

Long-term follow-up and impact studies for HPV vaccines: Canada

HPV Prevention and Control Board Focused Topic Technical Meeting June 1, 2023

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Health care in Canada

- Constitution Act, 1982
- Parliamentary democracy
- Federation of provinces
- Powers of education, health care at provincial level

Cervical cancer in Canada

- Median age of diagnosis is 47 years
- 73% of cervical cancer in women 25-59 years
- Immigrant women; women who do not speak English or French at home more likely to develop cervical cancer
- Incidence rate of cervical cancer rate in First Nations is significantly higher than in non First Nations women in BC: 33.1 (95%CI: 27.0-39) vs 17.2 (95%CI:16.6–17.9) [Standardized rate ratio: 1.92 (1.49–2.48)]

Elimination of Cervical Cancer in Canada

Action Plan Priorities and Targets



Culturally appropriate care closer to home



Peoples-specific, self-determined cancer care



Indigenous-governed research and data systems

PEOPLES-SPECIFIC PRIORITIES



Improve HPV immunization rates

BY 2025

90% of 17-year-olds are fully vaccinated with the HPV vaccine



Implement HPV primary screening

BY 2030

90% of eligible individuals are screened with an HPV test & are up-to-date with cervical screening

No less than **80%** of eligible individuals in any identifiable group are up to date with cervical screening



Improve follow-up of abnormal screening results

BY 2030

90% of individuals with abnormal results receive follow-up within 3 months and those at elevated risk receive colposcopy in timely manner

No less than **90%** of eligible individuals in any identifiable group receive follow-up

a place of mind



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An agency of the Provincial Health Services Authority



Provincial Health Services Authority



Canadian Institutes of Health Research



Global Control of HPV Related Diseases and Cancer

CPAC Target 1: Immunization

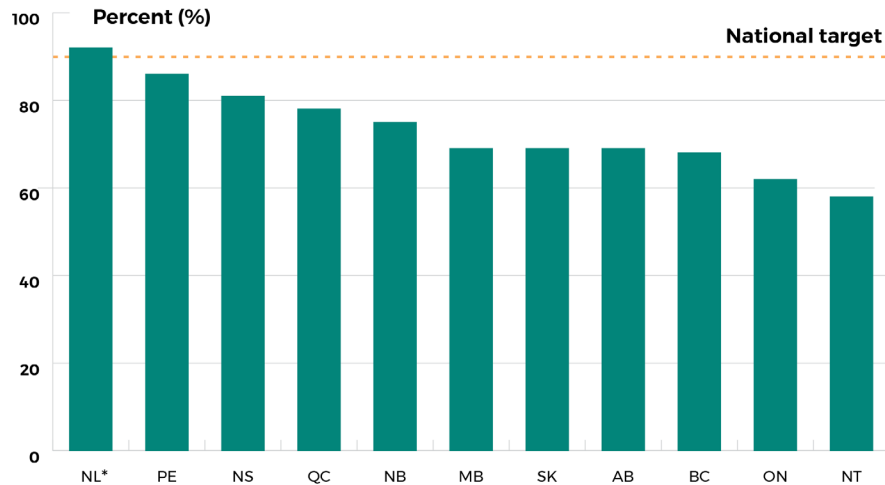
- By 2025, 90% of individuals are fully vaccinated with the HPV vaccine by age 17.
 - Priority 1: Increase awareness and acceptability of the HPV vaccine
 - Priority 2: Increase vaccination uptake in school-based HPV immunization programs
 - Priority 3: Improve measurement and reporting of vaccination coverage rates from school-based HPV immunization programs to identify inequities and inform program improvements

HPV vaccine programs in Canada

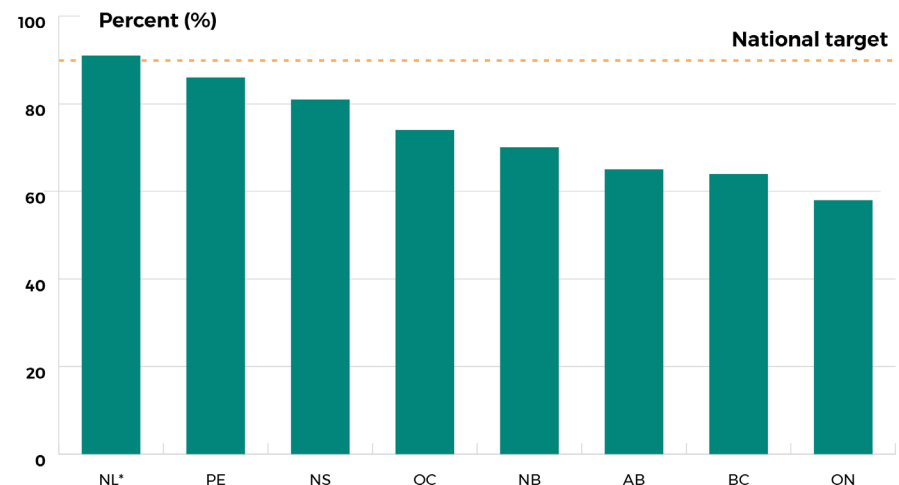


Provincial and territorial final dose uptake rates for HPV immunization (School-based)

Female



Male



British Columbia program

- Single provincial vaccine registry
- Single provincial lab for cervical screening
- Single cancer program and cancer agency
- Multiple private labs for STI screening

Evaluating HPV vaccine coverage in BC

- HPV vaccine coverage rates (2 doses, at least 6 months apart; Provincial vaccine registry)
- HPV prevalence in population (cervix, urine)
- CIN2+ rates in population (cervix screening)
- CIN2+ rates in vaccinated/unvaccinated population (cervix screening + vaccine registry)
- Cervical cancer rates in population (cancer registry)
- Vaccine hesitancy measures

HPV4 authorized in Canada (3 doses)

National goal: decrease HPV-related burden of disease and cancer

National goal: decrease morbidity & mortality of cervical cancer

WHO SAGE recommend 2-dose schedule

HPV4 school based program in BC (3 doses, female)

NACI recommend 2 - or 3- dose schedules in females & males

HPV2 authorized in Canada

HPV4 2-dose program in BC

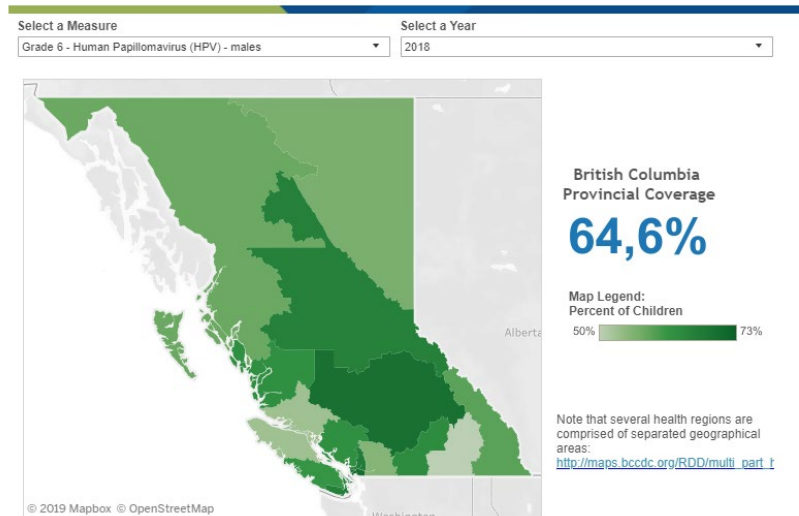
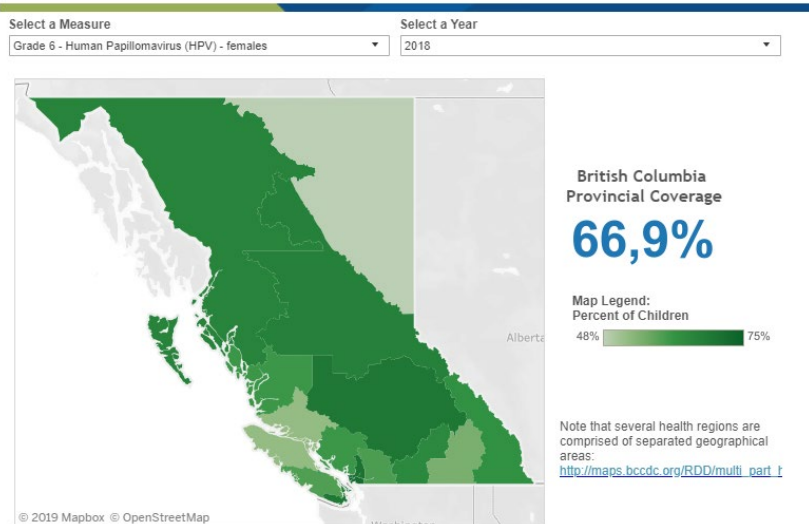
Australia includes males in school-based program

HPV9 authorized in Canada

HPV9 males & females in school based program BC



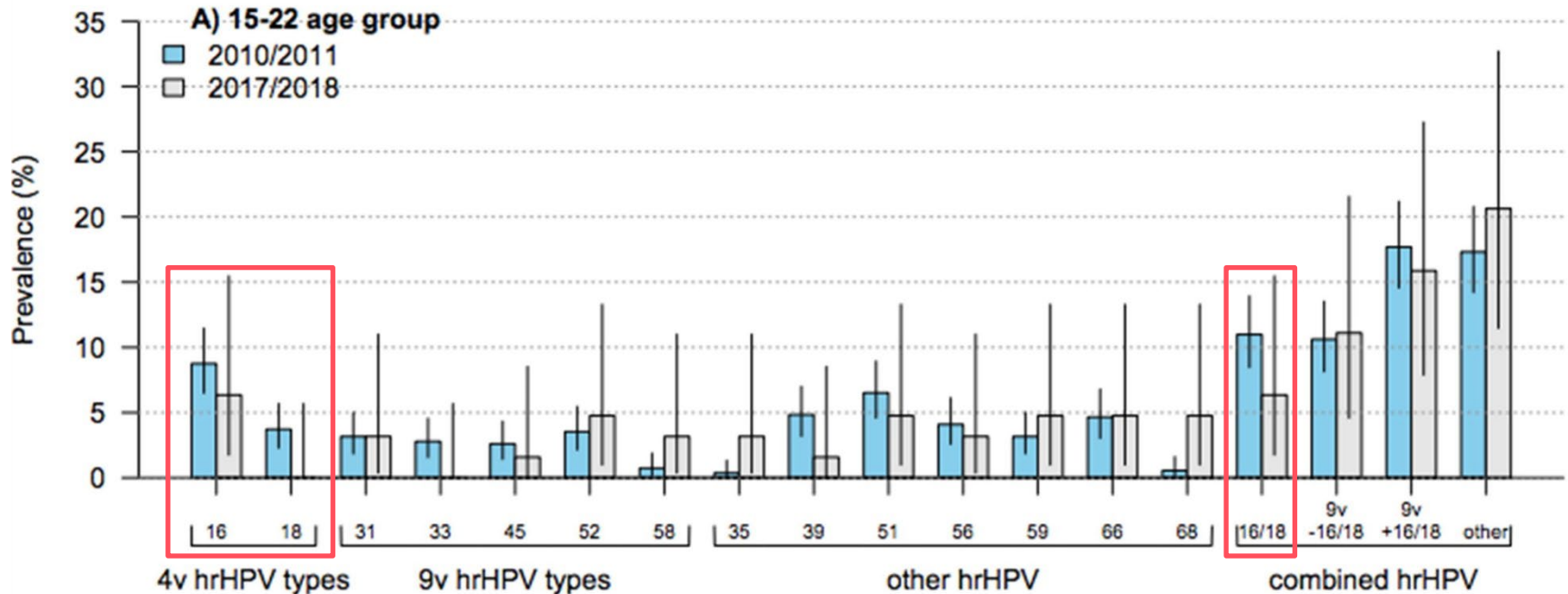
HPV vaccine coverage: BC



<http://www.bccdc.ca/health-professionals/data-reports/childhood-immunization-coverage-dashboard>

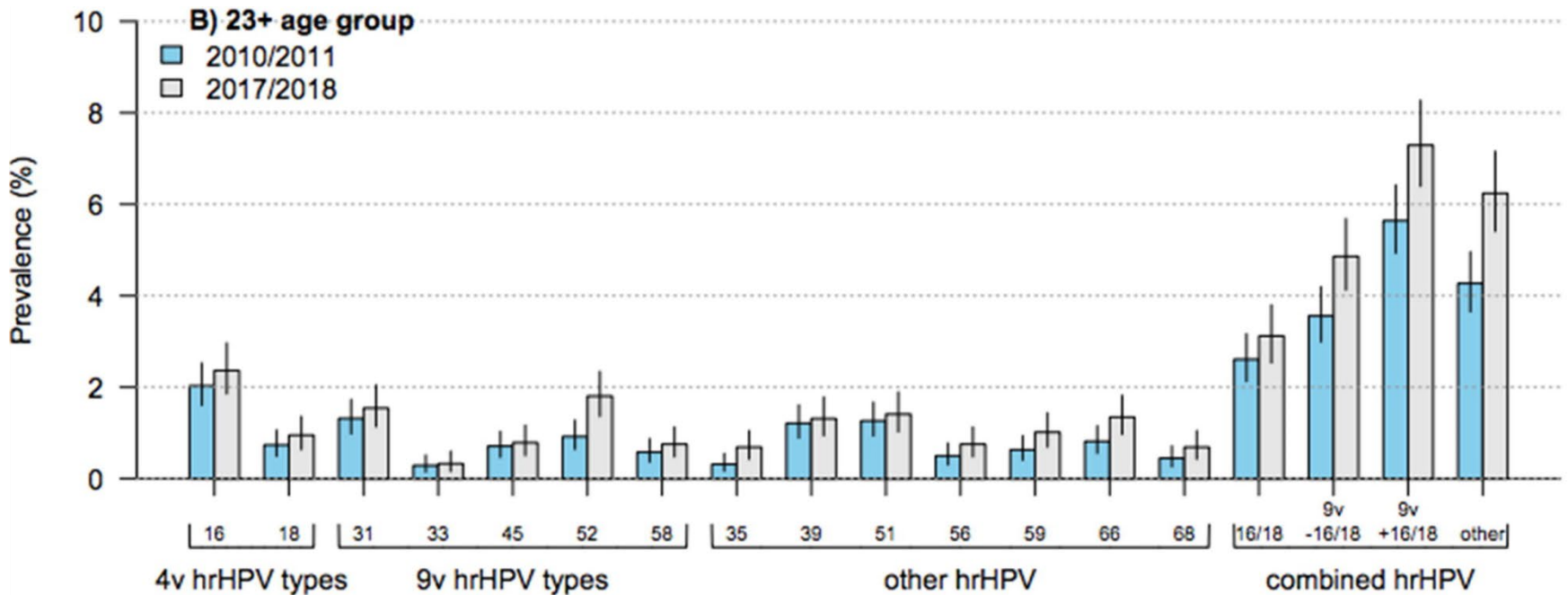
HPV prevalence after vaccination

Research showed an decrease in HPV16/18 among 15-22 year olds from 2010/2011 – 2017/2018

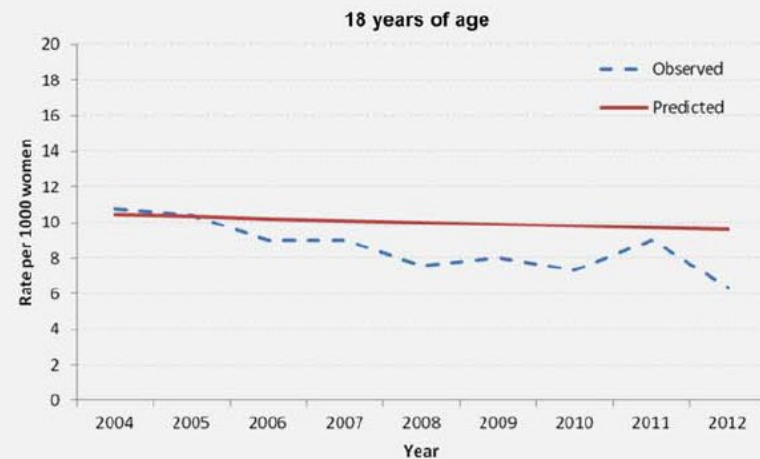
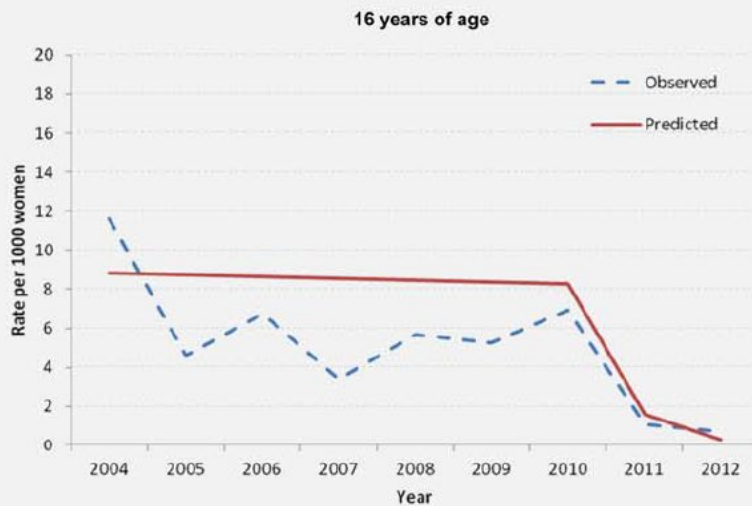
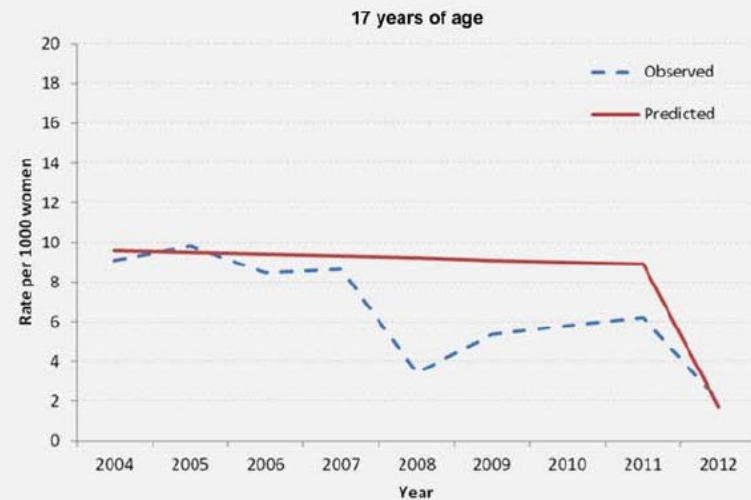
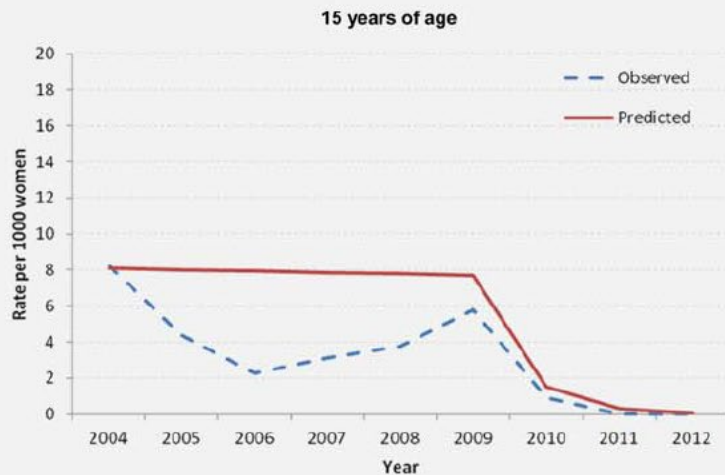


HPV prevalence among 23+ (unvaccinated in school program)

Research showed an increase in any hrHPV among 23+ year olds from 2010/2011 – 2017/2018



Ecological analysis of impact on CIN2+ in BC



Ogilvie et al. IJC. 2015

Vaccine data linkage

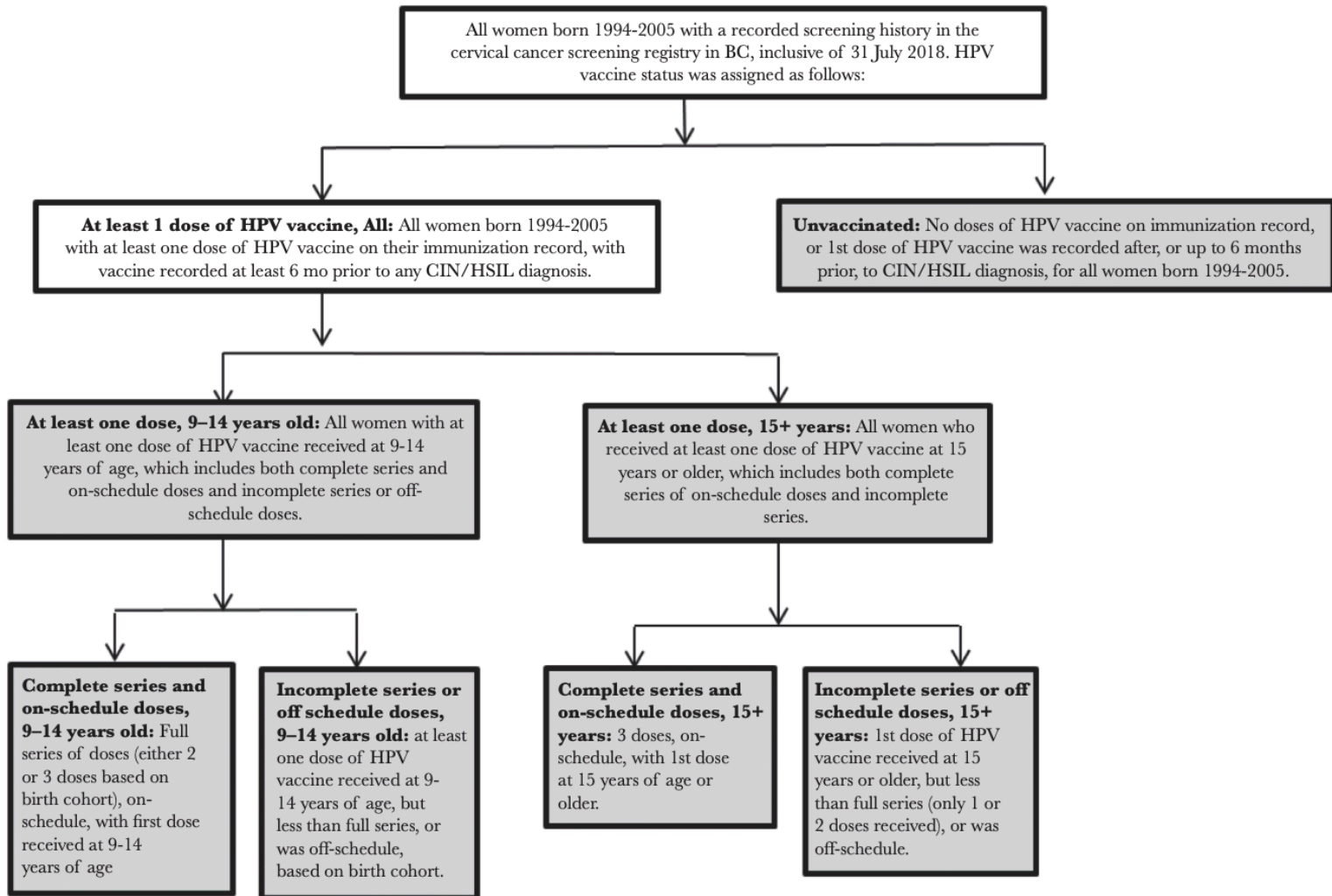
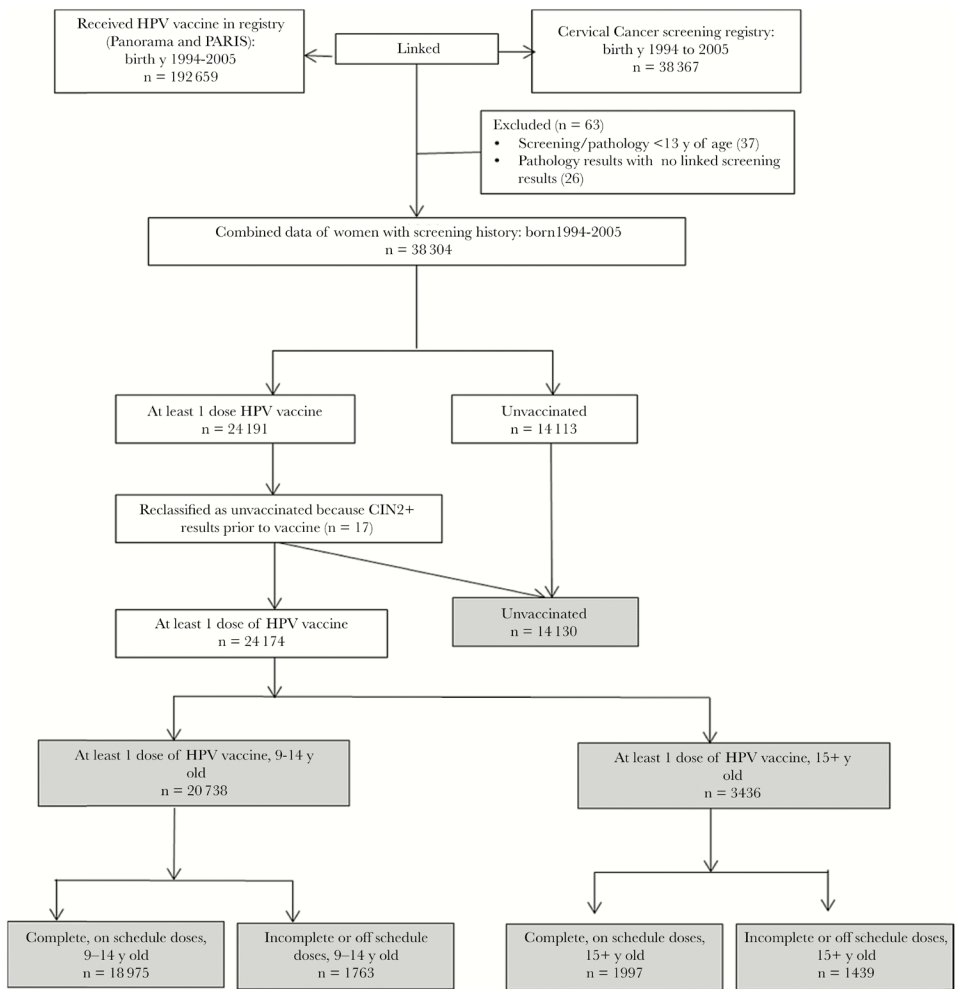


Figure 2. Flow chart of the data process



HPV Vaccination Registry and CCSP Screening History Linkage Analysis – RR CIN 2+ vaccine dose

	Estimates*		
	RR	(95%CI)	P-value
Any vaccine/no vaccine	0.51	0.35 – 0.75	0.0006
Incomplete/no vaccine	0.62	0.22 – 1.38	0.30
Complete/no vaccine	0.50	0.34 – 0.74	0.0006
Complete 15+/complete 9-14	2.50	1.25 – 4.68	0.01

* Adjusted for age at first screening and year of birth

Rate of CIN 2+ is approximately 50% lower in the vaccinated group relative to the unvaccinated group. 2.5 times higher in 15+ compared to 9-14.



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Opportunities to increase HPV vaccine uptake

Affordability

To increase uptake, vaccines should be publicly funded for people living in Canada.

Accessibility

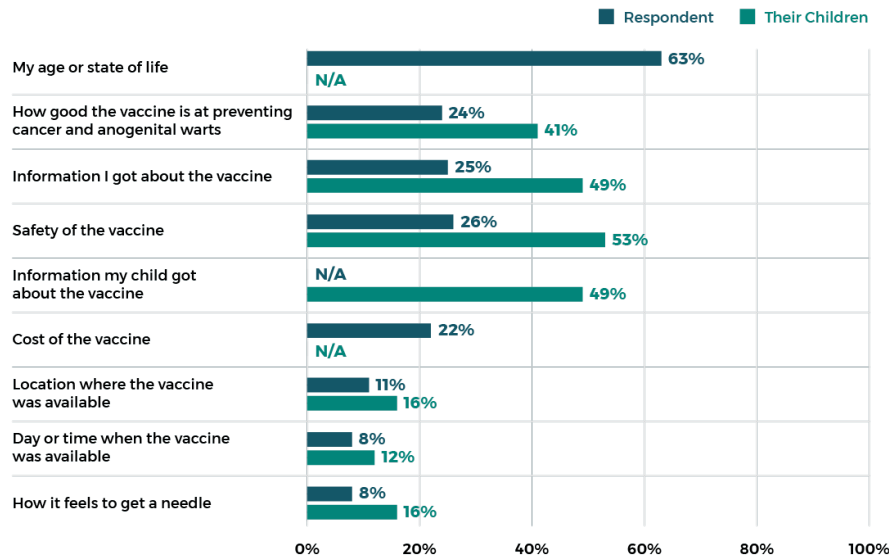
To increase uptake of HPV vaccine, it is imperative that the vaccine is available to those who did not have access to school-based programs or who did not receive the vaccination due to a lack of parent/guardian consent.

Acceptability

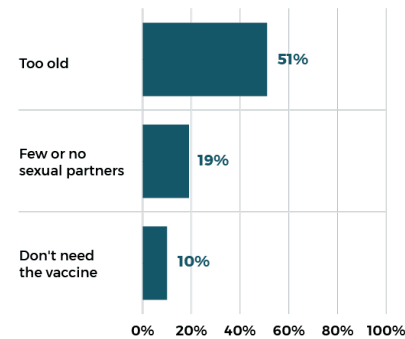
Strong and clear provider recommendation for vaccination. Consideration also needs to be given to the experience of the recipient.

Public Perceptions: HPV Vaccine

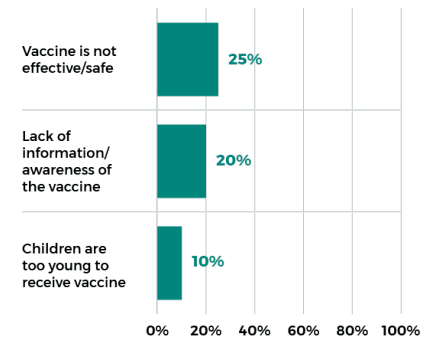
Decision factors to not receive HPV vaccination



Reasons for not vaccinating self



Reasons for not vaccinating children



Trend in Sexual Behaviours between 2003 and 2013, BC Adolescent Health Survey

	Year			Age-Adjusted Odds Ratio	
	% (95% Confidence Intervals)			AOR (95% Confidence Intervals)	
	2003*	2008*	2013†	Trend 2003-2013	Trend 2008-2013
Sexual Risk behaviours					
Ever had sexual intercourse	21.3 (20.0-22.5)	20.6 (19.7-21.5)	18.3 (17.4-19.3)	0.79 (0.71-0.88)	0.89 (0.82-0.98)
Early first intercourse (before age 14)	14.3 (12.7-16.2)	13.0 (11.6-14.7)	10.2 (8.7-11.8)	0.82 (0.65-1.03)	0.76 (0.61-0.96)
3 or more sexual partners within the past year	15.5 (13.4-17.8)	17.1 (15.4-18.9)	15.7 (14.0-17.6)	1.02 (0.83-1.26)	0.90 (0.75-1.09)
Used substances before last intercourse	26.0 (23.7-28.5)	28.3 (26.2-30.6)	19.3 (17.4-21.3)	0.69 (0.58-0.82)	0.60 (0.51-0.71)
Contraceptive use					
Used condoms at last intercourse	65.6 (63.2-68.1)	63.3 (60.9-65.7)	68.9 (66.4-71.3)	1.19 (1.02-1.39)	1.28 (1.10-1.49)
Used birth control pills at last intercourse	45.1 (42.2-48.0)	48.1 (45.7-50.5)	54.5 (52.0-57.0)	1.43 (1.21-1.67)	1.26 (1.10-1.45)
Pregnancy involvement					
Ever been involved in a pregnancy	5.9 (4.6-7.3)	5.0 (4.1-6.1)	3.4 (2.6-4.5)	0.56 (0.40-0.80)	0.69 (0.49-0.98)

Note: AORs in bold indicate p<0.05

* These survey years were before the school based BC HPV Vaccination Program was implemented



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Instituts de recherche en santé du Canada



RISKY SEX BEFORE AND AFTER THE HPV VACCINE

A VISUAL RESEARCH ABSTRACT

STUDY POPULATION

Adolescent girls identifying as heterosexual in the British Columbia Adolescent Health Surveys of 2003, 2008 and 2013.

OBJECTIVE

Determine whether receiving the HPV vaccination is associated with increased sexual risk-taking at the population level.

AGE-ADJUSTED ODDS OF SEXUAL BEHAVIOURS AND OUTCOMES BETWEEN 2003 AND 2013

Less likely after vaccine:

0.79

Sexual intercourse

0.82

Intercourse before age 14 years

0.69

Substance use before intercourse

0.56

Pregnancy

More likely after vaccine:

1.19

Condom use

1.43

Use of birth control pills

No change after vaccine:

1.02

Three or more partners in past year

These findings suggest no association between HPV vaccination and more risky sexual behaviours.

Source: Ogilvie GS, Phan F, Pedersen HN, et al. Population-level sexual behaviours in adolescent girls before and after introduction of the human papillomavirus vaccine (2003–2013). *CMAJ* 2018;190:E1221–1226.

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RESEARCH

Effect of human papillomavirus (HPV) vaccination on clinical indicators of sexual behaviour among adolescent girls: the Ontario Grade 8 HPV Vaccine Cohort Study

Leah M. Smith MSc, Jay S. Kaufman PhD, Erin C. Strumpf PhD, Linda E. Lévesque PhD



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Effect of human papillomavirus (HPV) vaccination on clinical indicators of sexual behaviour among adolescent girls: the Ontario Grade 8 HPV Vaccine Cohort Study

- Administrative data analysis of grade 8 girls 2 years before (2005/06, 2006/07) and after (2007/08, 2008/09) HPV vaccine program implementation
- Indicators on sexual behaviour in grades 10-12 included pregnancy & STIs
- Regression discontinuity to estimate RD and RR attributable to vaccination and to program eligibility

Smith et al, 2015

Effect of human papillomavirus (HPV) vaccination on clinical indicators of sexual behaviour among adolescent girls: the Ontario Grade 8 HPV Vaccine Cohort Study

- N=260,493, 15 441 (5.9%) cases of pregnancy or STI (outcome variable), no increased risk with vaccination or program eligibility
- Vaccination: RD=0.61 per 1000 girls (95% CI: 10.71 - 9.49), RR=0.96 (95% CI: 0.81 - 1.14)
- Program eligibility: RD=0.25 per 1000 girls (95% CI: 4.35 - 3.85), RR=0.99 (95% CI 0.93 - 1.06)

Smith et al, 2015

- Thank You



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