entry into Panorama. The data source for two-year-old coverage immunization coverage changed to Panorama as of 2013.  

The decline in coverage in 2013 may be explained by the change in the immunization registry. Due to increased workload involved with the new system, there was decreased clinic availability in some regions, leading to fewer children being immunized. In addition, some regions were unable to run their recall and reminder reports out of the new system, and therefore did not notify all children who were behind on their immunizations prior to their second birthday. In NH, during the initial cMOIS implementation timeliness of data import into Panorama may have been impacted, which might be observed as artificial declines in coverage. Current data transfer between systems is rapid with no expected reporting lag.
8. In February 2020, a small number of historical immunization records for NH were added to Panorama. Since only immunizations were added and these children were already included in the population denominator, this may have underestimated coverage rates for certain antigens and overall up-to-date for age for the 2019 report (2017 birth cohort).
9. In January 2012, the second dose of MMR vaccine was moved from 18-months to 4-6 years of age (offered as combined MMRV beginning in 2014). The first group of children affected by this change was those born in July 2010, or those receiving their second dose of MMR-containing vaccine in 2012 or later. As a result of this change, MMR coverage for the 2012 report (2010 birth cohort) increased dramatically when compared to previous years. If only one dose of MMR had been required for the 2011 report (2009 birth cohort), MMR coverage would have been 13% higher (89%), the overall percent up-to-date for age would have been 3% higher (71%), and the overall percent up-to-date minus booster would have been 2.6% higher (80%).
10. Starting in 2015 (2013 birth cohort), a Hib booster dose is considered valid when given as early as 12 months of age; previously, the minimum age for this dose was 15 months. This change had a very small effect on coverage estimates - at the provincial level, this change resulted in an increase of 0.2% in children up-to-date for Hib.
11. 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 region assigned (i.e., the client health region was missing). These children are excluded from the analysis.
12. Prior to 2017, children who received a single dose of quadrivalent meningococcal vaccine on or after 12 months of age were considered up-to-date for meningococcal C conjugate. Starting in the 2017 report (2015 birth cohort), children who receive quadrivalent meningococcal vaccine are only

considered up-to-date for meningococcal C conjugate if they receive 2-3 doses (depending on age at first dose) and if the trade name of those doses is recorded as Menveo®. Starting in the 2021 report (2019 birth cohort), children who receive at least one dose of Nimenrix® on or after 12 months of age are also considered up-to-date for meningococcal C conjugate.

13. 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 the provincial immunization registry is required. Some children may have received doses that have not been documented in the immunization registry. All 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 new RAPID system process outlined above.

## Acknowledgements

We acknowledge all BC health authorities in the contribution of information for this report.

**Prepared by:**

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](mailto:vpd.epi@bccdc.ca) | Phone: 604-707-2519