



**BC Centre for Disease Control**  
Provincial Health Services Authority

Immunization Programs  
and Vaccine Preventable  
Diseases Service

655 West 12th Avenue  
Vancouver, BC V5Z 4R4

Tel 604.707.2519  
Fax 604.707.2515

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

# Immunization Coverage in Children by the Seventh Birthday

## 2012-2022

March 2024

## Contents

Abbreviations .....	3
Executive Summary .....	4
Up-to-date for age .....	5
Up-to-date for age in British Columbia.....	5
Up-to-date for age by Health Authority .....	7
Up-to-date for age by Health Service Delivery Area .....	10
<i>Interior Health</i> .....	10
<i>Fraser Health</i> .....	12
<i>Vancouver Coastal Health</i> .....	14
<i>Island Health</i> .....	16
<i>Northern Health</i> .....	18
Diphtheria, Tetanus, Pertussis and Polio (D/T/aP/IPV) .....	20
Diphtheria, Tetanus and Pertussis (D/T/aP).....	21
Hepatitis B .....	25
Measles .....	28
Mumps .....	32
Rubella .....	36
Varicella .....	39
Meningococcal C Conjugate .....	43
Polio .....	46
Refusal to all vaccines.....	50
Notes .....	51
Acknowledgements .....	55
Appendix.....	56
Table A1. Reasons for non-immunization definitions .....	56
Table A2. Minimum Intervals Between Doses .....	58

## 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	MyEdBC	MyEducation BC
MoE	Ministry of Education	PIR	Provincial Immunization Registry
D/T/aP	Diphtheria, tetanus, acellular pertussis	MMRV	Measles, mumps, rubella, varicella
D/T/aP/IPV	Diphtheria, tetanus, acellular pertussis, polio	Tdap-IPV	Tetanus, diphtheria, acellular pertussis, polio

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

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

## Executive Summary

Routine childhood immunization coverage is assessed at milestone ages, including seven years, in BC. This report outlines immunization coverage among seven-year-olds from 2012 to 2022 for ten antigens: diphtheria, tetanus, pertussis, polio, hepatitis B, measles, mumps, rubella, varicella, and meningococcal C; as well as overall up-to-date coverage. Infants in BC are currently [recommended](#) to receive thirteen doses of seven different vaccines. In addition to infant vaccines, children in BC are recommended to receive a single booster dose of two different vaccines (Tdap-IPV and MMRV) between the ages of 4-6 years which protect against tetanus, diphtheria, pertussis, polio and measles, mumps, rubella, and varicella.

Following a period of relatively stable coverage, last year saw an improvement in the overall proportion of BC seven-year-olds who were up-to-date for routine childhood immunizations, however 2022 coverage subsequently declined to 70%. This decrease is likely driven by the 8% decline in coverage in VCH, however IH, FH, and ISLH also saw modest declines in coverage.

Provincial coverage was highest for rubella (90%), meningococcal C conjugate (86%), and hepatitis B (85%) while coverage for other antigens was comparable at 75-77%. This year, coverage has declined most significantly for antigens contained in the school-entry (4-6 years) booster doses, including D/T/aP, measles, mumps, polio, and varicella. The children in this year's assessment (2014 birth cohort) turned four in 2018, and thus the COVID-19 pandemic may have impacted both receipt of the school-entry age (4-6 years) booster doses after becoming age-eligible and immunization record collection, which could partially explain the declines in coverage.

The proportion of seven-year-olds in BC with documented refusals to all vaccines was 1.0% in 2022, comparable to the refusal rate observed in 2021.<sup>a</sup> At the regional level, the refusal rate ranged from 0.4-2.2% with the highest rate seen in IH. Reasons for non-immunization (i.e., documented refusals, exemptions, or contraindications) were also assessed for each individual antigen.<sup>b</sup> Varicella had the highest proportion of seven-year-olds who were unimmunized due to a documented refusal.

### Limitations

All calculations are based on vaccine doses recorded in the provincial or regional immunization registry and school enrollment records maintained by regional health authorities using electronic enrollment records from the Ministry of Education, or records received directly from schools. Doses administered by providers other than public health and not reported to public health or the registry, may not be reported in the registry. There may be lag times in data entry.

Please refer to the [Notes](#) for additional information.

---

<sup>a</sup> The Vaccination Status Reporting Regulation, which supports the collection of immunization records, was enacted July 1, 2019. See [Notes](#).

<sup>b</sup> Categorisation of reasons for non-immunization may be incomplete for FH and NH. See [Notes](#).

## Up-to-date for age

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

Figure 1 displays the time trends for up-to-date for age coverage in BC from 2012 to 2022.<sup>c</sup> Up-to-date for age coverage in BC has remained relatively stable since 2018 however, it declined by 3% in 2022 to 70% (Table 1). Up-to-date coverage was highest for rubella (90%), meningococcal C conjugate (86%), and hepatitis B (85%). The antigens with the lowest coverage were varicella (75%), and the D/T/aP-containing antigens (76%). Coverage for hepatitis B, meningococcal C, and rubella was comparable to 2021 while rates for D/T/aP-containing agents, measles, mumps, varicella, and polio declined by 2-3%. Only 1.0% of seven-year-olds had refusals for all vaccines.

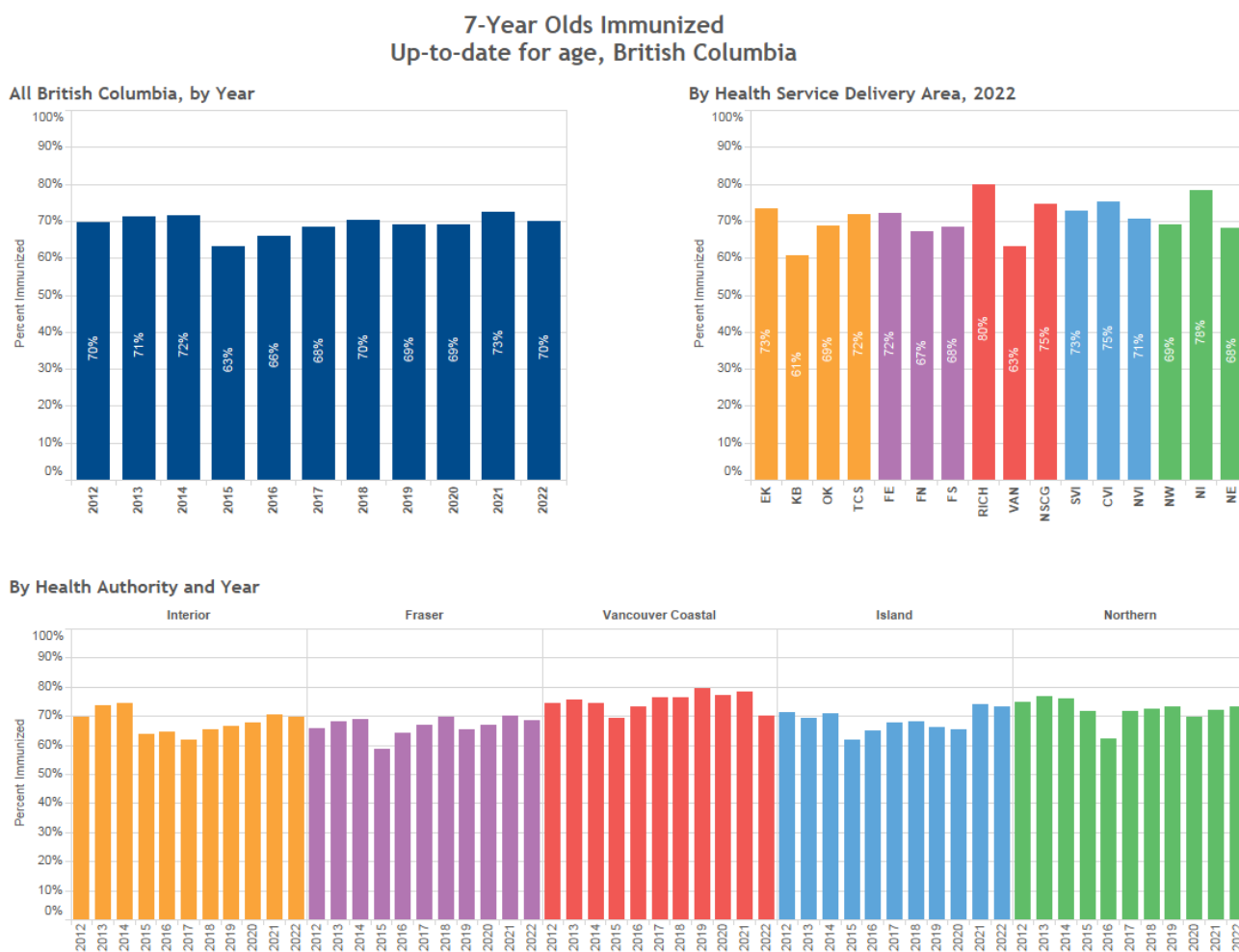


Figure 1. Percent of seven-year-olds immunized up-to-date for age, British Columbia

<sup>c</sup> Caution should be taken in interpreting this data as coverage calculations may be affected by changes in data sources. See [Notes 3-5](#)  
Immunization Coverage by the 7<sup>th</sup> Birthday  
2012-2022

Table 1. Percent of seven-year-olds with up-to-date immunizations, British Columbia

Province	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
British Columbia BC	Up-to-date for age	70%	71%	72%	63%	66%	68%	70%	69%	69%	73%	70%
	<i>Specific Agents</i>											
	D/T/aP/IPV	79%	79%	78%	77%	76%	76%	77%	76%	76%	79%	76%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	78%	76%	78%	79%	76%
	Hepatitis B	90%	91%	91%	89%	89%	89%	90%	85%	84%	85%	85%
	Measles	89%	91%	90%	90%	90%	88%	82%	78%	80%	80%	77%
	Mumps	89%	91%	90%	90%	90%	88%	82%	78%	80%	80%	77%
	Rubella	95%	96%	95%	96%	95%	95%	95%	91%	91%	90%	90%
	Varicella	89%	91%	92%	69%	72%	74%	76%	75%	77%	78%	75%
	Meningococcal C conjugate	89%	91%	92%	93%	94%	93%	n/a	89%	87%	87%	86%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	77%	78%	79%	77%
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.3%	0.5%	1.2%	1.0%	

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

Up-to-date for age coverage was similar across health authorities in 2022 ranging from 69-73%, with ISLH and NH having the highest rates (Table 2). Coverage declined by 1% in IH, FH, and ISLH with a more significant decrease (8%) in VCH in 2022. NH was the only region to observe an increase (1%) in coverage. Within each health authority coverage was highest for rubella, ranging from 88-92%. VCH had notable decreases (2-8%) for most antigens from 2021 to 2022, but coverage remained comparable to other health authorities. Compared to VCH, the other regions saw minor variation in antigen coverage compared to 2021, however most saw 1-3% declines for D/T/aP-containing agents, measles, mumps, varicella, and polio. Coverage for hepatitis B and rubella in ISLH, and meningococcal C in NH increased by 1% compared to 2021. IH had the highest proportion (2.2%) of children with documented refusals to all vaccines.

**Table 2. Percent of seven-year-olds with up-to-date immunizations by Health Authority<sup>d</sup>**

Health Authority	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Interior Health IH</b>	<b>Up-to-date for age</b>	<b>70%</b>	<b>73%</b>	<b>74%</b>	<b>64%</b>	<b>64%</b>	<b>62%</b>	<b>65%</b>	<b>67%</b>	<b>68%</b>	<b>71%</b>	<b>70%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	79%	81%	82%	76%	73%	68%	71%	74%	74%	76%	75%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	71%	74%	75%	77%	75%
	Hepatitis B	86%	88%	88%	84%	84%	81%	83%	84%	82%	83%	83%
	Measles	89%	89%	89%	86%	87%	80%	76%	75%	78%	78%	76%
	Mumps	89%	89%	89%	86%	87%	80%	76%	75%	78%	78%	75%
	Rubella	92%	93%	93%	90%	91%	86%	87%	90%	90%	88%	88%
	Varicella	88%	89%	89%	69%	69%	66%	71%	72%	74%	76%	74%
	Meningococcal C conjugate	87%	88%	89%	88%	90%	85%	n/a	89%	88%	87%	87%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	74%	75%	77%	75%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.7%	1.2%	2.5%	2.2%	
<b>Fraser Health FH</b>	<b>Up-to-date for age</b>	<b>66%</b>	<b>68%</b>	<b>69%</b>	<b>59%</b>	<b>64%</b>	<b>67%</b>	<b>70%</b>	<b>65%</b>	<b>67%</b>	<b>70%</b>	<b>69%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	75%	77%	76%	76%	75%	75%	77%	72%	74%	76%	74%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	77%	73%	74%	76%	75%
	Hepatitis B	90%	93%	93%	89%	91%	91%	93%	83%	83%	84%	84%
	Measles	89%	91%	90%	91%	91%	90%	83%	75%	77%	77%	75%
	Mumps	89%	91%	90%	91%	91%	90%	83%	74%	77%	77%	75%
	Rubella	96%	97%	97%	98%	97%	98%	97%	88%	89%	89%	89%
	Varicella	89%	92%	93%	66%	71%	73%	75%	72%	74%	75%	74%
	Meningococcal C conjugate	90%	92%	93%	95%	95%	95%	n/a	85%	86%	86%	85%

<sup>d</sup> Coverage rates approaching 100% in FH, ISLH and NH are likely over-estimates resulting from the use of different data sources for numerators and denominators. See [Notes 3-5](#)

Health Authority	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	73%	75%	76%	75%
	Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.1%	0.3%	0.9%	0.8%
<b>Vancouver Coastal Health VCH</b>	<b>Up-to-date for age</b>	<b>75%</b>	<b>76%</b>	<b>75%</b>	<b>69%</b>	<b>73%</b>	<b>76%</b>	<b>76%</b>	<b>80%</b>	<b>77%</b>	<b>78%</b>	<b>70%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	82%	81%	80%	80%	82%	84%	82%	85%	86%	86%	78%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	83%	85%	91%	86%	79%
	Hepatitis B	90%	89%	89%	90%	87%	90%	89%	90%	90%	90%	88%
	Measles	88%	90%	88%	89%	89%	90%	86%	87%	87%	87%	80%
	Mumps	87%	89%	87%	88%	89%	89%	86%	87%	87%	87%	80%
	Rubella	94%	93%	93%	93%	93%	94%	94%	95%	94%	94%	92%
	Varicella	88%	90%	90%	73%	79%	82%	82%	85%	84%	86%	78%
	Meningococcal C conjugate	86%	90%	91%	91%	92%	92%	n/a	93%	88%	88%	85%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	86%	87%	87%	78%
	Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.1%	0.2%	0.8%	0.4%
<b>Island Health ISLH</b>	<b>Up-to-date for age</b>	<b>71%</b>	<b>69%</b>	<b>71%</b>	<b>62%</b>	<b>65%</b>	<b>68%</b>	<b>68%</b>	<b>66%</b>	<b>65%</b>	<b>74%</b>	<b>73%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	79%	76%	77%	75%	75%	75%	75%	73%	72%	79%	78%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	75%	73%	72%	80%	79%
	Hepatitis B	91%	91%	93%	91%	90%	91%	92%	84%	81%	85%	86%
	Measles	92%	92%	93%	92%	91%	90%	80%	76%	80%	81%	80%
	Mumps	92%	91%	93%	92%	91%	90%	80%	76%	80%	81%	80%
	Rubella	96%	96%	98%	98%	97%	96%	97%	90%	90%	90%	91%
	Varicella	91%	92%	94%	68%	70%	72%	73%	73%	76%	79%	78%
	Meningococcal C conjugate	93%	92%	95%	96%	96%	95%	n/a	89%	88%	89%	89%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	74%	75%	80%	79%
	Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.3%	0.8%	1.4%	1.2%
<b>Northern Health NH</b>	<b>Up-to-date for age</b>	<b>75%</b>	<b>77%</b>	<b>76%</b>	<b>72%</b>	<b>62%</b>	<b>72%</b>	<b>73%</b>	<b>73%</b>	<b>70%</b>	<b>72%</b>	<b>73%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	85%	85%	84%	84%	72%	82%	81%	81%	77%	80%	80%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	81%	81%	78%	80%	80%
	Hepatitis B	92%	94%	92%	92%	92%	93%	94%	96%	85%	86%	85%
	Measles	93%	94%	92%	94%	93%	92%	85%	84%	80%	81%	80%
	Mumps	93%	94%	92%	94%	93%	92%	85%	84%	80%	81%	80%
	Rubella	96%	98%	95%	97%	98%	97%	96%	100%	90%	91%	90%



Health Authority	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	Varicella	91%	93%	92%	77%	67%	77%	77%	80%	77%	78%	78%
	Meningococcal C conjugate	92%	95%	93%	96%	97%	96%	n/a	99%	88%	87%	88%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	82%	79%	81%	81%
	Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.5%	0.2%	0.8%	0.9%

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

### Interior Health

Up-to-date coverage varied across the HSDAs in IH, ranging from 61% in Kootenay Boundary to 73% in East Kootenay (Table 3). Compared to the previous year, up-to-date coverage declined by 1-3% in all HSDAs except Okanagan where it remained the same. In East Kootenay, Okanagan, and Thompson Cariboo Shuswap, coverage for specific antigens was comparable to 2021. Conversely, Kootenay Boundary saw notable declines (5-9%) in coverage for D/T/aP-containing agents, measles, mumps, varicella, and polio. Within each HSDA, coverage was highest for rubella and meningococcal C conjugate, while coverage for the remaining antigens was comparable. Refusal rates ranged from 1.5-5.8% with the highest rate observed in Kootenay Boundary.

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

Health Service Delivery Area (HSDA)	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
East Kootenay EK	Up-to-date for age	66%	74%	73%	63%	69%	68%	72%	68%	71%	75%	73%
	<i>Specific Agents</i>											
	D/T/aP/IPV	79%	85%	83%	81%	79%	76%	80%	78%	80%	81%	80%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	80%	77%	80%	81%	81%
	Hepatitis B	86%	89%	87%	84%	85%	82%	84%	83%	81%	83%	82%
	Measles	91%	92%	91%	89%	90%	82%	83%	79%	81%	82%	81%
	Mumps	91%	91%	91%	89%	90%	82%	83%	79%	81%	82%	81%
	Rubella	95%	94%	94%	93%	93%	87%	90%	91%	90%	89%	88%
	Varicella	90%	90%	90%	73%	75%	72%	79%	76%	79%	79%	79%
	Meningococcal C conjugate	86%	87%	87%	89%	91%	86%	n/a	89%	89%	88%	87%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	79%	80%	81	81%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.4%	2.8%	2.5%	2.3%	
Kootenay Boundary KB	Up-to-date for age	60%	61%	61%	48%	52%	52%	63%	59%	62%	64%	61%
	<i>Specific Agents</i>											
	D/T/aP/IPV	73%	71%	70%	66%	67%	63%	72%	69%	72%	74%	67%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	72%	69%	73%	74%	67%
	Hepatitis B	77%	77%	76%	70%	72%	69%	76%	76%	74%	77%	78%
	Measles	80%	79%	80%	76%	77%	71%	75%	71%	75%	76%	67%
	Mumps	80%	79%	80%	76%	77%	71%	75%	70%	75%	75%	67%
	Rubella	84%	83%	83%	82%	84%	76%	83%	83%	85%	84%	83%
	Varicella	75%	77%	78%	56%	57%	58%	69%	65%	69%	70%	65%
	Meningococcal C conjugate	79%	78%	79%	79%	80%	74%	n/a	80%	81%	82%	82%

Health Service Delivery Area (HSDA)	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	70%	73%	75%	68%
	Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.4%	2.7%	4.7%	5.8%
<b>Okanagan OK</b>	<b>Up-to-date for age</b>	<b>69%</b>	<b>72%</b>	<b>74%</b>	<b>63%</b>	<b>64%</b>	<b>60%</b>	<b>62%</b>	<b>64%</b>	<b>65%</b>	<b>69%</b>	<b>69%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	78%	81%	81%	74%	73%	67%	68%	71%	71%	74%	74%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	68%	71%	71%	75%	74%
	Hepatitis B	86%	87%	88%	84%	85%	81%	82%	83%	81%	83%	82%
	Measles	89%	89%	88%	85%	87%	79%	73%	72%	75%	76%	75%
	Mumps	89%	89%	88%	85%	87%	79%	73%	72%	75%	76%	75%
	Rubella	92%	93%	93%	90%	91%	85%	85%	89%	88%	87%	87%
	Varicella	88%	89%	90%	68%	70%	64%	68%	70%	71%	74%	73%
	Meningococcal C conjugate	87%	88%	89%	88%	90%	84%	n/a	88%	86%	86%	85%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	72%	72%	75%	74%
	Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.7%	0.9%	1.9%	1.5%
<b>Thompson Cariboo Shuswap TCS</b>	<b>Up-to-date for age</b>	<b>76%</b>	<b>80%</b>	<b>81%</b>	<b>70%</b>	<b>67%</b>	<b>65%</b>	<b>68%</b>	<b>72%</b>	<b>73%</b>	<b>73%</b>	<b>72%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	82%	85%	86%	79%	74%	70%	73%	78%	78%	79%	76%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	73%	78%	78%	79%	76%
	Hepatitis B	90%	92%	92%	89%	88%	85%	86%	89%	87%	85%	86%
	Measles	91%	93%	93%	89%	89%	83%	78%	79%	83%	79%	77%
	Mumps	91%	93%	93%	89%	89%	83%	78%	79%	83%	79%	77%
	Rubella	94%	95%	95%	92%	92%	89%	90%	94%	93%	90%	91%
	Varicella	91%	93%	92%	73%	70%	68%	73%	77%	78%	78%	76%
	Meningococcal C conjugate	91%	93%	93%	91%	92%	88%	n/a	93%	92%	88%	90%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	78%	79%	79%	77%
	Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.9%	0.7%	2.8%	1.9%

### Fraser Health

Up-to-date coverage for HSDAs in FH ranged from 67% in Fraser North to 72% in Fraser East (Table 4). Coverage declined in all HSDAs compared to 2021 with the largest decrease (4%) in Fraser East. Coverage for individual antigens followed similar trends as described above, with the highest coverage seen in rubella and meningococcal C conjugate, and similar coverage for the remaining antigens. Excluding hepatitis B in Fraser South which increased by 1%, coverage for individual antigens was the same or lower than 2021, with notable decreases (3-4%) in D/T/aP/IPV, measles, mumps, polio, and varicella in Fraser East. Documented refusals ranged from 0.4-1.9% with the highest refusal rate in Fraser East.

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

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Fraser East FE	<b>Up-to-date for age</b>	<b>72%</b>	<b>75%</b>	<b>75%</b>	<b>71%</b>	<b>72%</b>	<b>76%</b>	<b>75%</b>	<b>71%</b>	<b>73%</b>	<b>76%</b>	<b>72%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	79%	81%	80%	82%	80%	82%	81%	76%	77%	79%	76%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	81%	76%	77%	79%	77%
	Hepatitis B	93%	98%	96%	97%	95%	96%	96%	86%	87%	88%	87%
	Measles	91%	96%	94%	96%	94%	93%	86%	78%	80%	80%	77%
	Mumps	91%	96%	94%	96%	94%	93%	86%	78%	80%	80%	77%
	Rubella	96%	100%	98%	100%	99%	99%	100%	90%	91%	90%	90%
	Varicella	92%	96%	95%	75%	76%	79%	79%	75%	77%	79%	75%
	Meningococcal C conjugate	93%	98%	96%	100%	98%	98%	n/a	88%	89%	89%	89%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	77%	78%	80%	77%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.2%	0.8%	2.3%	1.9%	
Fraser North FN	<b>Up-to-date for age</b>	<b>67%</b>	<b>69%</b>	<b>69%</b>	<b>60%</b>	<b>66%</b>	<b>66%</b>	<b>70%</b>	<b>64%</b>	<b>66%</b>	<b>68%</b>	<b>67%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	77%	78%	76%	77%	77%	75%	78%	71%	74%	74%	74%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	78%	72%	74%	74%	74%
	Hepatitis B	95%	95%	96%	90%	96%	93%	96%	82%	82%	83%	83%
	Measles	93%	94%	94%	94%	97%	92%	85%	74%	78%	76%	74%
	Mumps	93%	94%	94%	94%	96%	92%	85%	74%	78%	76%	74%
	Rubella	100%	100%	100%	100%	100%	100%	100%	88%	89%	89%	88%
	Varicella	94%	95%	98%	69%	73%	73%	76%	71%	75%	73%	73%
	Meningococcal C conjugate	94%	95%	96%	98%	100%	96%	n/a	84%	85%	85%	83%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	72%	75%	75%	74%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.2%	0.4%	0.5%	0.4%	
	<b>Up-to-date for age</b>	<b>63%</b>	<b>65%</b>	<b>66%</b>	<b>53%</b>	<b>60%</b>	<b>64%</b>	<b>67%</b>	<b>64%</b>	<b>65%</b>	<b>69%</b>	<b>68%</b>

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Fraser	<i>Specific Agents</i>											
South	D/T/aP/IPV	73%	75%	74%	73%	72%	73%	76%	71%	73%	75%	74%
FS	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	76%	72%	73%	76%	75%
	Hepatitis B	86%	89%	89%	86%	86%	88%	89%	82%	82%	83%	84%
	Measles	85%	87%	87%	87%	87%	88%	80%	74%	76%	77%	75%
	Mumps	85%	87%	86%	87%	86%	88%	80%	73%	75%	77%	75%
	Rubella	92%	95%	94%	96%	94%	95%	95%	88%	89%	89%	89%
	Varicella	85%	88%	89%	61%	67%	70%	73%	71%	73%	75%	73%
	Meningococcal C conjugate	87%	88%	89%	91%	90%	92%	n/a	85%	85%	86%	85%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	72%	74%	76%	75%
	Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0%	0.0%	0.7%	0.6%

### Vancouver Coastal Health

There was large variation in up-to-date coverage for HSDAs in VCH, ranging from 63% in Vancouver to 80% in Richmond (Table 5). Up-to-date coverage was lower than 2021 in all HSDAs, with the largest decrease occurring in Vancouver (14%). Richmond had the highest coverage for all antigens, ranging from 88% to 93%, followed by North Shore/Coast Garibaldi where coverage for individual antigens ranged from 82% to 92%. From 2021 to 2022, Vancouver saw significant declines (13-15%) in coverage for D/T/aP-containing agents, measles, mumps, polio, and varicella. Within all HSDAs, coverage was highest for rubella. The refusal rate ranged from 0.3-0.6%.

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

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Richmond RICH</b>	<b>Up-to-date for age</b>	<b>81%</b>	<b>85%</b>	<b>87%</b>	<b>82%</b>	<b>83%</b>	<b>86%</b>	<b>87%</b>	<b>88%</b>	<b>83%</b>	<b>84%</b>	<b>80%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	87%	89%	91%	89%	88%	91%	91%	92%	90%	90%	88%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	91%	92%	95%	90%	89%
	Hepatitis B	95%	94%	95%	96%	93%	95%	95%	95%	95%	94%	93%
	Measles	91%	95%	94%	95%	95%	94%	93%	93%	92%	91%	90%
	Mumps	90%	93%	93%	94%	94%	94%	93%	93%	91%	91%	90%
	Rubella	96%	97%	97%	97%	97%	97%	97%	98%	97%	96%	96%
	Varicella	93%	95%	95%	84%	87%	89%	90%	92%	89%	90%	89%
	Meningococcal C conjugate	88%	93%	95%	95%	95%	96%	n/a	96%	90%	90%	88%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	93%	91%	90%	88%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.1%	0.0%	0.3%	0.3%	
<b>Vancouver VAN</b>	<b>Up-to-date for age</b>	<b>78%</b>	<b>78%</b>	<b>76%</b>	<b>69%</b>	<b>73%</b>	<b>75%</b>	<b>75%</b>	<b>78%</b>	<b>76%</b>	<b>77%</b>	<b>63%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	83%	82%	81%	80%	82%	82%	81%	84%	85%	85%	70%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	81%	84%	91%	86%	71%
	Hepatitis B	90%	90%	90%	90%	87%	90%	89%	90%	90%	90%	87%
	Measles	90%	91%	90%	89%	89%	90%	85%	86%	87%	87%	74%
	Mumps	89%	90%	89%	88%	88%	89%	85%	86%	86%	87%	74%
	Rubella	94%	94%	94%	94%	93%	94%	94%	95%	94%	94%	91%
	Varicella	89%	91%	91%	72%	80%	81%	81%	84%	83%	84%	71%
	Meningococcal C conjugate	88%	91%	92%	92%	91%	91%	n/a	93%	87%	89%	83%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	85%	86%	86%	71%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0%	0.2%	0.8%	0.2%	
<b>North Shore / Coast Garibaldi</b>	<b>Up-to-date for age</b>	<b>63%</b>	<b>63%</b>	<b>63%</b>	<b>61%</b>	<b>66%</b>	<b>73%</b>	<b>73%</b>	<b>76%</b>	<b>75%</b>	<b>77%</b>	<b>75%</b>

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NSCG	<i>Specific Agents</i>											
	D/T/aP/IPV	76%	71%	71%	75%	78%	82%	80%	84%	84%	84%	82%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	81%	84%	88%	85%	83%
	Hepatitis B	85%	82%	83%	84%	83%	86%	86%	87%	86%	87%	87%
	Measles	81%	84%	81%	84%	86%	87%	83%	85%	85%	86%	84%
	Mumps	81%	84%	81%	83%	86%	87%	83%	85%	85%	86%	84%
	Rubella	92%	90%	88%	89%	91%	92%	92%	92%	93%	91%	92%
	Varicella	83%	85%	84%	66%	74%	79%	79%	82%	81%	84%	82%
	Meningococcal C conjugate	81%	86%	87%	89%	90%	91%	n/a	91%	89%	86%	86%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	85%	85%	86%	83%
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.3%	0.4%	1.3%	0.6%	

### Island Health

As shown in Table 6, up-to-date coverage was comparable across HSDAs in ISLH, ranging from 71% in North Vancouver Island to 75% in Central Vancouver Island. Compared to 2021, coverage declined in South and North Vancouver Island, while it increased slightly (1%) in Central Vancouver Island. In South and North Vancouver Island, coverage for individual antigens was the same or 1-3% lower than the previous year. Conversely, Central Vancouver Island saw some modest improvements in rates for most antigens. Across HSDAs, the highest coverage was seen in rubella (89-92%), meningococcal C conjugate (87-90%), and hepatitis B (83-87%), while coverage for the remaining antigens was comparable. North Vancouver Island had the highest refusal rate (2.0%), though it declined by 0.6% compared to last year.

**Table 6. Percent of seven-year-olds with up-to-date immunizations by Health Service Delivery Area, Island Health<sup>d</sup>**

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
South Vancouver Island SVI	Up-to-date for age	72%	71%	73%	63%	67%	70%	69%	66%	65%	75%	73%
	<i>Specific Agents</i>											
	D/T/aP/IPV	80%	77%	78%	75%	76%	77%	76%	73%	70%	80%	78%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	76%	73%	71%	81%	78%
	Hepatitis B	92%	91%	94%	88%	89%	91%	92%	84%	83%	86%	86%
	Measles	93%	92%	94%	91%	91%	90%	80%	76%	81%	82%	79%
	Mumps	93%	91%	94%	91%	91%	90%	80%	76%	81%	82%	79%
	Rubella	97%	95%	97%	96%	97%	96%	96%	89%	91%	90%	90%
	Varicella	93%	91%	94%	69%	72%	74%	73%	73%	78%	79%	77%
	Meningococcal C conjugate	93%	92%	95%	94%	95%	94%	n/a	87%	88%	89%	88%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	74%	74%	81%	78%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.2%	0.6%	1.0%	0.7%	
Central Vancouver Island CVI	Up-to-date for age	70%	69%	69%	60%	62%	67%	70%	65%	64%	74%	75%
	<i>Specific Agents</i>											
	D/T/aP/IPV	76%	75%	74%	75%	73%	74%	77%	72%	72%	79%	80%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	77%	72%	72%	79%	81%
	Hepatitis B	91%	92%	92%	92%	90%	93%	95%	84%	81%	86%	87%
	Measles	90%	91%	92%	93%	89%	90%	81%	74%	77%	81%	82%
	Mumps	90%	91%	92%	93%	89%	90%	81%	74%	77%	81%	81%
	Rubella	95%	95%	97%	99%	96%	98%	100%	90%	90%	91%	92%
	Varicella	90%	92%	93%	65%	68%	71%	75%	71%	75%	78%	80%
	Meningococcal C conjugate	92%	92%	94%	97%	95%	97%	n/a	89%	88%	90%	90%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	73%	75%	80%	81%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.5%	0.9%	1.4%	1.5%	



HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
North Vancouver Island NVI	Up-to-date for age	72%	65%	71%	63%	66%	64%	62%	70%	68%	72%	71%
	<i>Specific Agents</i>											
	D/T/aP/IPV	81%	75%	79%	77%	76%	71%	70%	77%	76%	78%	76%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	71%	77%	76%	78%	76%
	Hepatitis B	90%	91%	95%	92%	93%	88%	88%	86%	80%	83%	83%
	Measles	93%	93%	96%	94%	94%	88%	77%	80%	80%	79%	78%
	Mumps	93%	93%	96%	94%	94%	88%	77%	80%	80%	79%	78%
	Rubella	96%	99%	100%	100%	100%	95%	95%	93%	90%	89%	89%
	Varicella	90%	93%	96%	69%	71%	68%	67%	77%	77%	78%	76%
	Meningococcal C conjugate	93%	93%	97%	98%	99%	94%	n/a	92%	88%	88%	87%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	78%	78%	79%	77%
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.2%	1.1%	2.6%	2.0%	

**Northern Health**

Up-to-date coverage for HSDAs in NH ranged from 68-78%. While rates declined in Northwest and Northeast compared to the previous year, Northern Interior saw a 5% increase and also had the highest coverage. Northern Interior had the highest coverage for all antigens, ranging from 83% to 94%. In Northwest and Northeast, coverage for all antigens declined compared to the previous year, while Northern Interior saw 2-5% improvements across most antigens. There were notable declines in measles and mumps coverage in Northwest and Northeast ranging from 6-7%.

**Table 7. Percent of seven-year-olds with up-to-date immunizations by Health Service Delivery Area, Northern Health<sup>d</sup>**

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Northwest NW</b>	<b>Up-to-date for age</b>	<b>68%</b>	<b>73%</b>	<b>70%</b>	<b>59%</b>	<b>61%</b>	<b>62%</b>	<b>65%</b>	<b>70%</b>	<b>68%</b>	<b>73%</b>	<b>69%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	78%	83%	78%	77%	76%	74%	73%	80%	76%	81%	76%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	73%	80%	77%	81%	77%
	Hepatitis B	87%	89%	85%	84%	82%	83%	83%	91%	83%	84%	83%
	Measles	87%	90%	85%	86%	86%	82%	76%	82%	79%	83%	76%
	Mumps	87%	89%	85%	86%	86%	82%	76%	82%	79%	83%	76%
	Rubella	92%	94%	88%	91%	92%	89%	88%	97%	89%	91%	88%
	Varicella	85%	89%	83%	66%	69%	68%	70%	77%	76%	80%	74%
	Meningococcal C conjugate	86%	90%	85%	90%	91%	88%	n/a	95%	86%	88%	85%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	81%	78%	82%	77%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0%	0.0%	0.7%	1.0%	
<b>Northern Interior NI</b>	<b>Up-to-date for age</b>	<b>79%</b>	<b>82%</b>	<b>80%</b>	<b>81%</b>	<b>72%</b>	<b>78%</b>	<b>79%</b>	<b>78%</b>	<b>74%</b>	<b>73%</b>	<b>78%</b>
	<i>Specific Agents</i>											
	D/T/aP/IPV	88%	90%	88%	90%	81%	86%	86%	85%	81%	81%	85%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	86%	85%	81%	81%	85%
	Hepatitis B	93%	98%	94%	95%	95%	96%	95%	97%	88%	89%	89%
	Measles	94%	97%	94%	97%	96%	95%	90%	87%	84%	81%	85%
	Mumps	94%	97%	94%	96%	96%	95%	90%	87%	83%	81%	85%
	Rubella	97%	100%	97%	99%	100%	99%	98%	100%	94%	92%	94%
	Varicella	91%	95%	94%	85%	75%	81%	83%	84%	81%	79%	83%
	Meningococcal C conjugate	93%	98%	94%	98%	98%	98%	n/a	99%	91%	87%	92%
Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	86%	83%	82%	85%	
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.6%	0.3%	0.7%	0.5%	
<b>Northeast</b>	<b>Up-to-date for age</b>	<b>73%</b>	<b>70%</b>	<b>74%</b>	<b>67%</b>	<b>47%</b>	<b>70%</b>	<b>68%</b>	<b>67%</b>	<b>64%</b>	<b>70%</b>	<b>68%</b>

HSDA	Vaccination Details	Year										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NE	<i>Specific Agents</i>											
	D/T/aP/IPV	86%	78%	84%	81%	54%	80%	78%	76%	72%	78%	75%
	D/T/aP	n/a	n/a	n/a	n/a	n/a	n/a	78%	76%	72%	79%	75%
	Hepatitis B	95%	92%	95%	94%	96%	96%	100%	99%	82%	85%	81%
	Measles	98%	93%	97%	95%	95%	95%	82%	79%	75%	81%	75%
	Mumps	98%	93%	97%	95%	95%	95%	82%	79%	75%	81%	75%
	Rubella	100%	99%	100%	100%	100%	100%	100%	100%	86%	90%	87%
	Varicella	96%	93%	98%	74%	51%	75%	73%	74%	71%	77%	73%
	Meningococcal C conjugate	97%	93%	98%	99%	100%	100%	n/a	100%	84%	87%	85%
	Polio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	77%	74%	80%
Refused all vaccines	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.9%	0.1%	1.0%	1.5%

## Diphtheria, Tetanus, Pertussis and Polio (D/T/aP/IPV)

Figure 2 displays the time trends for D/T/aP/IPV coverage in BC from 2012 to 2022.<sup>c</sup> Over the past decade, provincial D/T/aP/IPV coverage has remained relatively stable, with rates improving from 2019 to 2021 before declining by 3% this year. During this same time period, IH, FH, and VCH have followed a similar pattern, though VCH saw a more significant drop in coverage in 2022. Despite declining this year, coverage in ISLH has improved overall in recent years while the rate in NH is comparable to 2021.

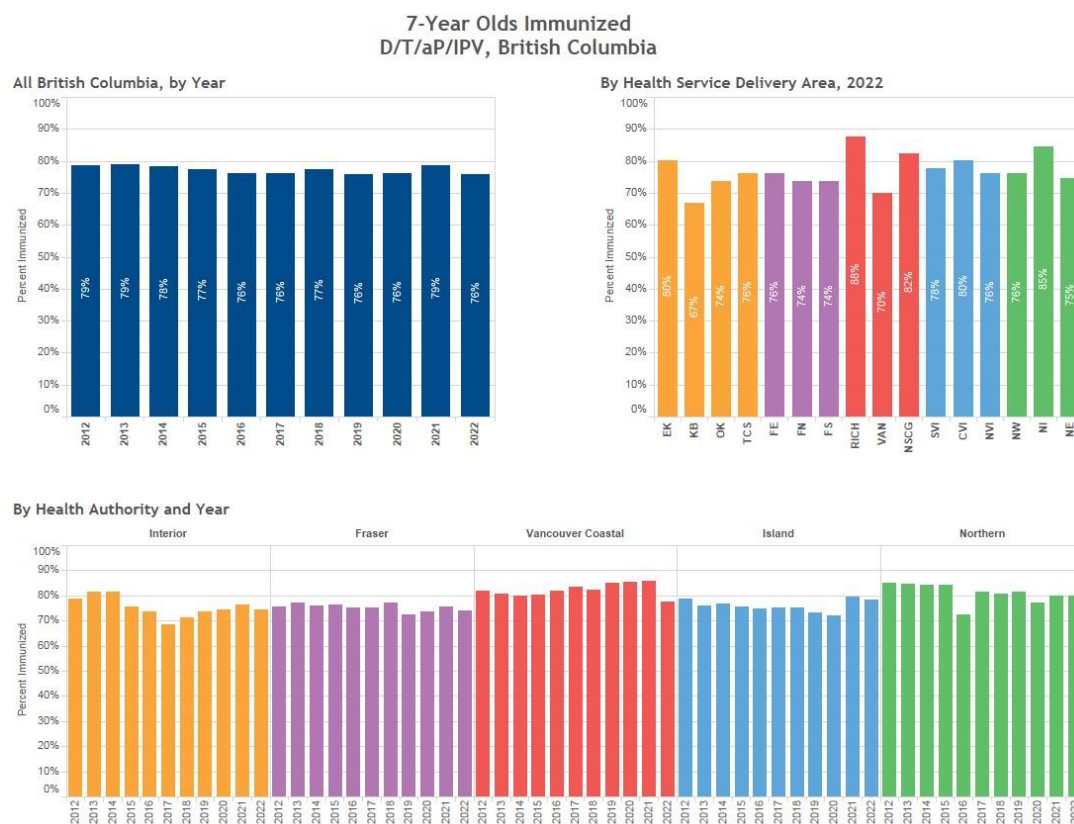


Figure 2. Percent of seven-year-olds immunized, D/T/aP/IPV, British Columbia

## Diphtheria, Tetanus and Pertussis (D/T/aP)

Assessment of D/T/aP, separate from polio, was introduced in 2018. Figure 3 displays the time trends for D/T/aP coverage in BC from 2012 to 2022.<sup>c</sup> D/T/aP coverage has remained relatively stable in BC since 2018, but declined by 3% compared to 2021. Coverage in VCH peaked at over 90% in 2020 and has since declined to 78%. Since 2018, coverage in IH and ISLH has improved overall while it has been more stable in FH and NH. Excluding NH, rates declined in all regions compared to 2021. Reasons for being partially or unimmunized for D/T/aP are displayed in Table 8 and Figure 4. At the provincial level, only 1% of BC seven-year-olds were unimmunized due to a documented refusal, while 14% and 8% were partially immunized and unimmunized due to unknown circumstances.



**Figure 3. Percent of seven-year-olds immunized, D/T/aP, British Columbia**

Table 8. Reasons for non-immunization, D/T/aP, British Columbia, 2022

Region	Population	Count				
		Partially Immunized			Unimmunized	
		Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>217</b>	<b>3</b>	<b>6,510</b>	<b>538</b>	<b>3,601</b>
<b>Interior Health</b>	<b>7,695</b>	<b>59</b>	<b>2</b>	<b>1,060</b>	<b>201</b>	<b>627</b>
East Kootenay	906	13	1	69	25	69
Kootenay Boundary	764	8	0	129	47	69
Okanagan	3,634	24	1	494	74	356
Thompson Cariboo Shuswap	2,391	14	0	368	55	133
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>53</b>	<b>0</b>	<b>2,880</b>	<b>160</b>	<b>1,696</b>
Fraser East	3,482	17	0	515	69	218
Fraser North	6,296	15	0	951	30	645
Fraser South	9,118	21	0	1,414	61	833
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>29</b>	<b>0</b>	<b>1,345</b>	<b>38</b>	<b>556</b>
Richmond	2,002	1	0	155	6	57
Vancouver	4,464	18	0	937	11	318
North Shore/Coast Garibaldi	2,787	10	0	253	21	181
<b>Island Health</b>	<b>7,229</b>	<b>63</b>	<b>1</b>	<b>879</b>	<b>102</b>	<b>499</b>
South Vancouver Island	3,299	18	1	400	28	271
Central Vancouver Island	2,479	28	0	292	40	124
North Vancouver Island	1,451	17	0	187	34	104
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>13</b>	<b>0</b>	<b>346</b>	<b>37</b>	<b>223</b>
Northwest	776	3	0	96	11	68
Northern Interior	1,456	8	0	132	11	73
Northeast	860	2	0	118	15	82

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

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

Table 8 (continued).

Region	Population	Percent				
		Partially Immunized			Unimmunized	
		Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>0%</b>	<b>0%</b>	<b>14%</b>	<b>1%</b>	<b>8%</b>
<b>Interior Health</b>	<b>7,695</b>	<b>1%</b>	<b>0%</b>	<b>14%</b>	<b>3%</b>	<b>8%</b>
East Kootenay	906	1%	0%	8%	3%	8%
Kootenay Boundary	764	1%	0%	17%	6%	9%
Okanagan	3,634	1%	0%	14%	2%	10%
Thompson Cariboo Shuswap	2,391	1%	0%	15%	2%	6%
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>0%</b>	<b>0%</b>	<b>15%</b>	<b>1%</b>	<b>9%</b>
Fraser East	3,482	0%	0%	15%	2%	6%
Fraser North	6,296	0%	0%	15%	0%	10%
Fraser South	9,118	0%	0%	16%	1%	9%
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>0%</b>	<b>0%</b>	<b>15%</b>	<b>0%</b>	<b>6%</b>
Richmond	2,002	0%	0%	8%	0%	3%
Vancouver	4,464	0%	0%	21%	0%	7%
North Shore/Coast Garibaldi	2,787	0%	0%	9%	1%	6%
<b>Island Health</b>	<b>7,229</b>	<b>1%</b>	<b>0%</b>	<b>12%</b>	<b>1%</b>	<b>7%</b>
South Vancouver Island	3,299	0%	0%	12%	1%	8%
Central Vancouver Island	2,479	1%	0%	12%	2%	5%
North Vancouver Island	1,451	1%	0%	13%	2%	7%
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>0%</b>	<b>0%</b>	<b>11%</b>	<b>1%</b>	<b>7%</b>
Northwest	776	0%	0%	12%	1%	9%
Northern Interior	1,456	0%	0%	9%	1%	5%
Northeast	860	0%	0%	14%	2%	10%

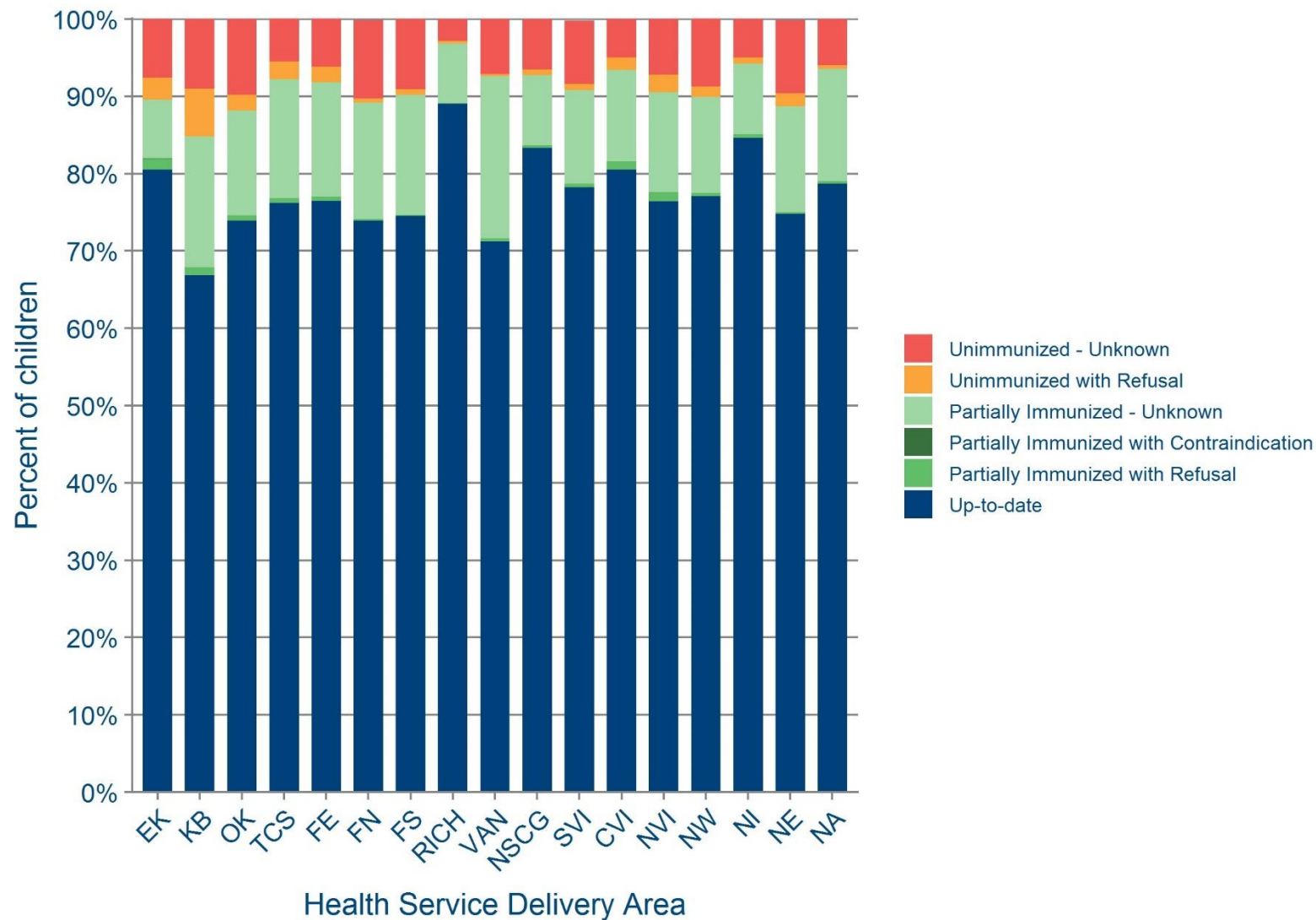
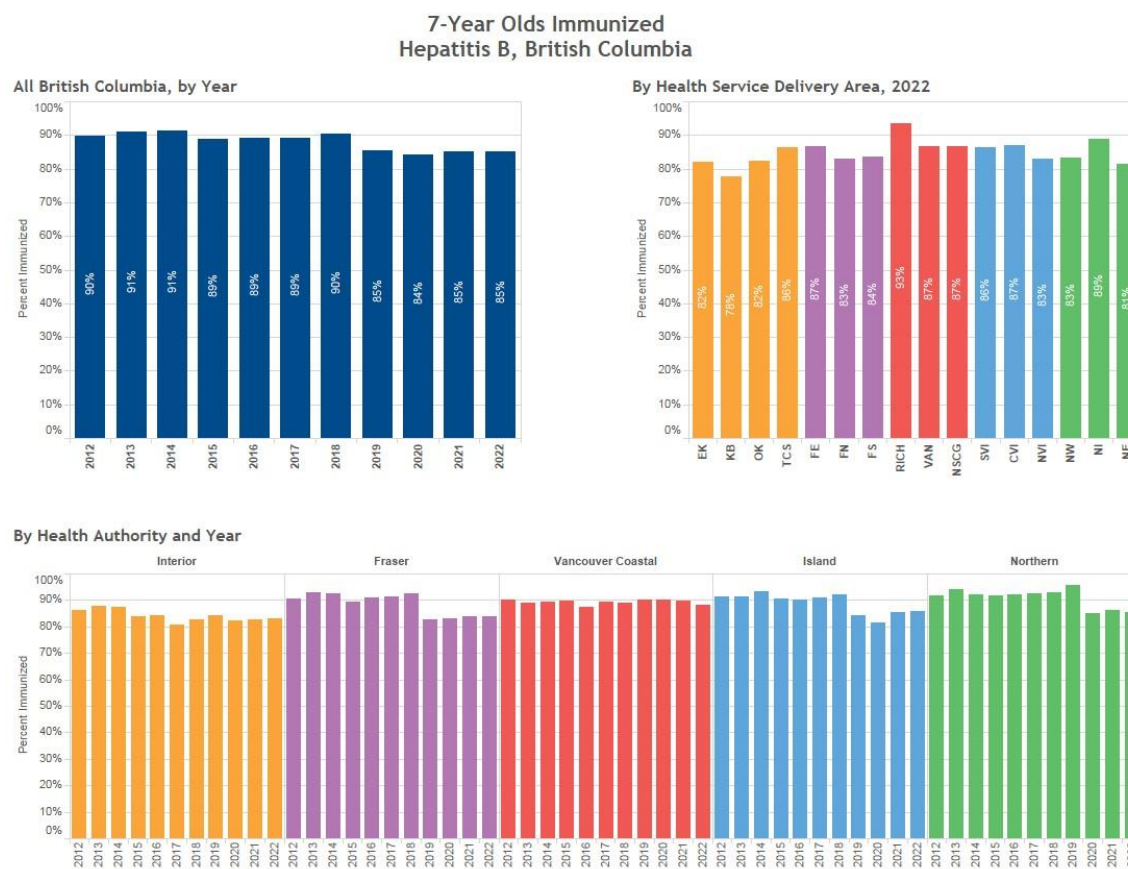


Figure 4. Reasons for non-immunization by Health Service Delivery Area, D/T/aP, British Columbia, 2022



## Hepatitis B

Figure 5 displays the time trends for Hepatitis B coverage in BC from 2012 to 2022.<sup>c</sup> Since 2019, provincial hepatitis B coverage has been stable at around 85%. At the health authority level, coverage is comparable to 2021 with a slight decline (2%) in VCH. With the exception of VCH which has higher coverage, rates between health authorities are similar. Reasons for being partially or unimmunized for hepatitis B are displayed in Table 9 and Figure 6. At the provincial level, only 1% of BC seven-year-olds were unimmunized due to a documented parental/guardian refusal, while 4% and 9% were partially immunized and unimmunized for unknown reasons.



**Figure 5. Percent of seven-year-olds immunized, Hepatitis B, British Columbia**

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

Region	Population	Count				Percent			
		Partially Immunized		Unimmunized		Partially Immunized		Unimmunized	
		Refusal	Unknown <sup>e</sup>	Refusal	Unknown <sup>e</sup>	Refusal	Unknown <sup>e</sup>	Refusal	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>139</b>	<b>1,824</b>	<b>680</b>	<b>4,273</b>	<b>0%</b>	<b>4%</b>	<b>1%</b>	<b>9%</b>
<b>Interior Health</b>	<b>7,695</b>	<b>41</b>	<b>251</b>	<b>255</b>	<b>754</b>	<b>1%</b>	<b>3%</b>	<b>3%</b>	<b>10%</b>
East Kootenay	906	11	27	30	94	1%	3%	3%	10%
Kootenay Boundary	764	3	22	58	88	0%	3%	8%	12%
Okanagan	3,634	18	116	103	402	0%	3%	3%	11%
Thompson Cariboo Shuswap	2,391	9	86	64	170	0%	4%	3%	7%
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>38</b>	<b>902</b>	<b>179</b>	<b>1,925</b>	<b>0%</b>	<b>5%</b>	<b>1%</b>	<b>10%</b>
Fraser East	3,482	11	130	75	248	0%	4%	2%	7%
Fraser North	6,296	10	303	33	732	0%	5%	0%	12%
Fraser South	9,118	17	469	71	945	0%	5%	1%	10%
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>8</b>	<b>315</b>	<b>53</b>	<b>720</b>	<b>0%</b>	<b>3%</b>	<b>1%</b>	<b>8%</b>
Richmond	2,002	0	50	7	75	0%	2%	0%	4%
Vancouver	4,464	6	165	15	405	0%	4%	0%	9%
North Shore/Coast Garibaldi	2,787	2	100	31	240	0%	4%	1%	9%
<b>Island Health</b>	<b>7,229</b>	<b>43</b>	<b>218</b>	<b>149</b>	<b>612</b>	<b>1%</b>	<b>3%</b>	<b>2%</b>	<b>8%</b>
South Vancouver Island	3,299	14	76	45	318	0%	2%	1%	10%
Central Vancouver Island	2,479	17	89	58	156	1%	4%	2%	6%
North Vancouver Island	1,451	12	53	46	138	1%	4%	3%	10%
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>9</b>	<b>138</b>	<b>44</b>	<b>262</b>	<b>0%</b>	<b>4%</b>	<b>1%</b>	<b>8%</b>
Northwest	776	2	39	13	76	0%	5%	2%	10%
Northern Interior	1,456	4	58	15	86	0%	4%	1%	6%
Northeast	860	3	41	16	100	0%	5%	2%	12%

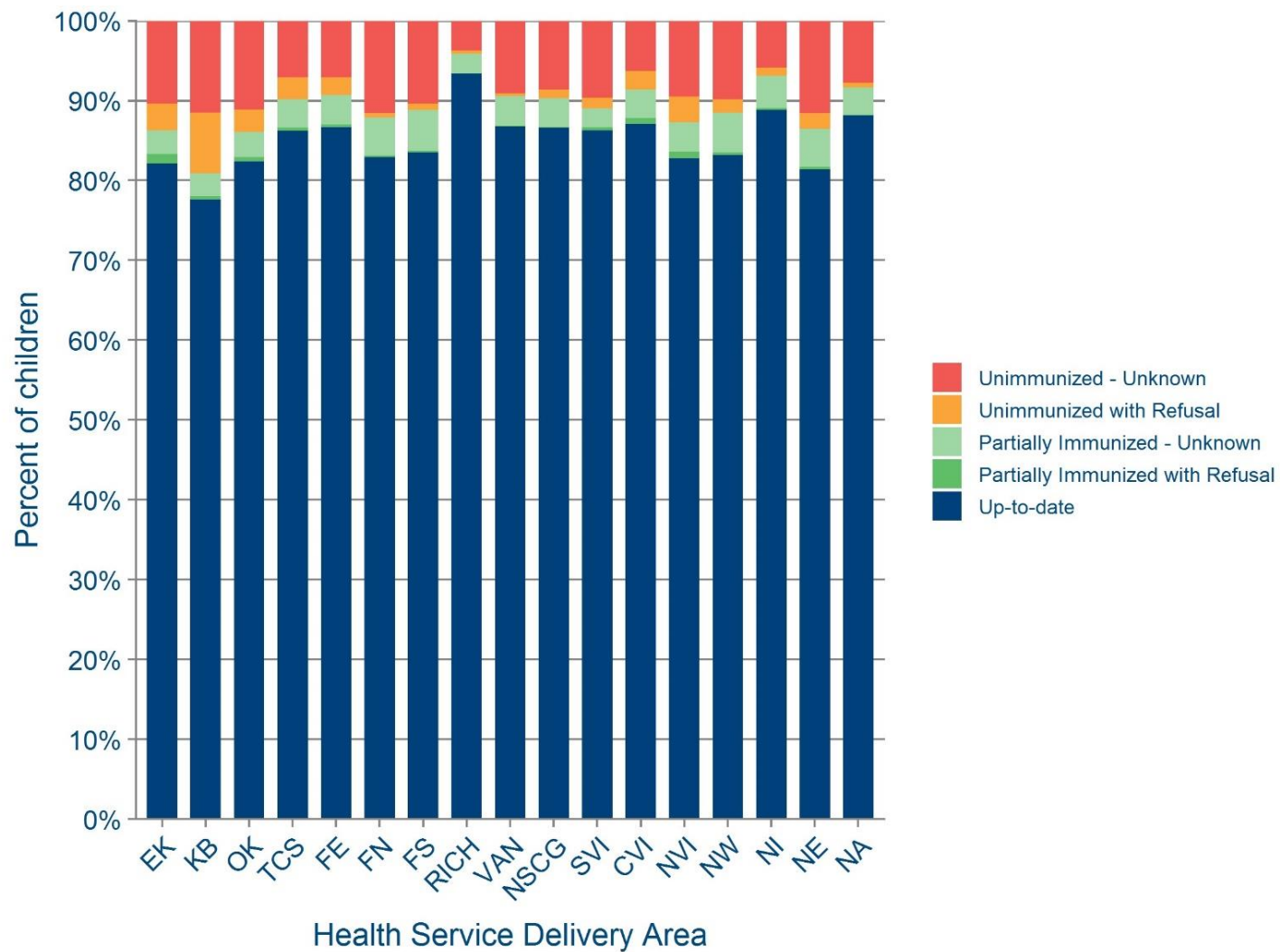
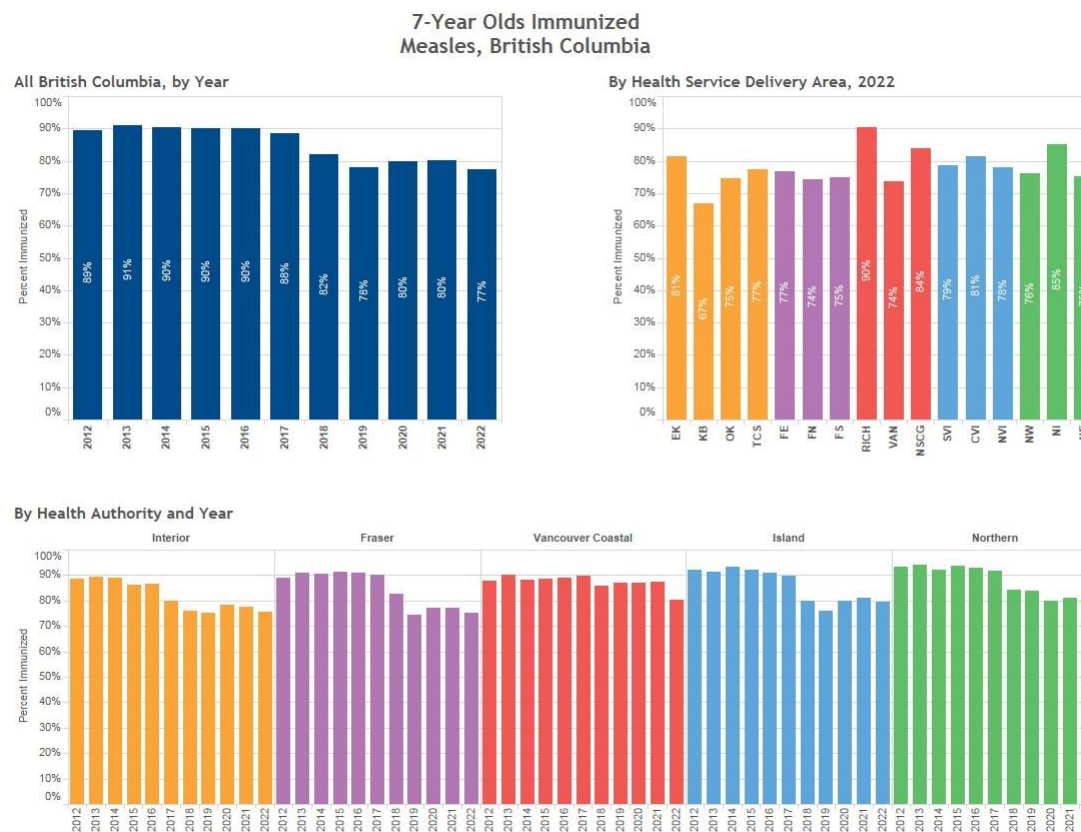


Figure 6. Reasons for non-immunization by Health Service Delivery Area, Hepatitis B, British Columbia, 2022

## Measles

Figure 7 displays the time trends for measles coverage in BC from 2012 to 2022.<sup>c,g</sup> Measles coverage in BC decreased by 3% from 2021, and has continually remained below the 88-91% coverage seen throughout 2012-2017. Coverage declined across all health authorities compared to 2021, with the largest decrease in VCH. Reasons for being partially or unimmunized for measles are displayed in Table 10 and Figure 8. At the provincial level, only 1% of BC seven-year-olds were unimmunized due to a documented refusal, while 12% and 9% were partially immunized and unimmunized for unknown reasons.



**Figure 7. Percent of seven-year-olds immunized, Measles, British Columbia**

<sup>g</sup> In January 2012, the second dose of MMR vaccine was moved from 18-months to 4-6 years of age, which may partially explain the drop in coverage in 2018. See [Notes](#).  
Immunization Coverage by the 7<sup>th</sup> Birthday  
2012-2022

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

Region	Population	Count						
		Immune: Lab Evidence	Partially Immunized			Unimmunized		
			Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Contraindication	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>2</b>	<b>126</b>	<b>9</b>	<b>5,598</b>	<b>571</b>	<b>4</b>	<b>4,189</b>
<b>Interior Health</b>	<b>7,695</b>	<b>0</b>	<b>31</b>	<b>3</b>	<b>914</b>	<b>203</b>	<b>0</b>	<b>736</b>
East Kootenay	906	0	5	2	57	26	0	79
Kootenay Boundary	764	0	3	0	118	53	0	79
Okanagan	3,634	0	15	1	429	71	0	407
Thompson Cariboo Shuswap	2,391	0	8	0	310	53	0	171
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>0</b>	<b>29</b>	<b>1</b>	<b>2,539</b>	<b>179</b>	<b>2</b>	<b>1,959</b>
Fraser East	3,482	0	7	1	459	76	1	266
Fraser North	6,296	0	8	0	850	34	0	724
Fraser South	9,118	0	14	0	1,230	69	1	969
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>0</b>	<b>22</b>	<b>1</b>	<b>1,070</b>	<b>43</b>	<b>1</b>	<b>670</b>
Richmond	2,002	0	1	0	117	7	0	68
Vancouver	4,464	0	15	1	746	12	1	393
North Shore/Coast Garibaldi	2,787	0	6	0	207	24	0	209
<b>Island Health</b>	<b>7,229</b>	<b>2</b>	<b>35</b>	<b>2</b>	<b>768</b>	<b>110</b>	<b>1</b>	<b>561</b>
South Vancouver Island	3,299	0	11	2	367	30	0	290
Central Vancouver Island	2,479	2	14	0	247	48	1	149
North Vancouver Island	1,451	0	10	0	154	32	0	122
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>0</b>	<b>9</b>	<b>2</b>	<b>307</b>	<b>36</b>	<b>0</b>	<b>263</b>
Northwest	776	0	2	0	93	10	0	81
Northern Interior	1,456	0	5	2	118	12	0	81
Northeast	860	0	2	0	96	14	0	101

Table 10 (continued).

Region	Population	Percent						
		Immune: Lab Evidence	Partially Immunized			Unimmunized		
			Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Contraindication	Unknown
<b>British Columbia</b>	<b>46,165</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
<b>Interior Health</b>	<b>7,695</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>3%</b>	<b>0%</b>	<b>10%</b>
East Kootenay	906	0%	1%	0%	6%	3%	0%	9%
Kootenay Boundary	764	0%	0%	0%	15%	7%	0%	10%
Okanagan	3,634	0%	0%	0%	12%	2%	0%	11%
Thompson Cariboo Shuswap	2,391	0%	0%	0%	13%	2%	0%	7%
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>13%</b>	<b>1%</b>	<b>0%</b>	<b>10%</b>
Fraser East	3,482	0%	0%	0%	13%	2%	0%	8%
Fraser North	6,296	0%	0%	0%	14%	0%	0%	12%
Fraser South	9,118	0%	0%	0%	14%	1%	0%	11%
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>0%</b>	<b>0%</b>	<b>7%</b>
Richmond	2,002	0%	0%	0%	6%	0%	0%	3%
Vancouver	4,464	0%	0%	0%	17%	0%	0%	9%
North Shore/Coast Garibaldi	2,787	0%	0%	0%	7%	1%	0%	7%
<b>Island Health</b>	<b>7,229</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>11%</b>	<b>2%</b>	<b>0%</b>	<b>8%</b>
South Vancouver Island	3,299	0%	0%	0%	11%	1%	0%	9%
Central Vancouver Island	2,479	0%	1%	0%	10%	2%	0%	6%
North Vancouver Island	1,451	0%	1%	0%	11%	2%	0%	8%
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>10%</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
Northwest	776	0%	0%	0%	12%	1%	0%	10%
Northern Interior	1,456	0%	0%	0%	8%	1%	0%	6%
Northeast	860	0%	0%	0%	11%	2%	0%	12%

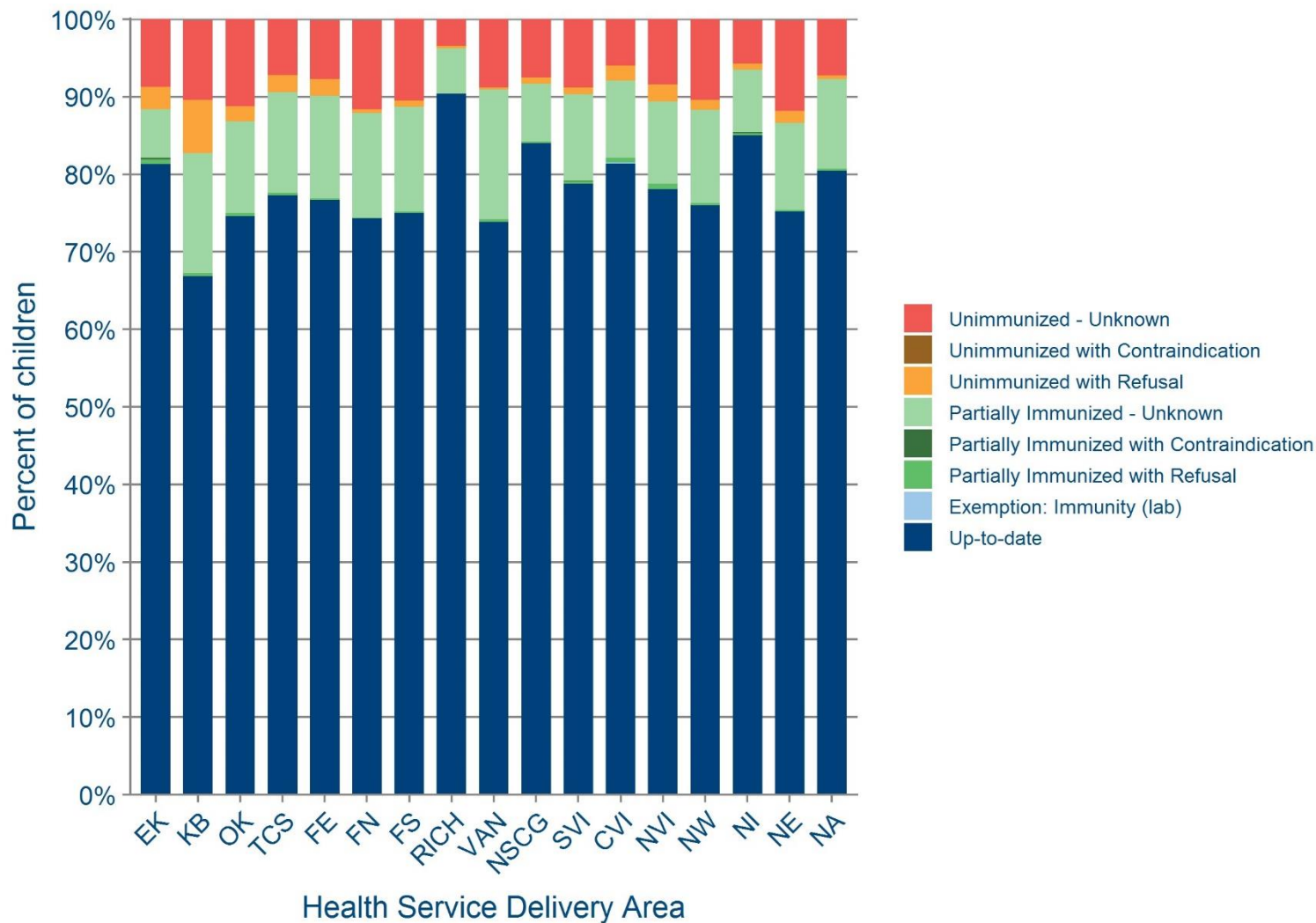
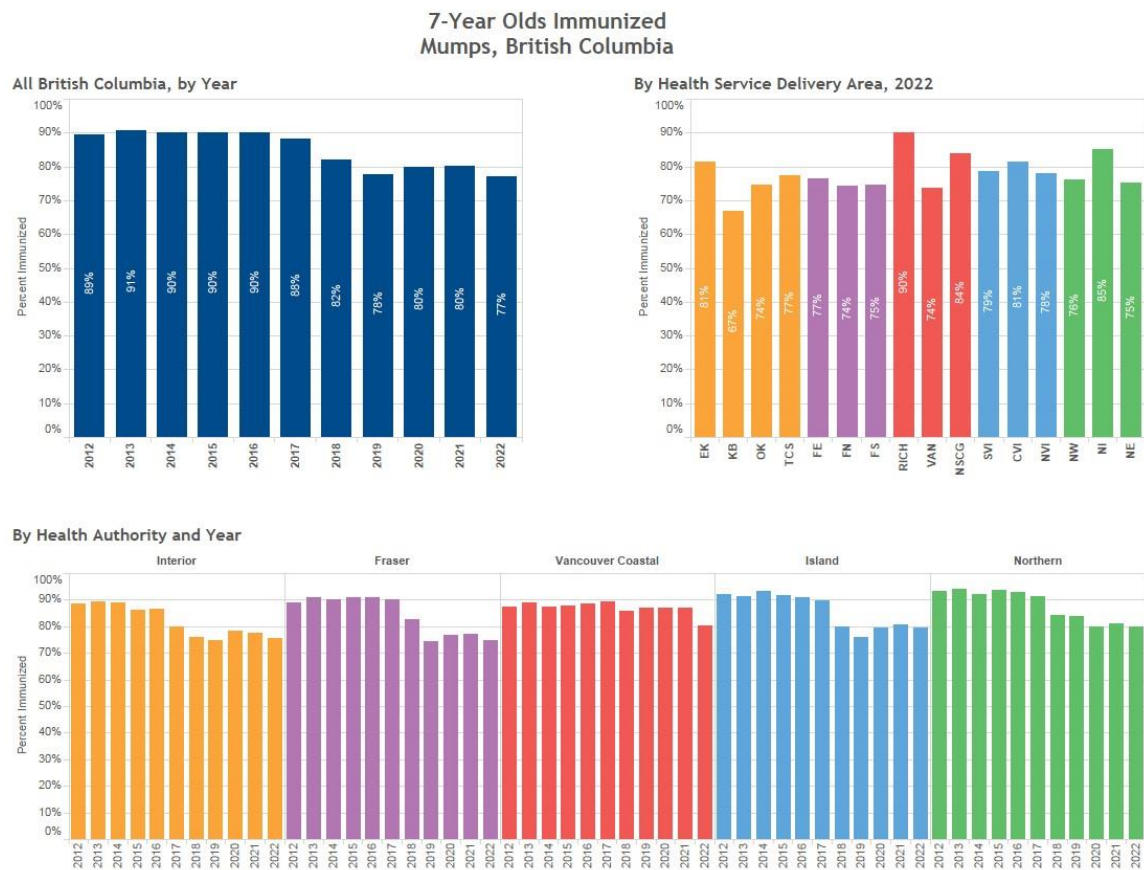


Figure 8. Reasons for non-immunization by Health Service Delivery Area, Measles, British Columbia, 2022

## Mumps

Figure 9 displays the time trends for mumps coverage in BC from 2012 to 2022.<sup>c,g</sup> Like measles, mumps coverage in BC decreased by 3% from 2021, and has continually remained below the 88-91% coverage seen throughout 2012-2017. VCH saw the largest decrease in coverage compared to the previous year.

Reasons for being partially or unimmunized for mumps are displayed in Table 11 and Figure 10. At the provincial level, only 1% of BC seven-year-olds were unimmunized due to a documented refusal, while 12% and 9% were partially immunized and unimmunized due to unknown circumstances.



**Figure 9. Percent of seven-year-olds immunized, Mumps, British Columbia**



Table 11. Reasons for non-immunization, Mumps, British Columbia, 2022

Region	Population	Count					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Contraindication	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>125</b>	<b>9</b>	<b>5,626</b>	<b>572</b>	<b>4</b>	<b>4,225</b>
<b>Interior Health</b>	<b>7,695</b>	<b>31</b>	<b>3</b>	<b>915</b>	<b>203</b>	<b>0</b>	<b>740</b>
East Kootenay	906	5	2	57	26	0	79
Kootenay Boundary	764	3	0	117	53	0	80
Okanagan	3,634	15	1	432	71	0	409
Thompson Cariboo Shuswap	2,391	8	0	309	53	0	172
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>28</b>	<b>1</b>	<b>2,555</b>	<b>180</b>	<b>2</b>	<b>1,979</b>
Fraser East	3,482	7	1	461	76	1	268
Fraser North	6,296	8	0	856	34	0	728
Fraser South	9,118	13	0	1,238	70	1	983
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>22</b>	<b>1</b>	<b>1,078</b>	<b>43</b>	<b>1</b>	<b>679</b>
Richmond	2,002	1	0	119	7	0	70
Vancouver	4,464	15	1	751	12	1	400
North Shore/Coast Garibaldi	2,787	6	0	208	24	0	209
<b>Island Health</b>	<b>7,229</b>	<b>35</b>	<b>2</b>	<b>772</b>	<b>110</b>	<b>1</b>	<b>563</b>
South Vancouver Island	3,299	11	2	369	30	0	291
Central Vancouver Island	2,479	14	0	249	48	1	150
North Vancouver Island	1,451	10	0	154	32	0	122
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>9</b>	<b>2</b>	<b>306</b>	<b>36</b>	<b>0</b>	<b>264</b>
Northwest	776	2	0	92	10	0	82
Northern Interior	1,456	5	2	118	12	0	81
Northeast	860	2	0	96	14	0	101

Table 11 (continued).

Region	Population	Percent					
		Partially Immunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Contraindication	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
<b>Interior Health</b>	<b>7,695</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>3%</b>	<b>0%</b>	<b>10%</b>
East Kootenay	906	1%	0%	6%	3%	0%	9%
Kootenay Boundary	764	0%	0%	15%	7%	0%	10%
Okanagan	3,634	0%	0%	12%	2%	0%	11%
Thompson Cariboo Shuswap	2,391	0%	0%	13%	2%	0%	7%
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>0%</b>	<b>0%</b>	<b>14%</b>	<b>1%</b>	<b>0%</b>	<b>10%</b>
Fraser East	3,482	0%	0%	13%	2%	0%	8%
Fraser North	6,296	0%	0%	14%	0%	0%	12%
Fraser South	9,118	0%	0%	14%	1%	0%	11%
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>0%</b>	<b>0%</b>	<b>7%</b>
Richmond	2,002	0%	0%	6%	0%	0%	3%
Vancouver	4,464	0%	0%	17%	0%	0%	9%
North Shore/Coast Garibaldi	2,787	0%	0%	7%	1%	0%	7%
<b>Island Health</b>	<b>7,229</b>	<b>0%</b>	<b>0%</b>	<b>11%</b>	<b>2%</b>	<b>0%</b>	<b>8%</b>
South Vancouver Island	3,299	0%	0%	11%	1%	0%	9%
Central Vancouver Island	2,479	1%	0%	10%	2%	0%	6%
North Vancouver Island	1,451	1%	0%	11%	2%	0%	8%
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>0%</b>	<b>0%</b>	<b>10%</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
Northwest	776	0%	0%	12%	1%	0%	11%
Northern Interior	1,456	0%	0%	8%	1%	0%	6%
Northeast	860	0%	0%	11%	2%	0%	12%

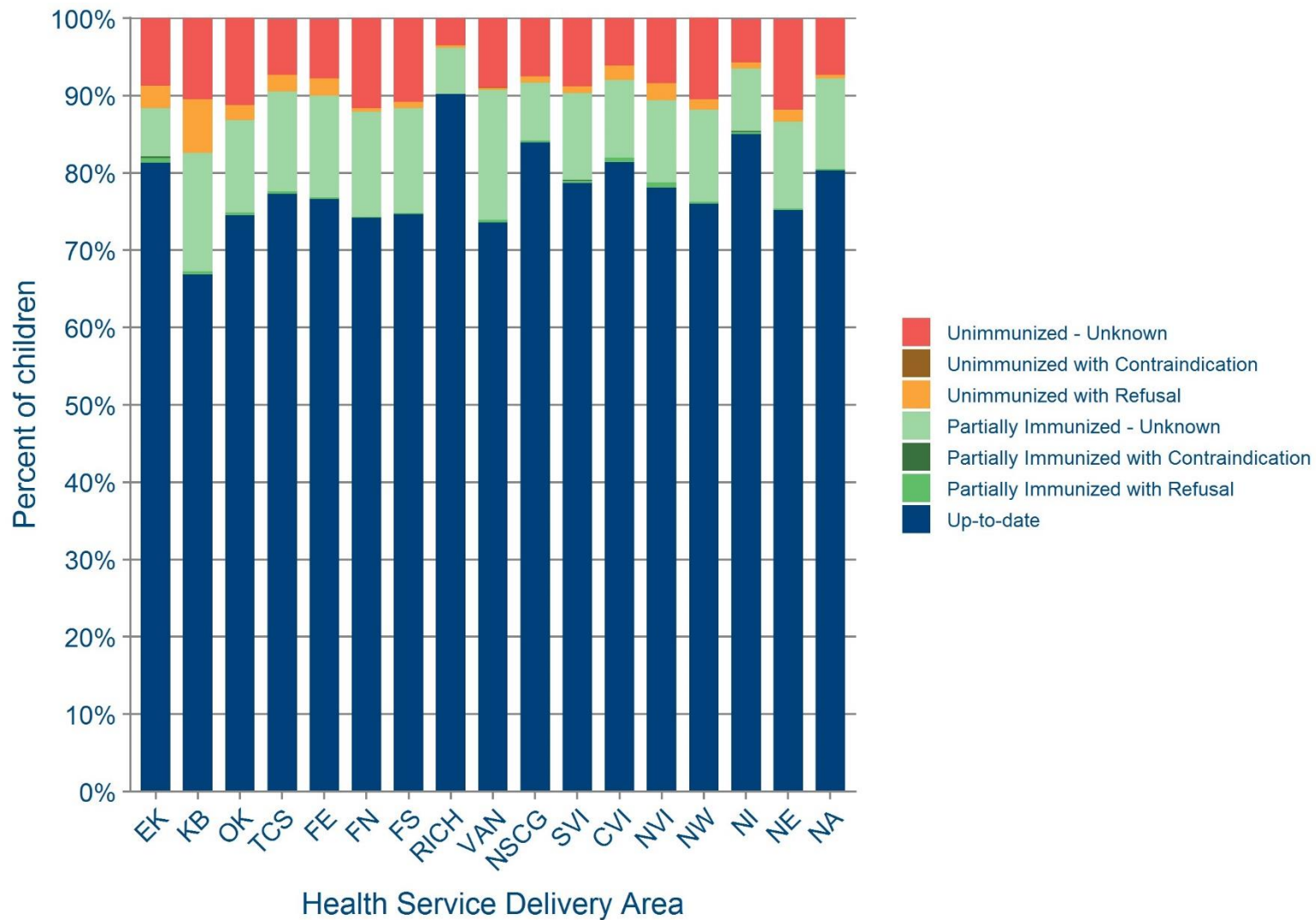


Figure 10. Reasons for non-immunization by Health Service Delivery Area, Mumps, British Columbia, 2022

## Rubella

Figure 11 displays the time trends for rubella coverage in BC from 2012 to 2022.<sup>c</sup> Rubella coverage in BC has been stable since 2019, but remains below the 95-96% coverage seen throughout 2012-2018. Coverage in FH, ISLH, and NH has been stable in recent years while IH and VCH have seen declining trends overall. Only one dose of rubella is required by age seven to be considered up-to-date in the current coverage assessment, which explains the higher coverage for rubella in comparison to measles and mumps, which are generally given as a single vaccine product. Reasons for being unimmunized for rubella are displayed in Table 12 and Figure 12. At the provincial level, only 1% of BC seven-year-olds were unimmunized due to a documented refusal, while 9% were unimmunized due to unknown circumstances.

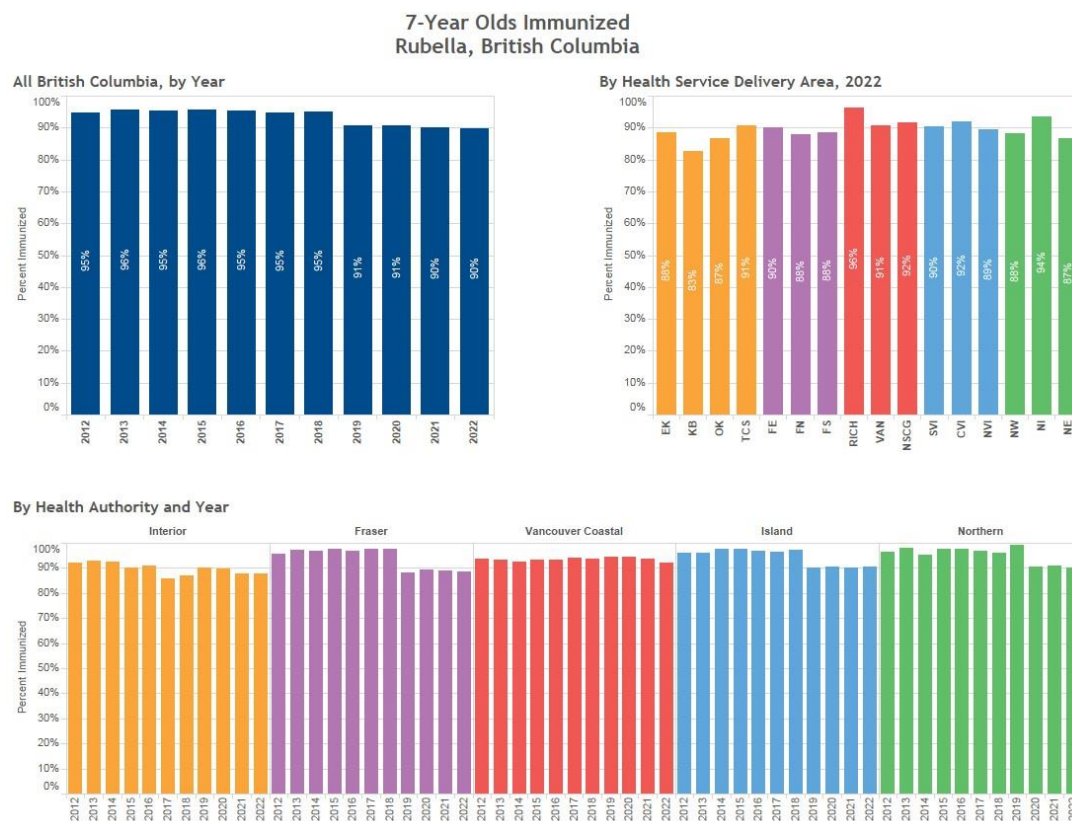


Figure 11. Percent of seven-year-olds immunized, Rubella, British Columbia

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

Region	Population	Count			Percent		
		Unimmunized			Unimmunized		
		Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Contraindication	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>572</b>	<b>4</b>	<b>4,209</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
<b>Interior Health</b>	<b>7,695</b>	<b>203</b>	<b>0</b>	<b>738</b>	<b>3%</b>	<b>0%</b>	<b>10%</b>
East Kootenay	906	26	0	79	3%	0%	9%
Kootenay Boundary	764	53	0	79	7%	0%	10%
Okanagan	3,634	71	0	408	2%	0%	11%
Thompson Cariboo Shuswap	2,391	53	0	172	2%	0%	7%
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>180</b>	<b>2</b>	<b>1,972</b>	<b>1%</b>	<b>0%</b>	<b>10%</b>
Fraser East	3,482	76	1	268	2%	0%	8%
Fraser North	6,296	34	0	724	0%	0%	12%
Fraser South	9,118	70	1	980	1%	0%	11%
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>43</b>	<b>1</b>	<b>672</b>	<b>0%</b>	<b>0%</b>	<b>7%</b>
Richmond	2,002	7	0	68	0%	0%	3%
Vancouver	4,464	12	1	395	0%	0%	9%
North Shore/Coast Garibaldi	2,787	24	0	209	1%	0%	7%
<b>Island Health</b>	<b>7,229</b>	<b>110</b>	<b>1</b>	<b>563</b>	<b>2%</b>	<b>0%</b>	<b>8%</b>
South Vancouver Island	3,299	30	0	291	1%	0%	9%
Central Vancouver Island	2,479	48	1	150	2%	0%	6%
North Vancouver Island	1,451	32	0	122	2%	0%	8%
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>36</b>	<b>0</b>	<b>264</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
Northwest	776	10	0	82	1%	0%	11%
Northern Interior	1,456	12	0	81	1%	0%	6%
Northeast	860	14	0	101	2%	0%	12%

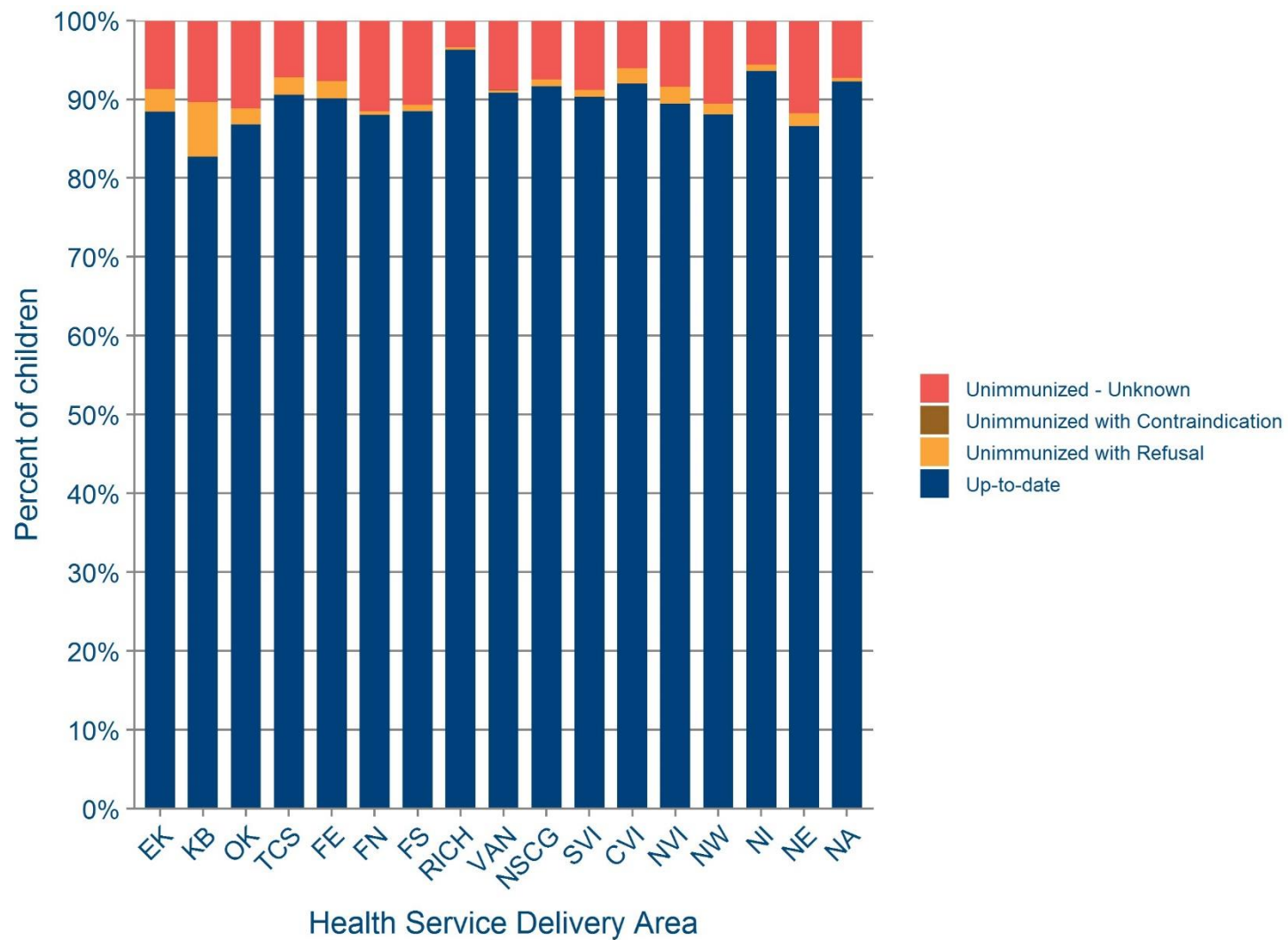
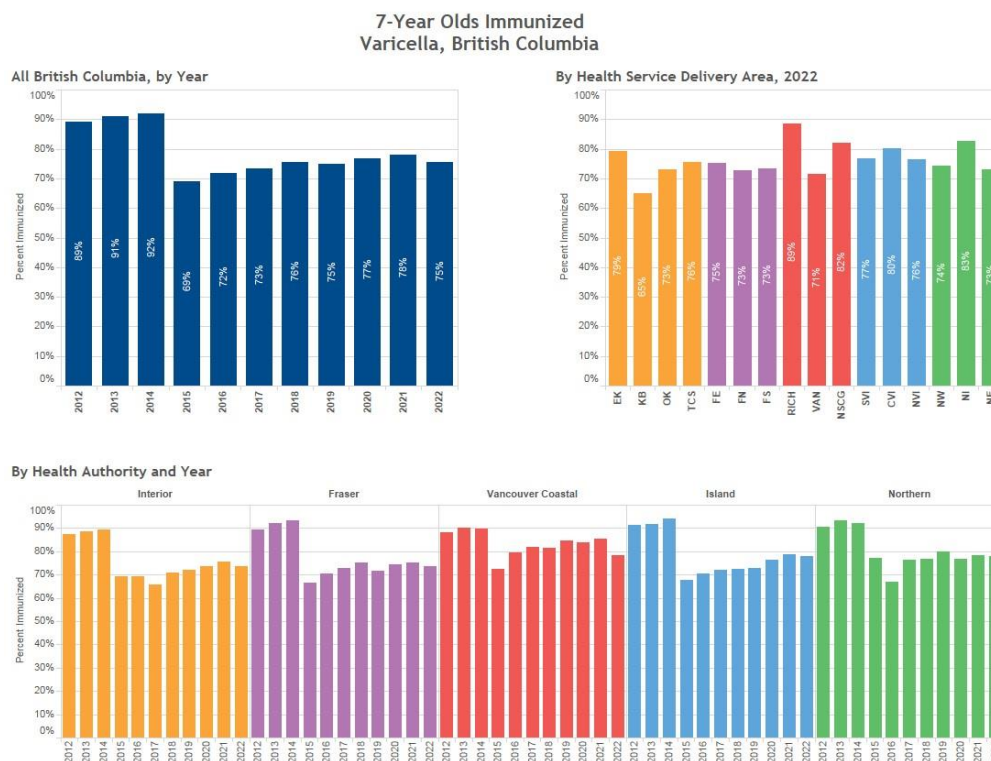


Figure 12. Reasons for non-immunization by Health Service Delivery Area, Rubella, British Columbia, 2022

## Varicella

Figure 13 displays the time trends for varicella coverage in BC from 2012 to 2022.<sup>c</sup> Prior to 2015, only one dose of varicella was required by age seven to be considered up-to-date, which may partially explain the large decline in coverage from 92% to 69% in 2014 and 2015.<sup>h</sup> As such, varicella coverage improved between 2015 and 2018, and has remained relatively stable since, but remains lower than the single dose coverage between 2012 and 2014. The BC varicella rate did decline this year by 3% which is largely attributable to the 6% decrease in VCH as coverage in the other regions was relatively stable in comparison. Reasons for being partially immunized or unimmunized for varicella are displayed in Table 13 and Figure 14. At the provincial level, only 2% of BC seven-year-olds were unimmunized due to a documented refusal, while 12% and 10% were partially immunized or unimmunized due to unknown circumstances.



**Figure 13. Percent of seven-year-olds immunized, Varicella, British Columbia**

<sup>h</sup> In 2015 (2007 birth cohort), the varicella requirement changed from requiring one to two doses for a child to be considered up-to-date. See [Note 8](#)

Table 13. Reasons for non-immunization, Varicella, British Columbia, 2022

Region	Population	Count							
		Immune: Previous Disease	Immune: Lab Evidence	Partially Immunized			Unimmunized		
				Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Contraindication	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>99</b>	<b>17</b>	<b>215</b>	<b>9</b>	<b>5,652</b>	<b>854</b>	<b>3</b>	<b>4,583</b>
<b>Interior Health</b>	7,695	11	5	56	3	879	288	0	789
East Kootenay	906	3	1	6	2	60	38	0	81
Kootenay Boundary	764	2	0	10	0	102	72	0	84
Okanagan	3,634	2	2	21	1	413	104	0	437
Thompson Cariboo Shuswap	2,391	4	2	19	0	304	74	0	187
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>21</b>	<b>7</b>	<b>43</b>	<b>2</b>	<b>2,630</b>	<b>234</b>	<b>2</b>	<b>2,100</b>
Fraser East	3,482	8	1	16	1	460	102	1	286
Fraser North	6,296	3	3	9	0	885	48	0	779
Fraser South	9,118	10	3	18	1	1,285	84	1	1,035
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>50</b>	<b>0</b>	<b>23</b>	<b>1</b>	<b>1,116</b>	<b>74</b>	<b>1</b>	<b>787</b>
Richmond	2,002	2	0	2	0	129	8	0	89
Vancouver	4,464	33	0	13	1	772	24	1	466
North Shore/Coast Garibaldi	2,787	15	0	8	0	215	42	0	232
<b>Island Health</b>	<b>7,229</b>	<b>13</b>	<b>5</b>	<b>71</b>	<b>1</b>	<b>719</b>	<b>185</b>	<b>0</b>	<b>628</b>
South Vancouver Island	3,299	8	1	29	1	347	65	0	325
Central Vancouver Island	2,479	3	3	26	0	233	72	0	164
North Vancouver Island	1,451	2	1	16	0	139	48	0	139
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>4</b>	<b>0</b>	<b>22</b>	<b>2</b>	<b>308</b>	<b>73</b>	<b>0</b>	<b>279</b>
Northwest	776	1	0	2	0	95	20	0	83
Northern Interior	1,456	3	0	12	2	121	27	0	90
Northeast	860	0	0	8	0	92	26	0	106



Table 13 (continued).

Region	Population	Percent							
		Immune: Previous Disease	Immune: Lab Evidence	Partially Immunized			Unimmunized		
				Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Contraindication	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>2%</b>	<b>0%</b>	<b>10%</b>
<b>Interior Health</b>	<b>7,695</b>	<b>0%</b>	<b>0%</b>	<b>1%</b>	<b>0%</b>	<b>11%</b>	<b>4%</b>	<b>0%</b>	<b>10%</b>
East Kootenay	906	0%	0%	1%	0%	7%	4%	0%	9%
Kootenay Boundary	764	0%	0%	1%	0%	13%	9%	0%	11%
Okanagan	3,634	0%	0%	1%	0%	11%	3%	0%	12%
Thompson Cariboo Shuswap	2,391	0%	0%	1%	0%	13%	3%	0%	8%
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>14%</b>	<b>1%</b>	<b>0%</b>	<b>11%</b>
Fraser East	3,482	0%	0%	0%	0%	13%	3%	0%	8%
Fraser North	6,296	0%	0%	0%	0%	14%	1%	0%	12%
Fraser South	9,118	0%	0%	0%	0%	14%	1%	0%	11%
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>1%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>12%</b>	<b>1%</b>	<b>0%</b>	<b>9%</b>
Richmond	2,002	0%	0%	0%	0%	6%	0%	0%	4%
Vancouver	4,464	1%	0%	0%	0%	17%	1%	0%	10%
North Shore/Coast Garibaldi	2,787	1%	0%	0%	0%	8%	2%	0%	8%
<b>Island Health</b>	<b>7,229</b>	<b>0%</b>	<b>0%</b>	<b>1%</b>	<b>0%</b>	<b>10%</b>	<b>3%</b>	<b>0%</b>	<b>9%</b>
South Vancouver Island	3,299	0%	0%	1%	0%	10%	2%	0%	10%
Central Vancouver Island	2,479	0%	0%	1%	0%	9%	3%	0%	7%
North Vancouver Island	1,451	0%	0%	1%	0%	10%	3%	0%	10%
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>0%</b>	<b>0%</b>	<b>1%</b>	<b>0%</b>	<b>10%</b>	<b>2%</b>	<b>0%</b>	<b>9%</b>
Northwest	776	0%	0%	0%	0%	12%	3%	0%	11%
Northern Interior	1,456	0%	0%	1%	0%	8%	2%	0%	6%
Northeast	860	0%	0%	1%	0%	11%	3%	0%	12%

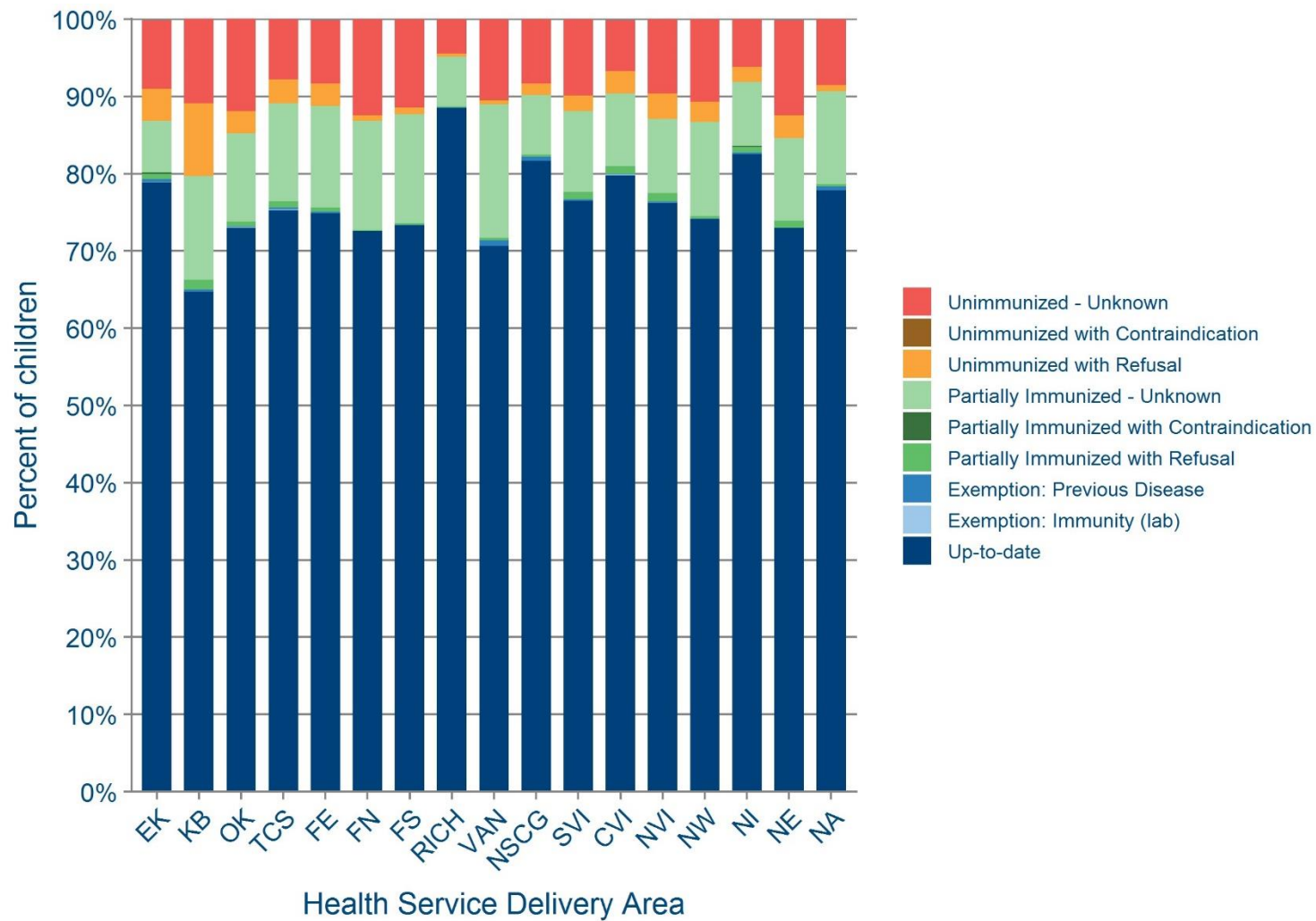


Figure 14. Reasons for non-immunization by Health Service Delivery Area, Varicella, British Columbia, 2022

## Meningococcal C Conjugate

Figure 15 displays the time trends for meningococcal C conjugate coverage in BC from 2012 to 2022.<sup>c</sup> There was no meningococcal C conjugate assessment in 2018. Coverage in BC has remained stable from 2020 to 2022 but is below the 89-94% coverage seen throughout 2012 to 2017. At the health authority level, coverage in FH, ISLH, and NH has been stable. IH and VCH have observed declining trends, however the decrease is most significant in VCH. Reasons for being partially immunized or unimmunized for meningococcal C conjugate are displayed in Table 14 and Figure 16. At the provincial level, only 1% of BC seven-year-olds were unimmunized due to a documented refusal, while 1% and 11% were partially immunized or unimmunized, respectively, due to unknown circumstances.

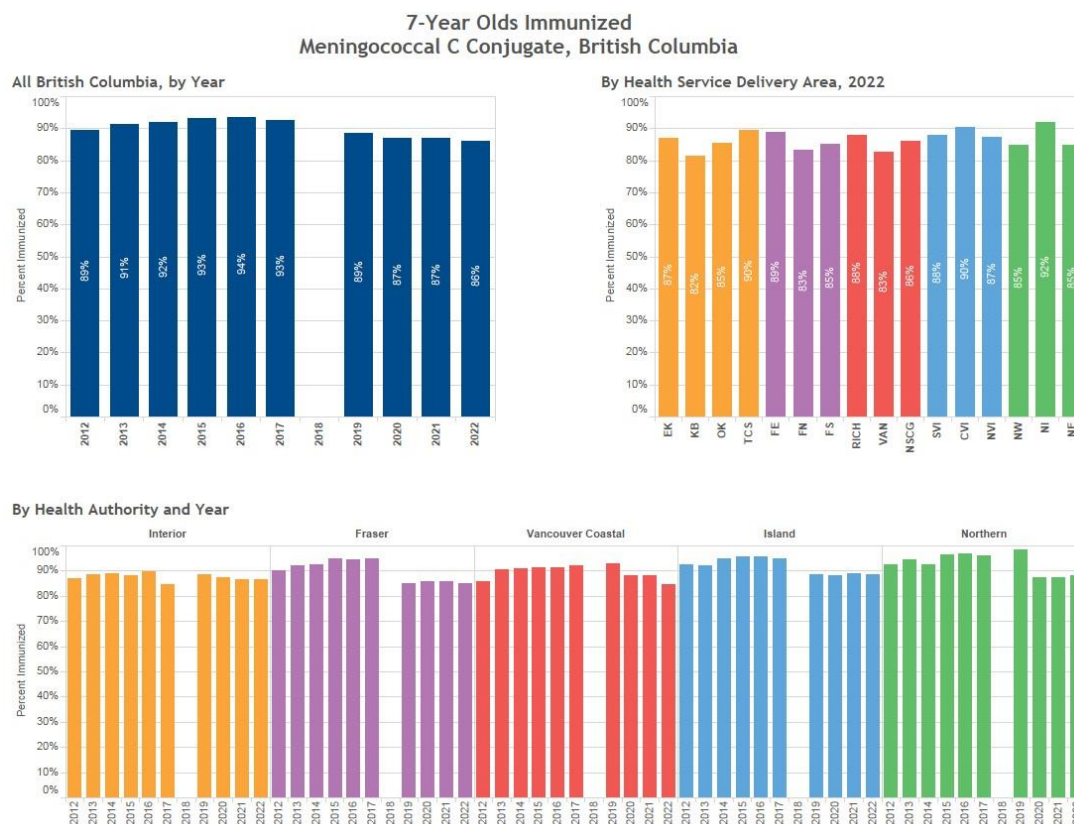


Figure 15. Percent of seven-year-olds immunized, Meningococcal C Conjugate, British Columbia

Table 14. Reasons for non-immunization, Meningococcal C Conjugate, British Columbia, 2022

Region	Population	Count					Percent				
		Partially Immunized		Unimmunized			Partially Immunized		Unimmunized		
		Refusal	Unknown <sup>e</sup>	Refusal	Contra-indication	Unknown <sup>e</sup>	Refusal	Unknown <sup>e</sup>	Refusal	Contra-indication	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>45</b>	<b>549</b>	<b>632</b>	<b>1</b>	<b>5,226</b>	<b>0%</b>	<b>1%</b>	<b>1%</b>	<b>0%</b>	<b>11%</b>
<b>Interior Health</b>	<b>7,695</b>	<b>15</b>	<b>99</b>	<b>225</b>	<b>1</b>	<b>700</b>	<b>0%</b>	<b>1%</b>	<b>3%</b>	<b>0%</b>	<b>9%</b>
East Kootenay	906	4	7	27	1	79	0%	1%	3%	0%	9%
Kootenay Boundary	764	3	9	50	0	79	0%	1%	6%	0%	10%
Okanagan	3,634	5	49	85	0	394	0%	1%	2%	0%	11%
Thompson Cariboo Shuswap	2,391	3	34	63	0	148	0%	1%	3%	0%	6%
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>15</b>	<b>300</b>	<b>179</b>	<b>0</b>	<b>2,325</b>	<b>0%</b>	<b>2%</b>	<b>1%</b>	<b>0%</b>	<b>12%</b>
Fraser East	3,482	2	54	76	0	259	0%	2%	2%	0%	7%
Fraser North	6,296	7	100	36	0	917	0%	2%	1%	0%	15%
Fraser South	9,118	6	146	67	0	1,149	0%	2%	1%	0%	13%
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>0</b>	<b>0</b>	<b>54</b>	<b>0</b>	<b>1,349</b>	<b>0%</b>	<b>0%</b>	<b>1%</b>	<b>0%</b>	<b>15%</b>
Richmond	2,002	0	0	8	0	233	0%	0%	0%	0%	12%
Vancouver	4,464	0	0	19	0	755	0%	0%	0%	0%	17%
North Shore / Coast Garibaldi	2,787	0	0	27	0	361	0%	0%	1%	0%	13%
<b>Island Health</b>	<b>7,229</b>	<b>14</b>	<b>83</b>	<b>132</b>	<b>0</b>	<b>596</b>	<b>0%</b>	<b>1%</b>	<b>2%</b>	<b>0%</b>	<b>8%</b>
South Vancouver Island	3,299	6	31	41	0	323	0%	1%	1%	0%	10%
Central Vancouver Island	2,479	7	26	52	0	155	0%	1%	2%	0%	6%
North Vancouver Island	1,451	1	26	39	0	118	0%	2%	3%	0%	8%
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>1</b>	<b>67</b>	<b>42</b>	<b>0</b>	<b>256</b>	<b>0%</b>	<b>2%</b>	<b>1%</b>	<b>0%</b>	<b>8%</b>
Northwest	776	0	25	11	0	81	0%	3%	1%	0%	10%
Northern Interior	1,456	1	19	14	0	85	0%	1%	1%	0%	6%
Northeast	860	0	23	17	0	90	0%	3%	2%	0%	10%

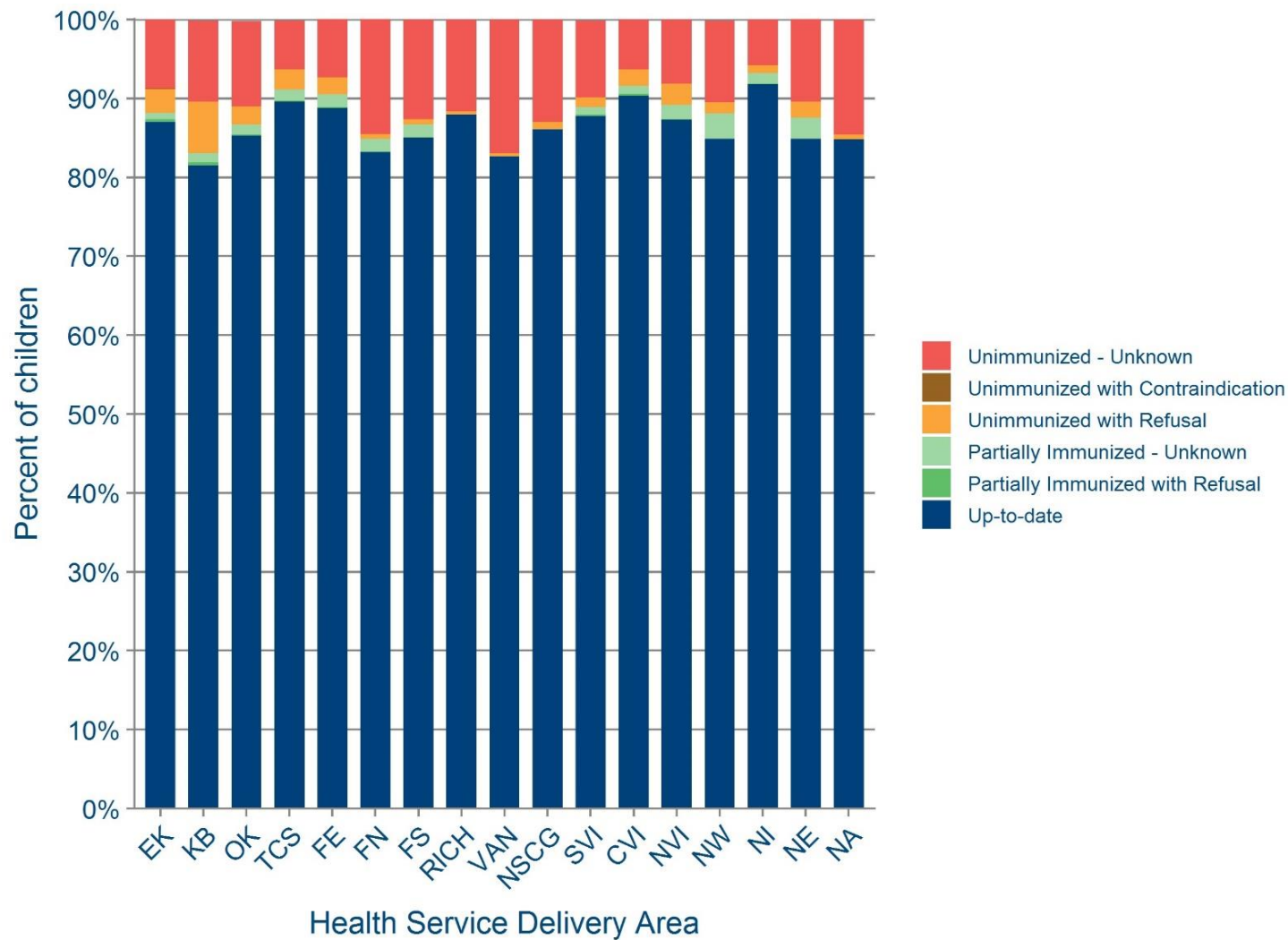


Figure 16. Reasons for non-immunization by Health Service Delivery Area, Meningococcal C Conjugate, British Columbia, 2022

## Polio

Reporting on assessment of polio coverage separate from D/T/aP began in 2019. Figure 17 displays the time trends for polio coverage in BC from 2019 to 2022.<sup>c</sup> Overall, polio coverage in BC has remained stable throughout 2019-2022. IH, FH, and NH have also seen relatively stable coverage, whereas coverage has improved in ISLH and declined in VCH. Reasons for being partially immunized or unimmunized for polio are displayed in Table 15 and Figure 18. At the provincial level, only 1% of BC seven-year-olds were unimmunized due to a documented refusal, while 14% and 8% were partially immunized or unimmunized, respectively, for unknown reasons.



**Figure 17. Percent of seven-year-olds immunized, Polio, British Columbia**

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

Region	Population	Count				
		Partially Immunized			Unimmunized	
		Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>200</b>	<b>2</b>	<b>6,450</b>	<b>541</b>	<b>3,605</b>
<b>Interior Health</b>	<b>7,695</b>	<b>58</b>	<b>1</b>	<b>1,028</b>	<b>205</b>	<b>630</b>
East Kootenay	906	10	0	71	25	69
Kootenay Boundary	764	8	0	120	49	70
Okanagan	3,634	26	1	479	75	358
Thompson Cariboo Shuswap	2,391	14	0	358	56	133
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>45</b>	<b>0</b>	<b>2,867</b>	<b>160</b>	<b>1,697</b>
Fraser East	3,482	14	0	509	69	218
Fraser North	6,296	13	0	949	30	644
Fraser South	9,118	18	0	1,409	61	835
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>27</b>	<b>0</b>	<b>1,375</b>	<b>38</b>	<b>558</b>
Richmond	2,002	1	0	175	6	57
Vancouver	4,464	17	0	951	11	320
North Shore / Coast Garibaldi	2,787	9	0	249	21	181
<b>Island Health</b>	<b>7,229</b>	<b>57</b>	<b>1</b>	<b>848</b>	<b>102</b>	<b>500</b>
South Vancouver Island	3,299	16	1	395	29	272
Central Vancouver Island	2,479	26	0	276	39	124
North Vancouver Island	1,451	15	0	177	34	104
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>13</b>	<b>0</b>	<b>332</b>	<b>36</b>	<b>220</b>
Northwest	776	3	0	100	9	67
Northern Interior	1,456	8	0	120	12	72
Northeast	860	2	0	112	15	81

Table 15 (continued).

Region	Population	Percent				
		Partially Immunized			Unimmunized	
		Refusal	Contraindication	Unknown <sup>e</sup>	Refusal	Unknown <sup>e</sup>
<b>British Columbia</b>	<b>46,165</b>	<b>0%</b>	<b>0%</b>	<b>14%</b>	<b>1%</b>	<b>8%</b>
<b>Interior Health</b>	<b>7,695</b>	<b>1%</b>	<b>0%</b>	<b>13%</b>	<b>3%</b>	<b>8%</b>
East Kootenay	906	1%	0%	8%	3%	8%
Kootenay Boundary	764	1%	0%	16%	6%	9%
Okanagan	3,634	1%	0%	13%	2%	10%
Thompson Cariboo Shuswap	2,391	1%	0%	15%	2%	6%
<b>Fraser Health<sup>f</sup></b>	<b>18,896</b>	<b>0%</b>	<b>0%</b>	<b>15%</b>	<b>1%</b>	<b>9%</b>
Fraser East	3,482	0%	0%	15%	2%	6%
Fraser North	6,296	0%	0%	15%	0%	10%
Fraser South	9,118	0%	0%	16%	1%	9%
<b>Vancouver Coastal Health</b>	<b>9,253</b>	<b>0%</b>	<b>0%</b>	<b>15%</b>	<b>0%</b>	<b>6%</b>
Richmond	2,002	0%	0%	9%	0%	3%
Vancouver	4,464	0%	0%	21%	0%	7%
North Shore / Coast Garibaldi	2,787	0%	0%	9%	1%	6%
<b>Island Health</b>	<b>7,229</b>	<b>1%</b>	<b>0%</b>	<b>12%</b>	<b>1%</b>	<b>7%</b>
South Vancouver Island	3,299	0%	0%	12%	1%	8%
Central Vancouver Island	2,479	1%	0%	11%	2%	5%
North Vancouver Island	1,451	1%	0%	12%	2%	7%
<b>Northern Health<sup>f</sup></b>	<b>3,092</b>	<b>0%</b>	<b>0%</b>	<b>11%</b>	<b>1%</b>	<b>7%</b>
Northwest	776	0%	0%	13%	1%	9%
Northern Interior	1,456	0%	0%	8%	1%	5%
Northeast	860	0%	0%	13%	2%	9%



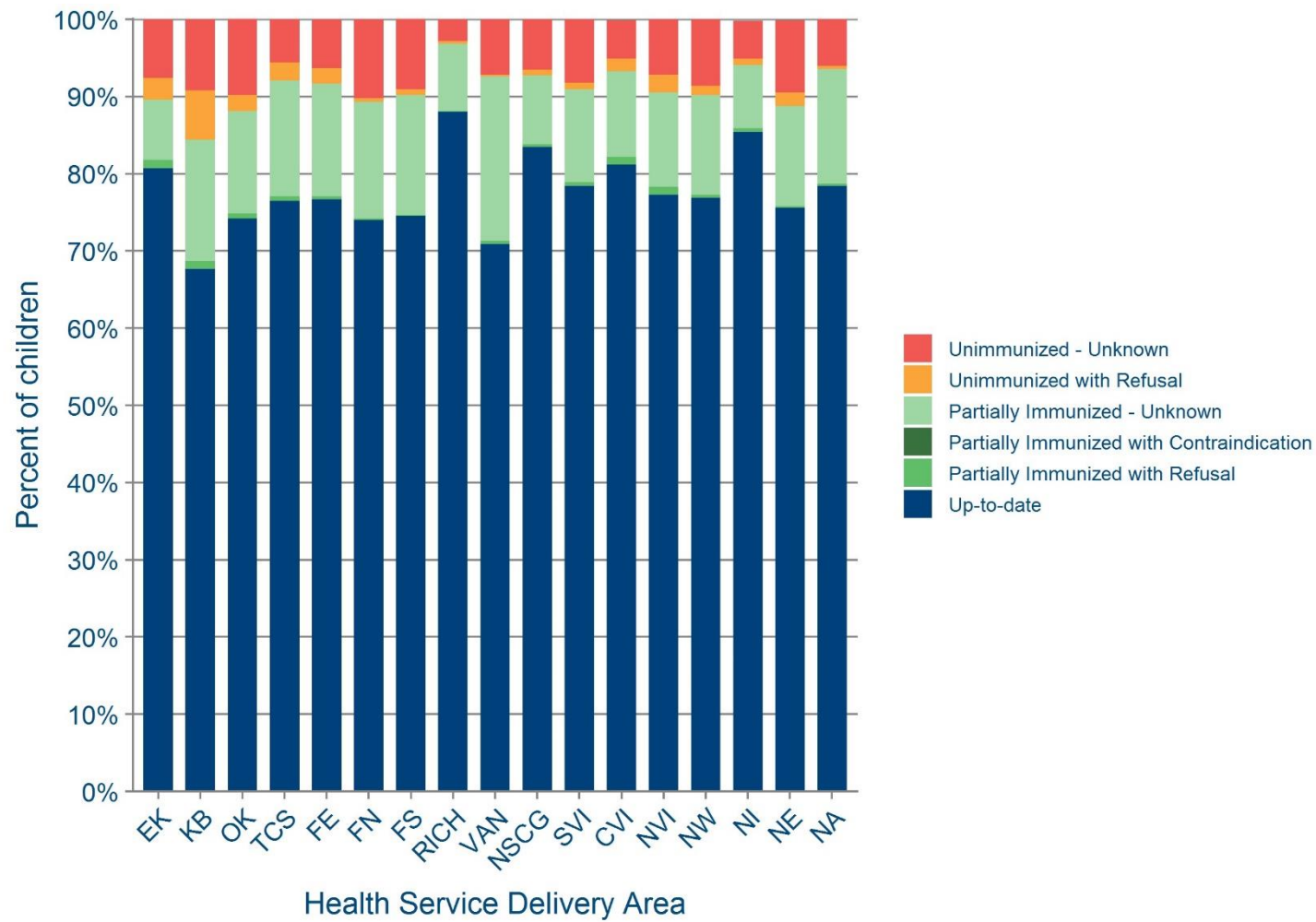
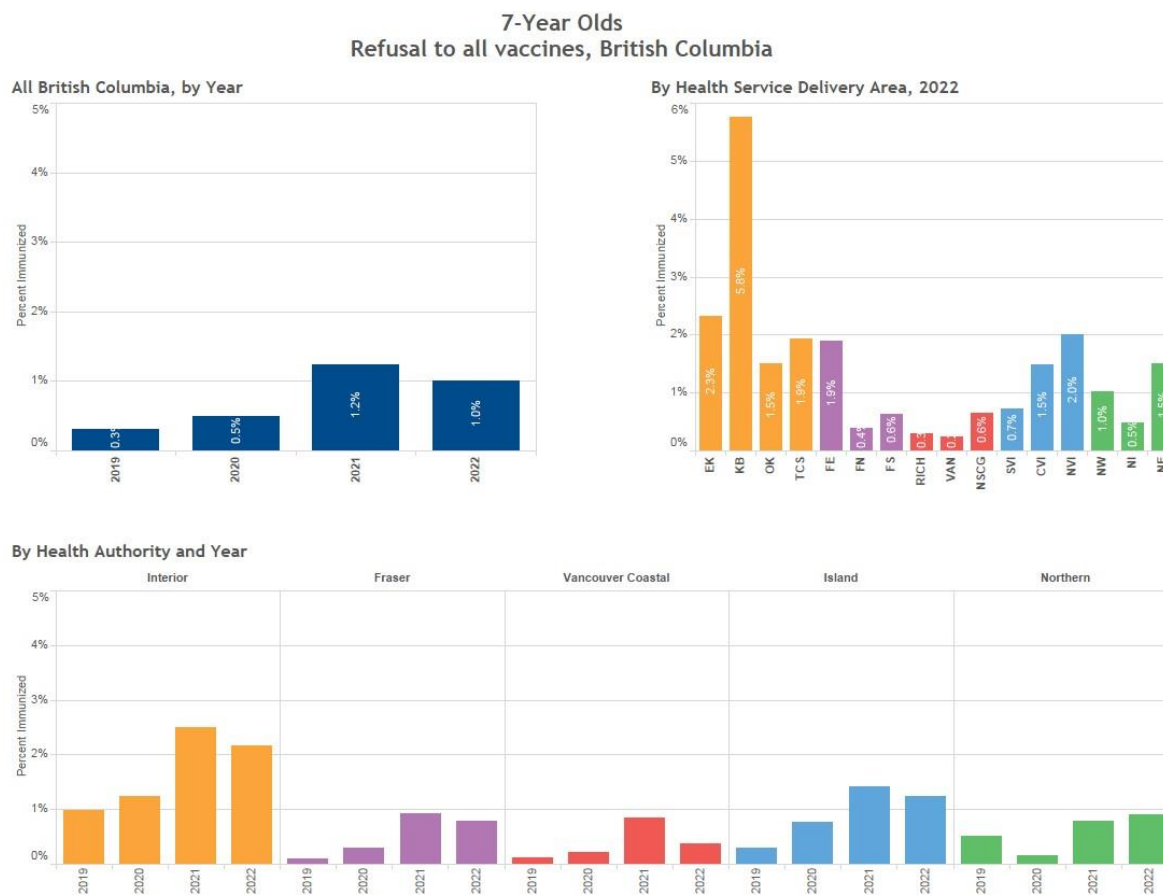


Figure 18. Reasons for non-immunization by Health Service Delivery Area, Polio, British Columbia, 2022

## Refusal to all vaccines

Figure 19 shows the proportion of refusals to all vaccines among seven-year-olds in BC since 2019.<sup>a</sup> The percentage of seven-year-olds with refusals to all vaccines was comparable to 2021 at 1%. IH had the highest percentage of documented refusals among all health authorities, driven largely by a 6% refusal rate in Kootenay Boundary. There was a small increase in the percentage of refusals in NH, while the rate decreased in IH, FH, VCH, and ISLH.



**Figure 19. Percent of seven-year-olds unimmunized, Refusal to all vaccines, British Columbia**

## Notes

### 1. Data Sources

Coverage estimates for all health authorities, excluding VCH, are based on immunization records in the Provincial Immunization Registry (PIR) (2014 onwards) or the Integrated Public Health Information System (iPHIS) (2012-2013). Estimates for VCH are based on immunization records in the Primary Access Regional Information System (PARIS). Coverage estimates are based on records in PIR (including transmission from regional registry systems) as of July 15, 2022.

All doses are recorded in the provincial immunization registry 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 the provincial immunization registry.

### 2. Up-to-date for age definitions

Coverage reported for any given year reflects uptake among children who turned seven years old during the previous calendar year (i.e., 2022 results are for children born in 2014 and who turned seven years old in 2021). Only doses given prior to the seventh birthday are included in this assessment.

Measure	Definition
Up-to-date for age	Children who met the up-to-date requirements for D/T/aP/IPV, hepatitis B, measles, mumps, rubella, varicella, and meningococcal C as defined below.
D/T/aP/IPV	4 <sup>th</sup> or 5 <sup>th</sup> dose of diphtheria/acellular pertussis/tetanus and 3 <sup>rd</sup> or 4 <sup>th</sup> dose of polio on or after 4 years of age
D/T/aP	4 <sup>th</sup> or 5 <sup>th</sup> dose of diphtheria/acellular pertussis/tetanus on or after 4 years of age
Polio	3 <sup>rd</sup> or 4 <sup>th</sup> dose of polio on or after 4 years of age
Hepatitis B	3 <sup>rd</sup> dose of hepatitis B vaccine on or after 24 weeks of age
Measles	2 doses measles-containing vaccine or recorded exemption due to laboratory evidence of immunity/previous disease
Mumps	2 doses mumps-containing vaccine
Rubella	At least 1 dose rubella-containing vaccine or recorded exemption due to laboratory evidence of immunity/previous disease
Varicella	1 (to 2014) or 2 (2015 onward) doses of varicella vaccine, or recorded exemption for varicella due to previous disease or protective antibody levels.  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 varicella exemption effective as of the 7 <sup>th</sup> birthday is considered protected, regardless of their age at the time of illness.

Meningococcal C <sup>1</sup>	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 are required depending on age at first dose.
Refusal to all vaccines	Documented refusals for all of the following antigens: diphtheria, tetanus, pertussis, polio, hepatitis B, measles, mumps, rubella, varicella, and meningococcal C conjugate or meningococcal quadrivalent conjugate, and is not up-to-date for any of the listed antigens. Refusals that are effective any time on or before the seventh birthday are counted, regardless of a documented end date, as long as the child is unimmunized.

All analyses were conducted using business rules which calculated ages and time intervals at receipt of immunization. Each dose was counted as a valid dose only if given at or after the earliest eligible age and/or at a time interval greater than or equal to the shortest acceptable interval. See [Minimum Intervals](#).

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

Health Authority	Year										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
IH	Registry (birth cohort)						Registry (school cohort)				
FH	Registry (birth cohort)/MoE aggregate enrollment							Registry (school cohort)			
VCH	Registry (school cohort)										
ISLH	Registry (birth cohort)/MoE aggregate enrollment							Registry (school cohort)			
NH	Registry (birth cohort)/MoE aggregate enrollment								Registry (school cohort)		

\*Numerators and denominators are defined as follows:

Data source	Numerator	Denominator
Registry (birth cohort)	Number of children from the denominator who were up-to-date for the specified agent(s) by their seventh birthday	Number of children in the birth cohort of interest with active records in the health authority's immunization registry (iPHIS/PIR or PARIS).
Registry (school cohort)	Number of children from the denominator who were up-to-date for the specified agent(s) by their seventh birthday	Number of children in the birth cohort of interest with active records in the health authority's immunization registry (PIR or PARIS) and with immunization registry records indicating they were enrolled in a BC school as of June 30 of the most recent school year
Registry (birth cohort)/ MoE aggregate enrollment	Number of children in the birth cohort of interest with active records in the health authority's immunization registry (iPHIS/PIR or PARIS) who were up-to-date for the specified agent(s) by their seventh birthday	Number of children in the birth cohort of interest attending schools within the health authority, based on estimates derived from BC MoE enrollment statistics

4. Changes in data sources can impact coverage rates. Between 2018 and 2020, IH, FH, ISLH, and NH changed their data sources to count children in the birth cohort of interest with active records in PIR whose records indicated they were enrolled in school during the most recent school year (see [note 3](#)). While this change in measurement is anticipated to more accurately reflect the population of these regions, it may explain some of the differences observed in coverage rates, when compared to previous years.

Starting in 2018 for IH, 2019 for FH and ISLH, and 2020 for NH, school and grade information is attached to students' records in the PIR in two ways:

<sup>1</sup> Assessment of uptake of Meningococcal-C conjugate vaccine at the seven-year-old milestone stopped in 2018 and resumed in 2019.

- a. For schools using the MyEdBC or CIMS information system and who have signed a letter of agreement, information is uploaded from a Ministry of Education extract into PIR using a tool called STIX. As of June 2022, this process included 94.3% of students. Health authority staff reconcile the school information against the PIR record when discrepancies occur.
- b. For schools using other information systems, health authority staff may manually enter or upload school and grade information. The process of adding enrollment details may not be completed for all health authorities and grades. Most health authorities prioritize milestone grades (kindergarten, grade 6 and grade 9) and a small number of schools may not make their class lists available.

Gaps are expected for FH, for which non-MyEdBC enrollment data is entered into FH PARIS but not PIR, (approximately 3% of FH students) and NH (approximately 6% of students).

5. Ideally, numerators and denominators should be taken from the same data source. In order to maintain accurate denominators in an immunization registry, the health authorities need to be aware of every child who moves into and out of the health region. As not all health regions had been able to fully establish these processes, ISLH (2012-2018), FH (2012-2018) and NH (2012-2019) felt that the BC MoE enrollment data were more accurate estimates of the number of children in each health region than iPHIS/Panorama.

School district boundaries do not directly line up with health region boundaries. As such, the BC MoE enrollment data are based on a process of identifying the schools that lie within each health service delivery area (with health authority input). The BC MoE enrollment data exclude youth custody, continuing education, early learning and summer schools.

Using different data sources for numerators and denominators can result in inaccurate results, including coverage results that appear to be greater than 100%. When this occurred, the coverage rates were adjusted to 100%. Immunization coverage rates approaching 100% in FH (2012-2018), ISLH (2012-2018) and NH (2012-2019) are likely over-estimates resulting from the use of different data sources for numerators and denominators. This artefact was rectified when the health authorities used the same data source for numerators and denominators.

6. 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.
7. Due to ongoing development of the interfaces between the NH and FH information systems 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 seven-year-olds 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, measles, and rubella due to previous infection and/or lab evidence of immunity would be underestimated.
8. In January 2012, the BC immunization schedule introduced a second dose of varicella at school entry (4-6 years) (offered as combined MMRV beginning in 2014), thus the varicella requirement changed from requiring one to two doses for a child to be considered up-to-date. Children born in 2007 (2015 report) were the first cohort to be affected by this change. As a result of this change, the percent of children born in 2007 who were considered up-to-date for varicella decreased considerably compared to previous years. If only one dose of varicella vaccine had been required for the 2007 birth cohort, the percent of children up-to-date for varicella would have been 24% higher (93%) and the percent of up-to-date for age would have been 6% higher (69%). See the [History of Immunization in BC](#).
9. Compared to 2019, the proportion of children with refusals to all vaccines increased in 2020 for all health authorities, except NH. This is likely related to improved documentation of refusals as a result of the implementation of the [Vaccination Status Reporting Regulation](#), which supports the collection of immunization records (including refusals) of school-age children by Public Health. NH records refusals in their regional public health information system (cMOIS), but they are not yet automatically transferred to PIR. See more information [here](#).

10. Coverage results by Health Authority and Health Service Delivery Area are reported based on the location of the child's school.
11. The following school types are included in the PIR: Alternate, Distance, Distance Learning, Independent, Long Term Program, Self-Directed, Short Term Program, and Standard. Students attending First Nations schools may be under-represented in this dataset because some First Nations schools are not registered with the BC Ministry of Education and are therefore not captured in the provincial list of schools.
12. BC launched a measles catch-up immunization program for school-age children in 2019. This program ran between April 1 and June 30, 2019. This program resulted in the collection of measles-related immunization records that were not previously reported to public health and some catch-up immunization with measles/mumps/rubella (MMR) or measles/mumps/rubella/varicella vaccine (MMRV). The impact of this program cannot be assessed using the routine 7-year old immunization coverage data due to the change in data sources and other program changes (see notes [3-5](#) and [9](#)).
13. In January 2012, the second dose of MMR vaccine was moved from 18-months to school entry (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. The change in immunization schedule may have resulted in fewer opportunities to provide the second dose of MMR-containing vaccine prior to the seventh birthday, explaining the drop in measles and mumps coverage in 2018. The impact of this program change could not be assessed in 2019 due to changes in data sources (see notes 3-5) and the measles catch-up immunization program for school-age children (see note [12](#)). See the [History of Immunization in BC](#).
14. In 2016 (2008 birth cohort), the in-Panorama coverage report was used to assess immunization coverage, because the routine method (analysis using an external analysis program) could not be applied. The in-Panorama reports allow for doses to be counted as adequate even if these do not meet the minimum age/interval criteria through a manual validation process at the user and record level. An assessment of the differences between estimates produced by the two reporting methods indicated that these produce very similar results. For the 2007 birth cohort, the differences in coverage results between the two reporting methods were less than 0.7% for all measure at the provincial level.
15. Historically, health regions using the iPHIS immunization registry inactivated the records of clients receiving the majority of their immunizations from First Nations Health Services Organizations (FNHSOs) that did not use the iPHIS immunization registry. The reason for inactivation was because the iPHIS records were likely incomplete as their immunizations were recorded in other systems. Inactivated records were excluded from coverage analyses. Three FNHSOs used the iPHIS immunization registry, and the records of children immunized by these FNHSOs remained active. Between June 2015 and January 2018 the Panorama records of children born in 2008-2013 that had been inactivated because they received the majority of their immunizations from FNHSOs were reactivated. These records were activated to facilitate the use of Panorama by the FNHSOs that have adopted Panorama.  
  
The overall effect of activating the Panorama records was an increase of up to 0.1% in the provincial immunization coverage estimate for children up-to-date for age in 2015-2018. This ranged from a decrease of 0.5% to an increase of 1.5% at the Health Authority level and a decrease of 1.1% to an increase of 2.1% at the Health Service Delivery Area level. When the school enrollment denominators were used for the coverage calculations, the denominators remained the same. As such, any change in the proportion up-to-date for age reflected the fact that additional children were being counted in the numerator. When Panorama data were used for both the numerators and denominators, the inclusion of the records that had previously been inactivated resulted in small declines in coverage, likely due to the inclusion of children with incomplete Panorama records.
16. Starting in 2015, for varicella assessment, only exemptions for previous disease that were effective at the time of the 7th birthday were considered as proof of immunity, while in previous years all recorded exemptions for previous disease in Panorama were considered as proof of immunity. This change only applied to a small number of children and did not have an appreciable effect on overall coverage rates.
17. Starting in 2015, doses marked invalid in Panorama due to vaccine interactions and manual invalidation were excluded from counts, while in previous years these invalid doses in Panorama had been counted. At the provincial level, this change resulted in a decrease in coverage rates that ranged 0.0% to 0.5% for all measures.



18. 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 an immunization registry (PIR/PARIS) is required. Some children may have received doses that have not been documented. All regions make their best efforts to obtain vaccination records pertaining to immunizations given by providers other than BC public health.
- b. There can be a delay in obtaining immunization records, which can result in delay of data entry.
- c. First Nations children may not be completely captured in the registries. On-reserve birth records and immunizations may not be reported to the regional health authorities.

### 19. Reporting History

Seven-year old coverage assessment became an official measure in 2012 (for the 2004 birth cohort). Prior to 2012, assessment of school-entry immunization coverage was conducted at the end of Kindergarten. Kindergarten assessment did not allow for complete capture of on-time immunizations since "school-entry" doses are recommended at 4-6 years of age. Kindergarten assessment does not capture doses administered after Kindergarten but prior to the seventh birthday. Due to the use of different data sources, 7-year old coverage results cannot be directly compared to Kindergarten coverage results.

## 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

## Appendix

**Table A1. Reasons for non-immunization definitions**

Measure	Definition
Exemption: Lab Evidence of Immunity	<p><i>For varicella, measles and rubella 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 ≤ 7<sup>th</sup> birthday AND                      Special Consideration Effective To Date &gt; 7<sup>th</sup> birthday 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 ≤ 7<sup>th</sup> birthday AND                      Special Consideration Effective To Date &gt; 7<sup>th</sup> birthday 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 ≤ 7<sup>th</sup> birthday AND                      Special Consideration Effective To Date &gt; 7<sup>th</sup> birthday 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 ≤ 7<sup>th</sup> birthday</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>



Measure	Definition
Unimmunized with Contraindication	Does not meet any of the previous definitions AND Has no recorded valid dose(s) 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 $\leq$ 7 <sup>th</sup> birthday AND Special Consideration Effective To Date $>$ 7 <sup>th</sup> birthday OR <blank>
Unimmunized with Refusal	Does not meet any of the previous definitions AND Has no recorded valid dose(s) 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 $\leq$ 7 <sup>th</sup> birthday
Unimmunized - Unknown	Does not meet any of the previous definitions AND Has no recorded valid dose(s) 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.

**Table A2. Minimum Intervals Between Doses**

Antigen/Agent	Minimum Age or Minimum Time Interval Between Eligible Doses			
	Dose 1 <sup>A</sup>	Dose 2	Dose 3	Dose 4
Diphtheria, Tetanus, acellular Pertussis (DTaP or Tdap)	42 days	28 days	28 days	24 weeks <sup>B</sup>
Polio <sup>C</sup>	42 days	28 days	24 weeks <sup>B</sup>	
Hepatitis B				
received 3rd dose before June 2007	0 days	28 days	28 days	
received 3rd dose between June 2007 and May 2014	0 days	28 days	56 days <sup>D</sup>	
received 3rd dose in June 2014 or later	0 days	28 days	56 days <sup>D,E</sup>	
Measles	12 months	28 days		
Mumps	12 months	28 days		
Rubella <sup>F</sup>	12 months			
Varicella <sup>G</sup>	12 months	28 days		
Meningococcal C Conjugate				
meningococcal-C conjugate vaccine <sup>G</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>H</sup>	
quadrivalent meningococcal vaccine (Menveo <sup>®</sup> ), initial dose on or after 12 months of age	12 months	8 weeks		
quadrivalent meningococcal vaccine (Menveo <sup>®</sup> or Menactra <sup>®</sup> ), initial dose on or after 24 months of age	24 months			

- A. Dose 1 refers to the earliest age a child can receive the initial dose.
- B. Last dose must be given on or after 4 years of age.
- C. Schedule for DTaP should be followed when poliomyelitis provided in combination vaccine.
- D. Dose 3 must be given at least 16 weeks (112 days) after dose 1.
- E. Dose 3 must be given on or after 24 weeks of age.
- F. Schedule for measles/mumps should be followed when rubella provided in combination vaccine with measles/mumps.
- G. Dose must be given at least 8 weeks after any previous meningococcal C conjugate dose (if previous dose given).
- H. Dose 3 must be given on or after 12 months of age.