Contraception
Cost-Effectiveness
in British Columbia

CART-GRAC

Contraception
Access
Research
Team

Groupe de
recherche sur
l'accessibilité à
la contraception

THE UNIVERSITY OF BRITISH COLUMBIA

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This model incorporates data collected through the 2015 BC Sexual Health Survey. See our separate report of CSHS results 2017 June 15, http://cart-grac.ubc.ca/research/current-projects/.

Contents

Executive Summary

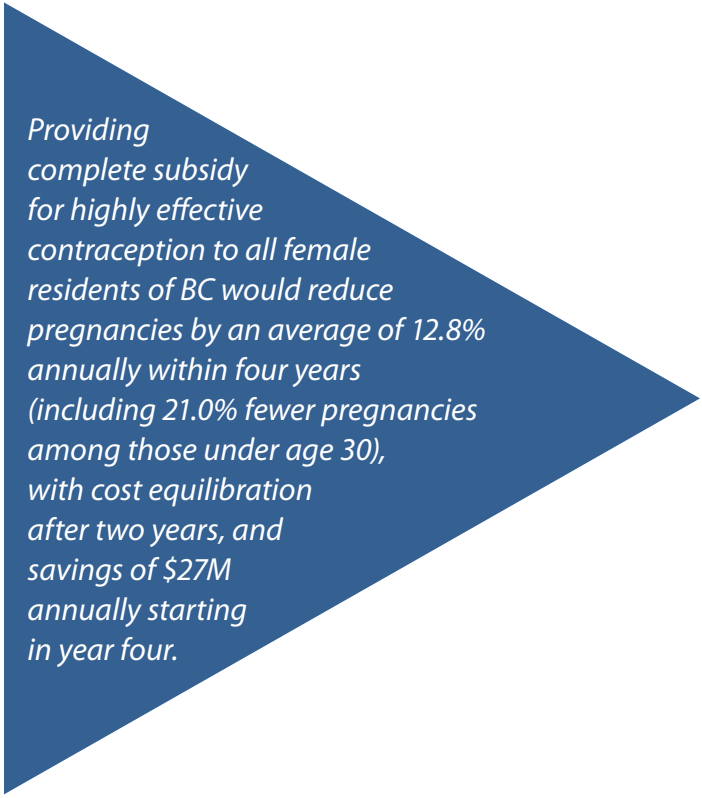## A Policy Tool for British Columbia

A model to simulate health outcomes and health systems costs resulting from policy interventions to reduce unintended pregnancy

Unintended pregnancy is common in British Columbia (BC) where 40 % of pregnancies, including a third of all births, are unintended at the time of conception. Compounding the burden and system costs of managing unintended pregnancy is the significant equity gradient between families able, and those who face challenges, to time and space their births. Vulnerable populations with the least favourable social determinants of health are the most likely to experience unintended pregnancy, and the most likely to have that pregnancy result in an unplanned birth, and yet conversely have the fewest resources to manage the additional demands of an unplanned birth. Consumer cost for contraception is the most commonly cited barrier to achieving desired pregnancy timing and spacing. Government has an opportunity to improve outcomes and reduce costs by reducing the rate of unintended pregnancy when providing subsidy for the most effective contraception. This policy results in the lowest overall health system cost.

Is it more expensive for a health system to pay for the care of unintended pregnancies, or to subsidize contraception?

Canadian health systems have not been able to answer this question as neither pregnancy intention nor contraception method use prevalence has previously been measured. To answer this question for BC, we conducted a door-to-door survey throughout BC to collect high quality population data to determine the indicators of pregnancy intention, contraceptive method use, and sexual activity. We used these data as inputs for a simulation model to ascertain provincial health system costs and outcomes associated with unintended pregnancy and project costs associated with contraceptive subsidy. Simulation models were developed by UBC faculty of the Sauder School of Business, the School of Population and Public Health and Center for Clinical Epidemiology and Evaluation.

Providing complete subsidy for highly effective contraception to all female residents of BC would reduce pregnancies by an average of 12.8% annually within four years (including 21.0% fewer pregnancies among those under age 30), with cost equilibration after two years, and savings of $27M annually starting in year four.

Cost Difference between Status Quo and the BCAS Policy for Pregnancy, Contraception, and Overall, by year

BCAS Policy ● Policy 1 ● Policy 2
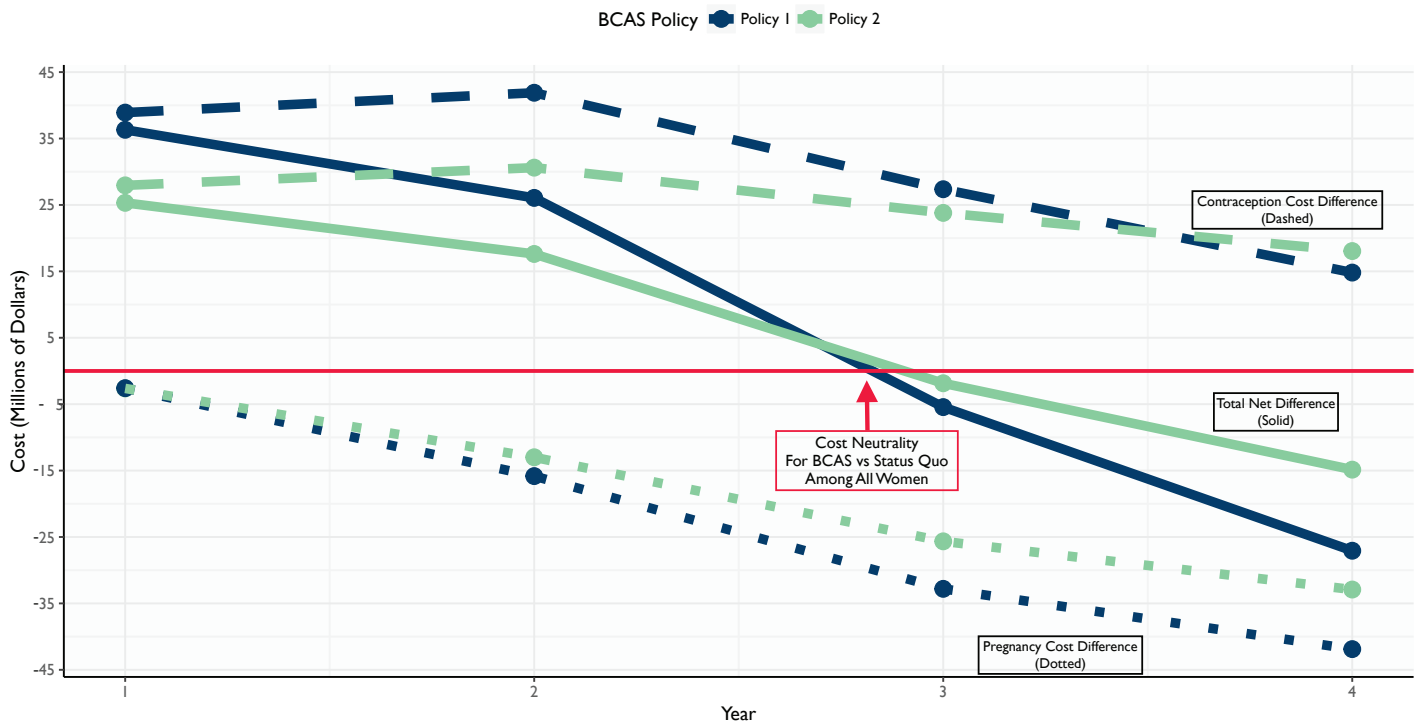
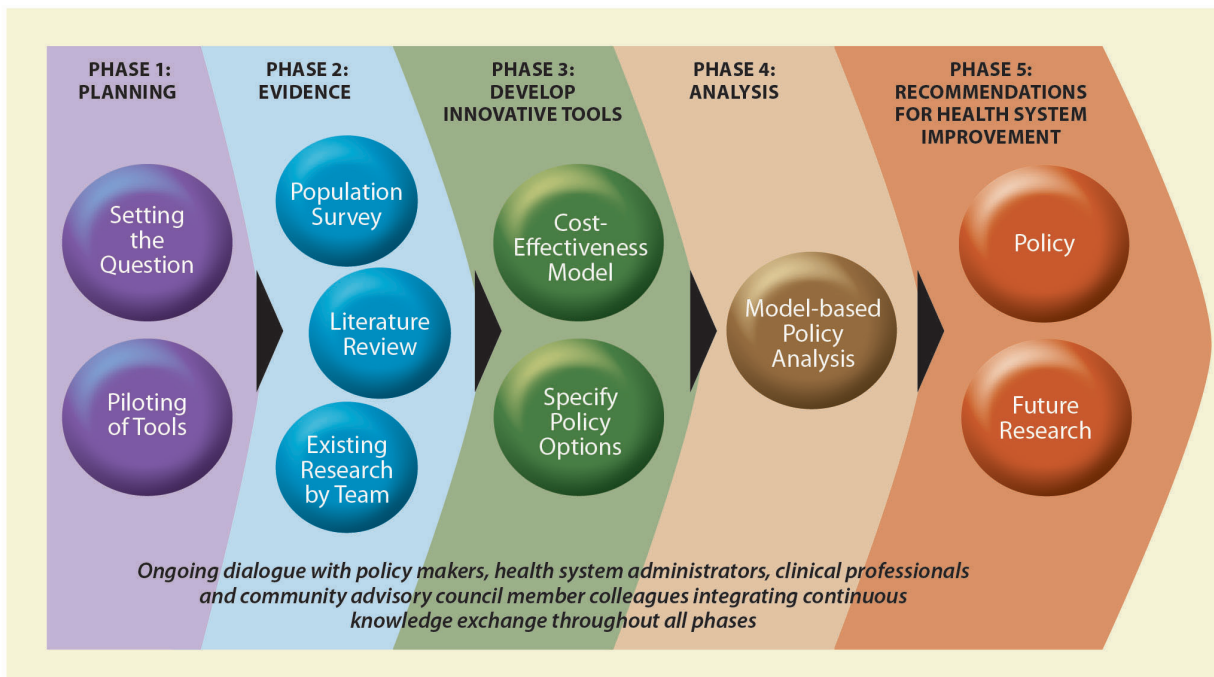|		
Status Quo:	Results expected with no policy change indicated by the Red Line of Zero Cost Difference	
BCAS 1:	Results expected with a policy of subsidy for contraception for all BC residents	
BCAS 2:	Results expected with a policy of subsidy for contraception among BC residents under age 30 years	

Developing the Model

Project Overview

Our team developed a simulation model predicting the occurrence and outcomes of pregnancies in BC and the associated costs, which is suited to inform decision-making relating to the provision of subsidy for contraception. The tool is intended to support evidence-informed policy development to equitably support British Columbians to achieve their goals for timing and spacing pregnancies. We have incorporated new primary data from BC, collected through a high quality representative sample household survey, as well as secondary evidence from existing research by members of the team, and from the highest quality evidence available in published literature.

CART–Contraception Cost-Effectiveness Modelling: Project Overview

| PHASE 1: PLANNING | PHASE 2: EVIDENCE | PHASE 3: DEVELOP INNOVATIVE TOOLS | PHASE 4: ANALYSIS | PHASE 5: RECOMMENDATIONS FOR HEALTH SYSTEM IMPROVEMENT |

Setting the Question · Piloting of Tools · Population Survey · Literature Review · Existing Research by Team · Cost-Effectiveness Model · Specify Policy Options · Model-based Policy Analysis · Policy · Future Research

Ongoing dialogue with policy makers, health system administrators, clinical professionals and community advisory council member colleagues integrating continuous knowledge exchange throughout all phases

Background

Decision makers in health care are frequently expected to make choices in an evidentiary and analytic vacuum. This is an unacceptable state of affairs and one that the BC Ministry of Health is working to address across the health sector broadly. [2] Our project's starting point was policy making relating to access to contraception, with a particular focus on the needs of vulnerable subgroups and the unique features of British Columbian contexts. The Contraception Access Research Team (CART) Contraception Cost-effectiveness Modelling Study (CART-CCM, funded by MSFHR and CIHR) was undertaken to address this gap and foster evidence-informed decision making on contraception access for BC populations. The CART-CCM policy-research partnership collaborated with BC Ministry of Health, Population and Public Health division staff to determine the evidence policy makers require to support policy-making. This report details our findings with respect to the potential for cost-aversion strategies to support the equitable provision of affordable, effective, accessible and culturally-appropriate contraception.

The BC Ministry of Health has identified the need to improve access to contraception as a key health priority. The Provincial Health Officer's report "The Health and Well-being of Women

in British Columbia" released in Dec. 2011[3] highlighted summary recommendations including:

- Improve access to contraception, especially long-acting reversible contraception;

- Improve access to and coverage of sex education services, the principles of which should include the following: Access to contraception is unimpeded or even free.

Family planning is acknowledged to be one of the top ten public health advances of the millennium.[4] Health policy supporting accessible family planning has proven value, leading to population-level gains in terms of health equity in high-income countries around the world.[5-22] Disadvantaged and vulnerable populations, particularly youth, those of low socio-economic status or subjected to Adverse Childhood Experiences (ACES) and/or intimate partner violence, those living with substance use and mental health disorders, residents in rural and remote communities, and immigrants, are overrepresented among those with unintended pregnancies and among those seeking abortion.[23-50] Research supports that disadvantaged and vulnerable women with access to family planning are better able to achieve education and work goals.[8, 10, 11, 21, 38, 39, 51-54] Furthermore, women able to effectively time their pregnancies can better provide resources for their existing children, from food to education to housing, and have lower risks for adverse pregnancy and child development outcomes, thus contributing to improved health and economic outcomes overall in our society.[10, 21, 55, 56]

Accurate data on reproductive health indicators are essential to assess the need for services, evaluate the impact of health policies and programs and examine trends over time. Analysis of such indicators by social and health systems determinants can provide information on inequities in the health of the population and inform the development and evaluation of interventions to reduce inequities.[8, 9, 20, 51, 55-59] Canadian researchers and policy makers examining reproductive health problems and their solutions are currently limited due to incomplete, inconsistent or non-existent reproductive health indicator data. Although data such as those related to childbirth are robust and reliable, other data, such as rates for pregnancy intention, abortion and contraceptive method prevalence, are not. Compared to international surveys of national sexual health, Canadian national surveys including any measure of sexual and reproductive health,[85-87] are limited and out of date and most often include sampling inequities. For example, the most recent and comprehensive data on contraceptive method prevalence in Canada is from a 2006 survey undertaken by Black and colleagues using a volunteer, internet-based, market research panel.[85] Even

among this group indicating income and education among the highest levels in Canada, withdrawal was the third most commonly reported method of contraception among those at risk for pregnancy but not desiring to conceive, with 15% of the same group reporting no contraceptive use at all.

The Black findings are consistent with gaps identified by knowledge user partners and community stakeholders across BC[23, 47, 48, 90-92] indicating (even among our most affluent citizens) consumer cost of contraception influences consumer preference for the least effective (and least costly) methods, in turn generating health system costs for provision of abortion and management of unintended births. In high income countries the rate of unintended pregnancy resulting in birth is roughly equal to those resulting in abortion.[41, 42, 60, 62, 65, 93] In Canada, a third of women have at least one abortion.[89]

Further, unintended pregnancies resulting in birth are associated with higher rates of smoking and substance use during pregnancy, lower rates of breastfeeding, increased morbidity, mortality, and poor short and long-term child health with associated individual, societal and system costs.[10, 28, 36-39, 54]

Unintended pregnancies that result in birth contribute to increased health system costs, potentially over a generation, compared to management and costs of intended pregnancies and to policies supporting prevention of unintended pregnancy.
(11, 16, 18, 19, 37, 40, 82, 88)

To understand fully the reproductive health needs of British Columbians, an appropriate survey tool was required that would include questions that address contraceptive methods and adherence, validated measures to understand pregnancy intention, gender-inclusive sexual health and relationship practices, and barriers to comprehensive reproductive health care.

Peer countries around the world have adopted policies supporting universal subsidy of contraceptives.[5, 94-97] A 2009 report on policies among European Union (EU) countries reported eleven countries providing subsidy for all contraceptives to some extent for all women (United Kingdom, Belgium, Denmark, France, Greece, Estonia, the Netherlands, Ireland, Portugal, Slovenia and Spain).[97] Eight additional EU countries were found to provided partial subsidy for contraception.[97] In the United States (US), the Patient Protection and Affordable Care Act (PPACA) included the requirement that all health insurance providers include universal subsidy for all contraceptive methods, without charging a "co-pay", co-insurance, or deductible to the insured.[96]
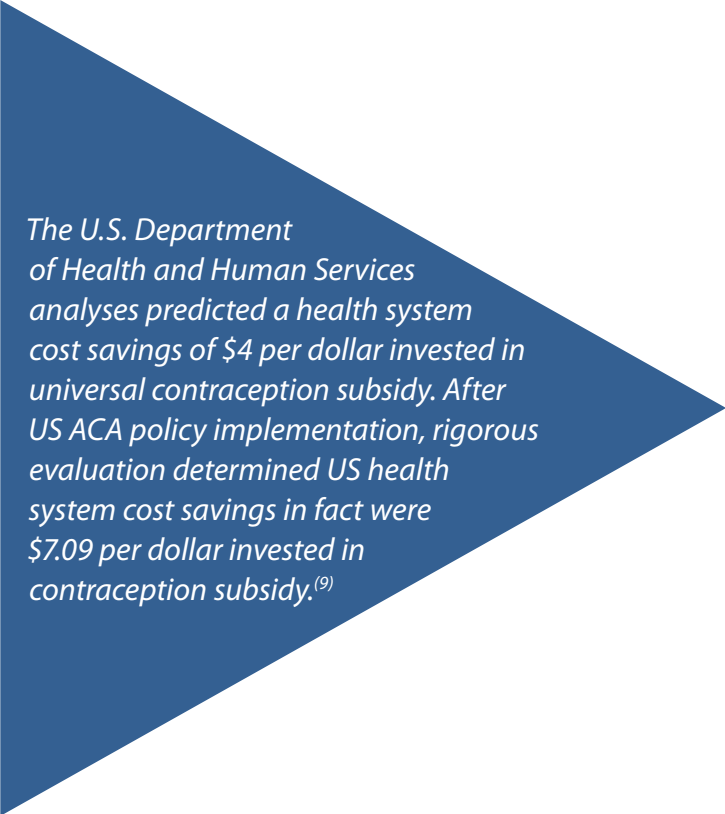
In contrast, Canadian provincial jurisdictions cover all costs to manage unintended pregnancy outcomes of birth or abortion, but do not provide universal subsidy to prevent unintended pregnancy through effective contraceptive methods.

Modelling to predict the effect of potential policy on number of pregnancies, by pregnancy outcome, and health system costs and cost-aversions, by health system sector.

Several published cost-effectiveness models have addressed health policy relating to contraception. [12-14, 16, 18, 19, 82, 88, 94]The most common approach taken by authors of existing models has been either a decision tree or Markov model.

There are several problems with existing modeling work in this clinical area. None of the existing models specifically address policy issues in Canada and so the particular policy context of Canadian jurisdictions, and particularly for BC, has not been incorporated. Published decision tree and Markov models have considered cohorts of women and have modeled over relatively short time horizons – **we have chosen to model over the full fertility period for individual women, recognizing variation in the length of the fertility window and variation in sexual activity, fertility and childbearing intention over time.** We have developed a simulation-based policy tool that can be used to understand the importance of variation and heterogeneity in the population of interest, to support development of nuanced policy.

Our model is an individual-level simulation model predicting the occurrence of pregnancy for each simulated fertile female in BC over each monthly cycle, where characteristics of individuals are explicitly considered. To ensure potential policy cost and output simulations reflect the need for health equity, our model incorporates variation in line with factors associated with health determinants such as poverty, education, housing status, single parenthood, cultural heritage, parity, and relationship status. The simulation accurately models the number of pregnancies in British Columbia within 1.5% of actual. As potential policy changes are input, the model sensitively and specifically produces estimates of revised age-specific number of pregnancies expected annually, as well as specific health sector costs and cost-aversions.

The U.S. Department of Health and Human Services analyses predicted a health system cost savings of $4 per dollar invested in universal contraception subsidy. After US ACA policy implementation, rigorous evaluation determined US health system cost savings in fact were $7.09 per dollar invested in contraception subsidy.[9]

Project Components

Research Question

What would be the impact, in economic and health terms, of extending government subsidy for contraceptive methods in British Columbia?

Aim

Our research aimed to develop a simulation model to inform decision-making relating to access to contraception in Canada. Our output was designed to support evidence-informed policy development for optimal contraception strategies in British Columbia. Our analyses utilized new primary data from BC's 2015 Sexual Health Survey, secondary evidence from existing research work undertaken by members of the team, and secondary published evidence through literature review.

Objectives

1. To develop the first Canadian "Contraception Cost-effectiveness Model" (CART-CCM) using Operations Research techniques incorporating determinants of pregnancy and pregnancy outcomes among the broad range of BC populations.

2. To specify and test policy options based on the CART-CCM, such as subsidy for contraceptive methods, to support evidence-informed health policy decisions by BC Provincial health system leaders.

## The 2015 BC Sexual Health Survey

The full report[1] may be downloaded here: http://med-fom-cart-grac.sites.olt.ubc.ca/files/2017/08/2015-BC-Sexual-Health-Indicators-CART-CSHS_2017-06-15.pdf

We conducted the CSHS among a representative sample of British Columbian females age 14-49 years. This personal interview household survey collected data from Dec 2014 to Oct 2015 in all regions in BC. Among eligible females approached 75.3% participated. Education, income levels and self-identified cultural heritage among respondents are reflective of the general BC female population.

Mean age at first intercourse among those who had ever had vaginal intercourse was 18.2 years (SD 4.2), with 2.2% of females reporting first intercourse prior to first menstrual period, and 81% reporting vaginal intercourse within the past year. Nearly 20% of females approaching menopause reported ever having a sexually transmitted infection (STI). Overall 1.6% of females reported an STI in the past year.

Nearly 90% of respondents currently wished to avoid pregnancy. We found 63% of respondents are "At Risk for Unintended Pregnancy" (ARUP) using a standard definition that combines fertility, intention and sexual activity. Among females who had a pregnancy within the past five years, 40% of pregnancies were unintended at the time of conception, with 57% of unintended pregnancies resulting in birth, and a third of births overall reported as unintended. Among those ARUP, only 14% indicated use of highly effective intrauterine contraceptives, while 21% used other hormonal methods, and over half (56%) of females not using permanent methods reported using a method with higher than 10% pregnancy rates per year, or no method. For example, 26% used condoms as their most effective method, and 9% used withdrawal. Generally, 8% of females ARUP used no method at last intercourse, with a range of 5-8% among those younger than 30 years. Use of the most effective methods at last intercourse correlated with higher income, education beyond high school, older age, with higher income as the most significant determinant of effective contraception use in multivariate analyses.

40%

of **pregnancies are unintended**
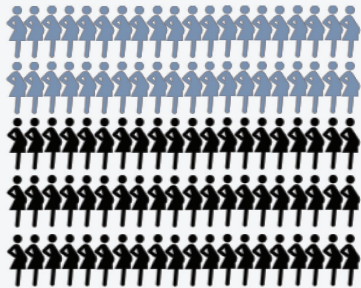
In BC, this means 24,000 women every year have an unintended pregnancy

Among unintended pregnancies

57%

result in a birth

The most common outcome for an unintended pregnancy is birth: **almost 14,000 BC women annually have an unintended pregnancy result in birth**

1/3
of all births were unintended
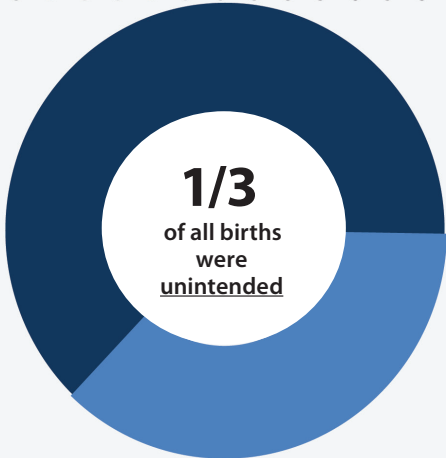
This infographic incorporates transformed and recoloured derivatives of: "Pregnant" by Andrew McKinley from the Noun Project, used under a CC BY 3.0 License. https://thenounproject.com/term/pregnant/12961/ , and of "Mother" by H.A from the Noun Project, used under a CC BY 3.0 License. https://thenounproject.com/search/?q=mother%20and%20baby&i=6393.

CSHS
Canadian Sexual Health Survey
UBC

The Simulation Model Decision Support Tool

How the Simulation Model Works

Simulation models are useful tools to study complex systems. They allow conduct of experiments on a representative abstract of reality instead of the actual system. This enables decision-makers to examine the outcomes before implementing certain policies or interventions. Further, decision-makers will have the ability to perform sensitivity analysis with respect to each component of their decisions. This helps them understand the impact of each component on the outcomes and costs and thus to revise and optimize their decision or policy accordingly.

We have developed a simulation model capable of imitating sexual behaviours and predicting pregnancy related outcomes as experienced by individual women throughout their reproductive years. The model combines information on individual determinants, choices and activities for each woman over each month, for the range of combinations of individual factors, including how the factors and outcomes the prior month affect the current month and subsequent months. Iterating the simulation allows collective population level estimations for costs and outcomes related to status quo compared to varied inputs related to policy alternatives. The simulation model consists of three sub modules: sexual activity, contraception, and pregnancy. Each module has separate data inputs, processes, and outputs.

The Sexual Activity module simulates the sexual behaviours of women over time within a month by month framework. This module includes data about sexual activity level, relationship status, and other sexual health related information. The Contraception module captures characteristics of contraceptive methods such as the prevalence of contraception methods, the patterns of use, and effectiveness. The Pregnancy module incorporates probability of pregnancy, pregnancy intention, decision-making with respect to each pregnancy, and the associated outcomes.

These modules and their connections to each other are represented through conceptual models that describe: the interactions between different elements of the model; how individuals transit between different states over time; and how the output of one module is used as the input of another module We term this sort of input an "internal input" to the next module. In addition to the internal inputs created by the simulation models, there are an extensive number of external parameters and inputs required. We analyzed data collected through 2015 BC Sexual Health Survey whenever possible, to identify and estimate the essential determinants of sexual activity behaviours, pregnancy intentions, family planning decisions and the related social determinants of health among BC populations. Whenever the data was not available, we have used similar data from National Survey of Family Growth (NSFG) of the United States or from relevant published literature. We have validated the simulation model at different levels against BC statistics. The final model predicts the pregnancy event rates within 1.5% of the rates in the BC populations.

The relevant cost components have been identified and attached to the appropriate elements of the simulation model. As the simulation model is running we can monitor all costs incurred to the health system. Using the outputs of the simulation model, cost and benefit streams likely to result from policy changes over time are predicted. Both costs related to policy inputs (such as a cost of contraceptive methods and the related health services) and health outcomes, such as the number of (unintended and thus potentially avoidable) pregnancies averted, are evaluated. The essential indicators facilitate economic analyses of policy options capable to improve health outcomes and lower health system costs.

Model Parameters

The tool examines the age-specific pregnancy rates and outcomes among females in BC through modelling the events, behaviours and outcomes of each monthly cycle over multiple iterations, among females with the range of social determinants of health and determinants of pregnancy risk, status, intention and outcomes. The model uses the best available data for inputs, including all of the data collected in the 2015 BC Sexual Health Survey among a representative sample of females aged 14-49 years throughout BC.

Model Assumptions

The model presents the pregnancy rates expected in BC over years 1 through 4, assuming no policy change, and has estimated current pregnancy rates (status quo) within 1.5% of actual for females age 15-29 and for those 15-49. The model presumes women using a contraceptive in a given year use that method all year starting from the first month, and in the case of short acting hormonal contraceptives, that each dose is purchased. This is a conservative estimate as savings with respect to the model will be realized due to those who do not remain on a chosen contraceptive method an entire year, those who fail to purchase all doses in the year, and those starting at times other than the first month of the year.

The health system costs in the model are reported separately for those within BC Government Pharmaceutical Services, Medical Services Plan and Health Authority domains.

Numbers for outcomes (pregnancies) and costs are presented for policy inputs (contraception) and outcomes occurring at status quo, and estimating rate changes assuming a policy of subsidy for Intrauterine contraceptive methods (IUC) and for

Hormonal methods (oral contraceptive pill (OCP) and depo-medroxyprogesterone acetate (DMPA) among all females under age 30. The modelling assuming this policy change is called "British Columbia's contraception Access Subsidy (BCAS)". We have assumed that program promotion costs are not included.

Results with BCAS implementation assume 25% of increased IUC uptake will take place in the first year, 50% in the second year and the rest in the 3rd year. The final uptake of IUC has assumed that the program will match the prevalence of IUC method use on par with those in northern European countries. Concurrently we have adjusted the use of each of the other contraceptive methods, and the proportion of those who use no contraceptive method, based on preference data from the 2015 BC Sexual Health Survey, as well as evidence from the literature and uptake in other jurisdictions. Modelling sensitivity of system costs related to the proportion of copper or hormone-releasing IUC among all IUC indicated only small differences, thus the outputs illustrated reflect current proportional uptake observed in the BC SMART program (providing free IUC post-abortion for all women in BC). Modelling has accounted for the fact that the Government pharmaceutical services plan (designated in tables below as "Government Pharmaceutical Services") has current costs for providing contraception.

All costs are reported to the nearest thousand dollars, although modelling calculated costs to the cent. All costs reported are from the health system perspective.

Simulation Model Inputs

COST FOR CONTRACEPTIVE METHODS					
Contraception	Pharmaceutical Cost	Practitioner Payment (MSP)	Health Authority Cost	Cost per Unit	Cost per Month
Copper IUD	$110.25	$ 42.19		$152.44	$1.27
LNG-IUS	$334.55	$ 42.19		$355.10	$5.92
OCP	$17.15			$17.15	$17.15
DMPA* (injection)	$32.01			$29.35	$9.78
Sterilization- female		$451.17	$2,721.83	$3,173.00	One-time
Sterilization- male		$220.42		$220.42	One-time

The sales tax is not included.

*DMPA: depo-medroxyprogesterone acetate is a hormonal contraceptive
 given once each 12 weeks

COST FOR PREGNANCY OUTCOMES				
From the (blue book) government estimation of total health system cost				
Pregnancy Outcome	Practitioner Payment MSP Fee	Government Pharmacare Cost	Health Authority Cost	Total
Induced Abortion	$180.09	0	$438.91	$619.00
Birth	$3,470.30	$84.99	$4,592.47	$8,147.76

Simulation Results

Simulation Results
with No Policy Change

NUMBER OF PREGNANCIES AT STATUS QUO FOR WOMEN UNDER 30 YEARS OF AGE AND FOR ALL WOMEN				
Age Group	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Under 30 years	32,137	31,853	31,776	31,897
All Women	63,136	62,590	62,467	62,563

Health System Costs for All Women Under Status Quo

Costs include costs for managing all pregnancy related care to six weeks after the pregnancy outcome, or of discharge of mother and baby from hospital if later than six weeks for all women.

Cost Component	Year 1	Year 2	Year 3	Year 4
Pregnancy related care	406,085,000	402,137,000	400,948,000	401,314,000
Contraception related care	25,284,000	25,185,000	25,004,000	25,300,000
Total cost	**431,369,000**	**427,322,000**	**425,952,000**	**426,613,000**

Simulation Results with Implementation of a New BC Contraception Access Subsidy (BCAS) Policy

BCAS 1 = Contraception subsidy for all women
BCAS 2 = Contraception subsidy for women under age 30

NUMBER OF PREGNANCIES FOR ALL WOMEN UNDER BCAS POLICY OPTIONS				
Policy	Year 1	Year 2	Year 3	Year 4
BCAS Policy 1	62,278	58,813	55,773	54,530
BCAS Policy 2	62,275	59,317	56,836	55,880

Status Quo:	Results expected with no policy change
BCAS 1:	Results expected with a policy of subsidy for contraception for all BC residents
BCAS 2:	Results expected with a policy of subsidy for contraception among BC residents under age 30 years

Reduction in Pregnancies, by Number and Percent

DIFFERENCE IN NUMBER OF PREGNANCIES FOR ALL WOMEN UNDER THE NEW BCAS POLICY OPTION VS STATUS QUO				
	Year 1	Year 2	Year 3	Year 4
BCAS Poliy 1 vs Status Quo	(858)	(3,777)	(6,694)	(8,033)
BCAS Poliy 2 vs Status Quo	(861)	(3,273)	(5,631)	(6,683)

DIFFERENCE IN THE PERCENT OF PREGNANCIES FOR ALL WOMEN, AT YEAR 4, UNDER THE NEW BCAS POLICY OPTIONS VS STATUS QUO			
Pregnancy Counts at Year 4			
	Status-quo	BCAS Policy	Difference (%)
BCAS Policy 1	62,563	54,530	12.84
BCAS Policy 2	62,563	55,880	10.68

Change in Pregnancies per year under New BCAS Policy, in Percent Difference from Status Quo

BCAS Policy: ● Policy 1 (Solid)   ● Policy 2 (Dashed)
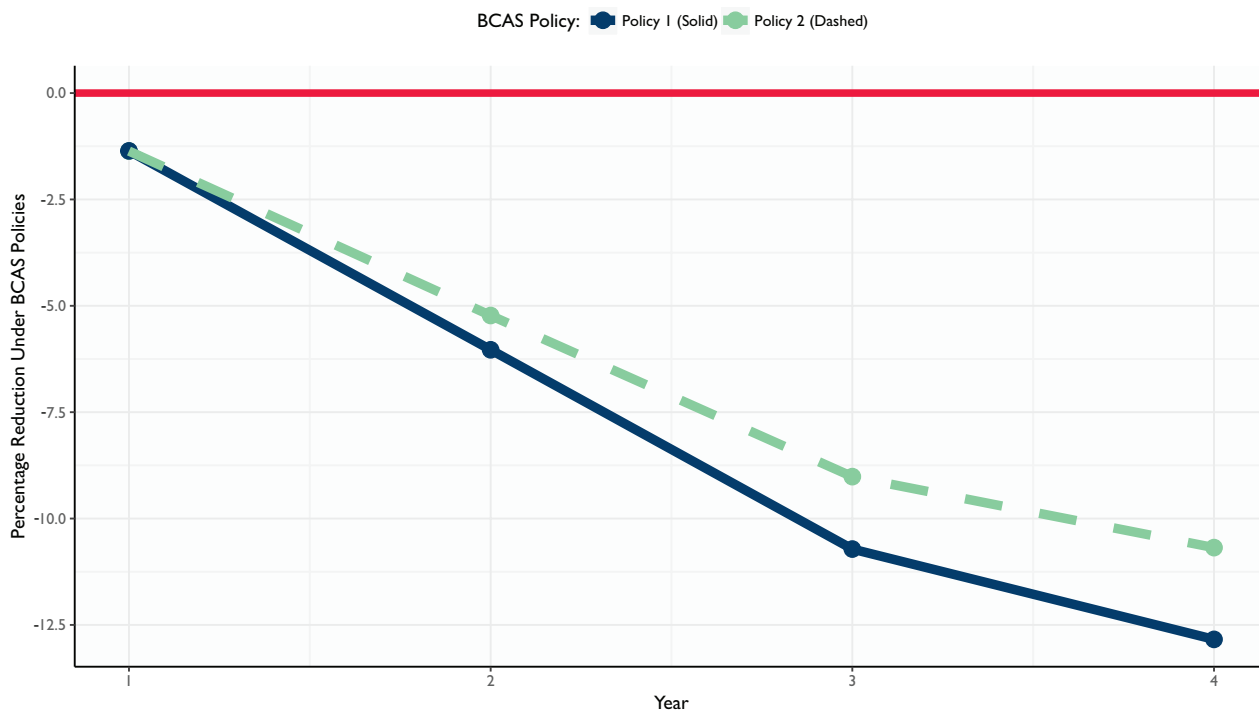
Number of Pregnancies each year 1 to 4: BCAS Policy Options and Status Quo
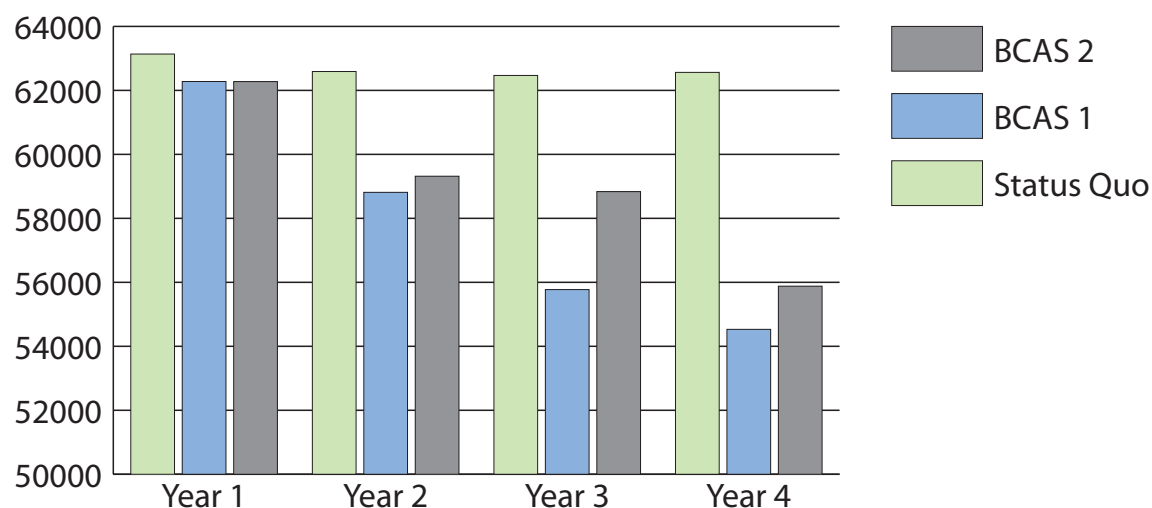
Health System Costs Under BCAS Policies

Policy	Cost	Year 1	Year 2	Year 3	Year 4
COSTS FOR ALL WOMEN UNDER STATUS QUO AND BCAS POLICIES, FOR PREGNANCY CARE, CONTRACEPTION AND TOTAL					
Status Quo	Total Pregnancy Cost	$406,085,000	$402,137,000	$400,948,000	$401,314,000
	Total Contraception Cost	$25,284,000	$25,185,000	$25,004,000	$25,300,000
	Combined Total Cost	$431,369,000	$427,322,000	$425,952,000	$426,613,000
BCAS Policy 1	Total Pregnancy Cost	403,495,000	386,306,000	368,141,000	359,429,000
	Total Contraception Cost	64,190,000	67,076,000	52,368,000	40,114,000
	Combined Total Cost	467,685,000	453,382,000	420,509,000	399,542,000
BCAS Policy 2	Total Pregnancy Cost	403,455,000	389,139,000	375,293,000	368,401,000
	Total Contraception Cost	53,232,000	55,800,000	48,805,000	43,353,000
	Combined Total Cost	456,687,000	444,940,000	424,099,000	411,754,000

Status Quo: Results expected with no policy change
BCAS 1: Results expected with a policy of subsidy for contraception for all BC residents
BCAS 2: Results expected with a policy of subsidy for contraception among BC residents under age 30 years

Pregnancy and Contraception Costs by Sector for BCAS Policies, Compared to Status Quo

Legend:
- Pregnancy Cost - MSP
- Pregnancy Cost - PS
- Pregnancy Cost - HA
- Contraception Cost - MSP
- Contraception Cost - PS
- Contraception Cost - HA
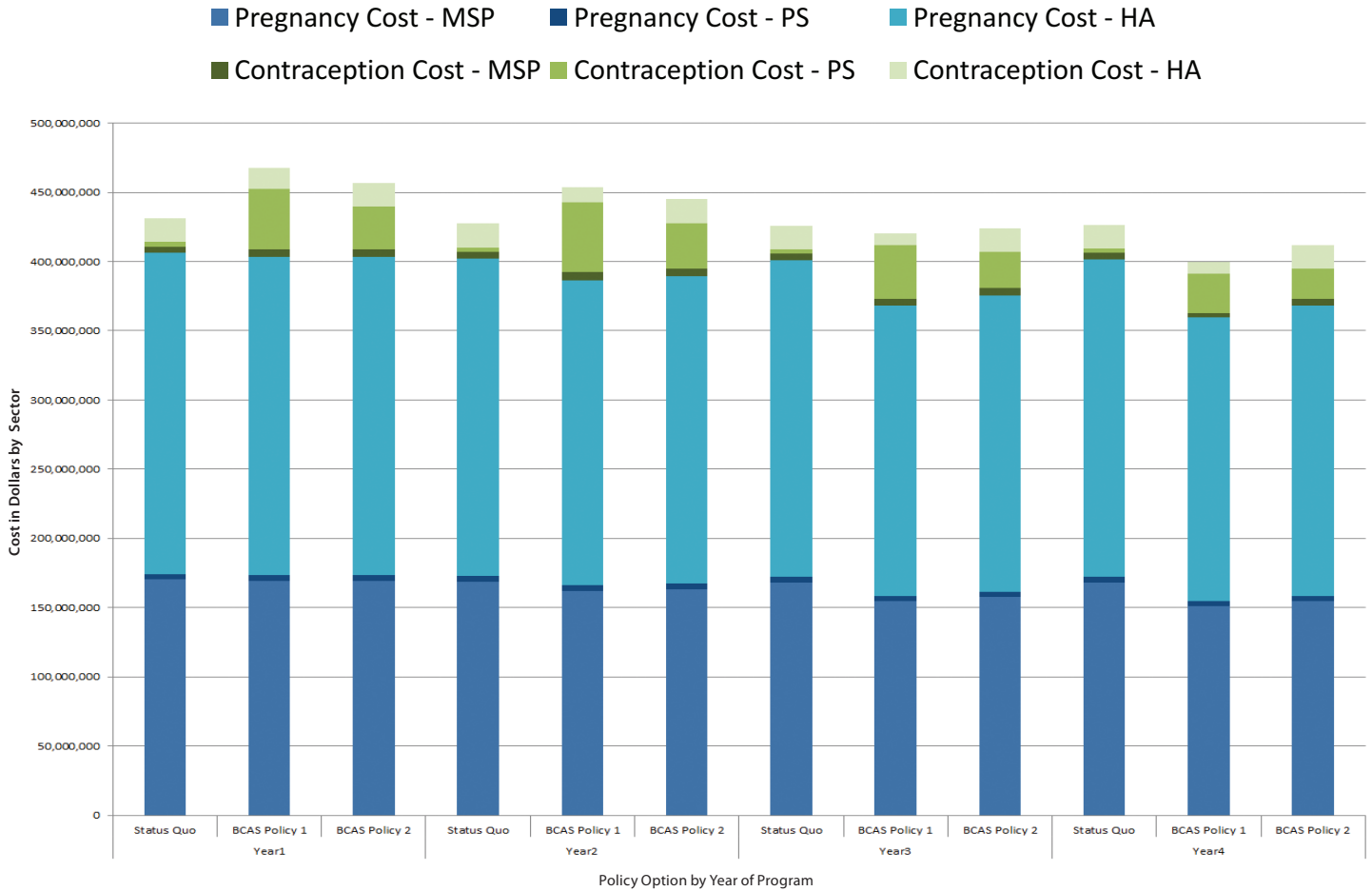
MSP – Medical Service Plan | PS – Pharmaceutical Services | HA – Health Authority

Comparing Costs Under the Proposed BCAS Policy to Status Quo

| Cost Difference when providing BCAS Policy for all women, in dollars (Cost savings are shown in brackets)				
	Year 1	Year 2	Year 3	Year 4
BCAS Policy 1 vs Status Quo	36,317,000	26,060,000	(5,442,000)	(27,071,000)
BCAS Policy 2 vs Status Quo	25,318,000	17,617,000	(1,853,000)	(14,859,000)

Summary

Rigorous evidence and state of the art simulation modelling using purpose-specific data collected from a representative sample of British Columbians has produced a customized policy decision support tool for the BC Ministry of Health.

We found that 40% of pregnancies in BC, including a third of all births, are unintended. We found these are inequitably distributed with a concentration among people with the poorest social determinants of health. We found that the costs to manage unintended pregnancies that would be preventable with improved contraception access, exceeds the cost to provide contraception subsidy for all women in BC.

Universal subsidy for highly effective contraceptive methods in BC would reduce overall pregnancy rates by 12.8% each year from the fourth year of policy implementation onward, including over 20% reduction among those under age 30.

While policy implementation costs exceed cost-aversions in the initial months of implementation, cost-neutrality is achieved in the second year with overall cost-aversion of $5M at year three, and cost-aversion of $27M per year from the fourth year.

Cost Difference Between Status Quo and the BCAS Policy for Pregnancy, Contraception, and Overall, by Year
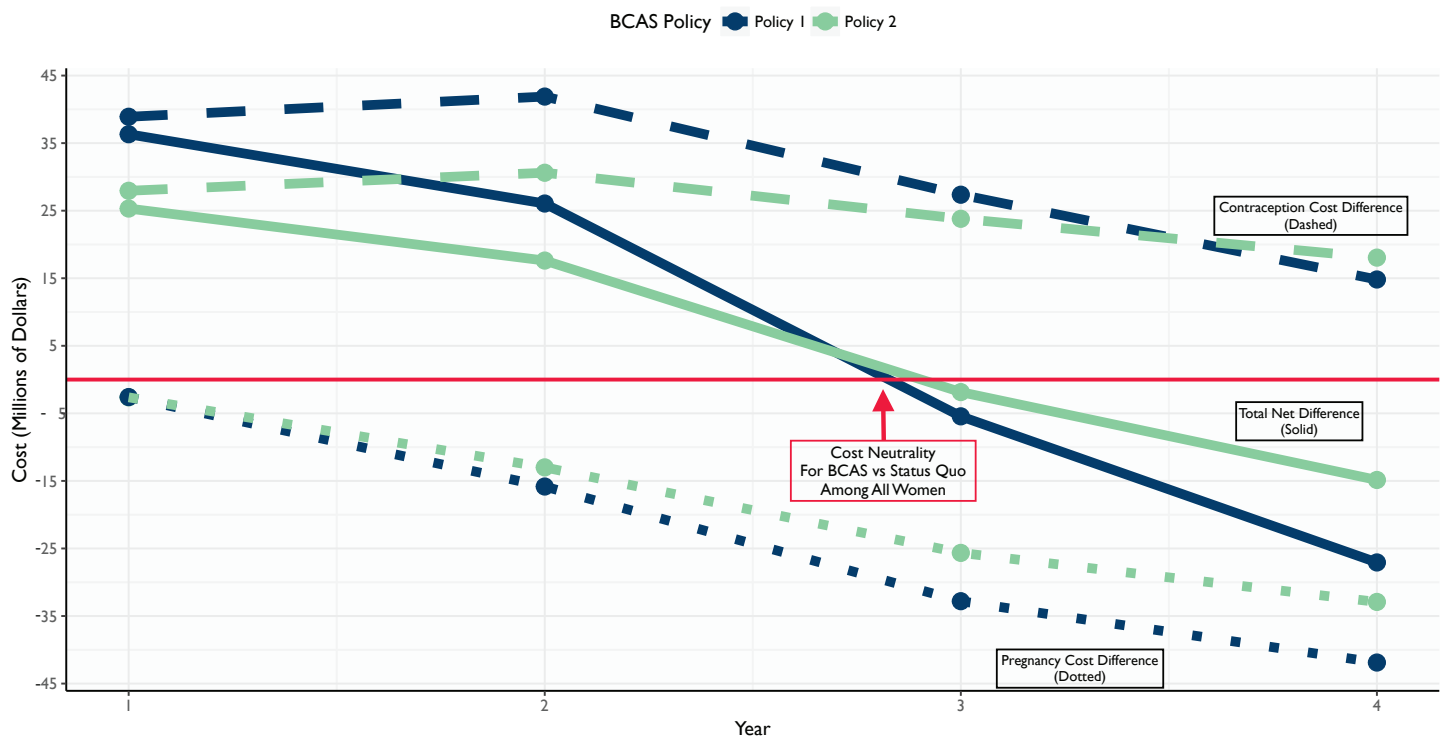
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Appendix I

Costs Related to Pregnancy Care and Contraception by Responsible Government Division

Costs for Status Quo

(MSP = MSP Costs; PS = Pharmaceutical Services Costs; HA = Health Authority Costs)

COSTS FOR PREGNANCY RELATED CARE AND CONTRACEPTION FOR ALL WOMEN BY GOVERNMENT DIVISION UNDER STATUS QUO								
	Year 1		Year 2		Year 3		Year 4	
	Pregnancy Cost	Contraception Cost	Pregnancy Cost	Contraception Cost	Pregnancy Cost	Contraception Cost	Pregnancy Cost	Contraception Cost
MSP	170,226,000	4,704,000	168,557,000	4,704,000	168,046,000	4,702,000	168,191,000	4,845,000
PS	4,103,000	3,367,000	4,063,000	3,268,000	4,050,000	3,088,000	4,054,000	3,241,000
HA	231,756,000	17,214,000	229,518,000	17,214,000	228,852,000	17,214,000	229,069,000	17,214,000

Costs for BCAS Policy Options

MSP COSTS								
	Year 1		Year 2		Year 3		Year 4	
	Pregnancy Cost	Contraception Cost	Pregnancy Cost	Contraception Cost	Pregnancy Cost	Contraception Cost	Pregnancy Cost	Contraception Cost
BCAS Policy 1	169,234,000	5,589,000	162,191,000	6,306,000	154,621,000	4,895,000	150,946,000	3,524,000
BCAS Policy 2	169,216,000	5,348,000	163,366,000	5,971,000	157,629,000	5,350,000	154,716,000	4,792,000

PHARMACEUTICAL SERVICES								
	Year 1		Year 2		Year 3		Year 4	
BCAS Policy 1	4,082,000	43,532,000	3,916,000	49,992,000	3,735,000	38,839,000	3,645,000	27,956,000
BCAS Policy 2	4,081,000	30,670,0009	3,944,000	32,616,000	3,807,000	26,242,000	3,737,000	21,348,000

HEALTH AUTHORITY								
	Year 1		Year 2		Year 3		Year 4	
BCAS Policy 1	230,180,000	15,069,000	220,199,000	10,779,000	209,785,000	8,634,000	204,837,000	8,634,000
BCAS Policy 2	230,157,000	17,214,000	221,829,000	17,214,000	213,857,000	17,214,000	209,948,000	17,214,000

Status Quo: Results expected with no policy change
BCAS 1: Results expected with a policy of subsidy for contraception for all BC residents
BCAS 2: Results expected with a policy of subsidy for contraception among BC residents under age 30 years

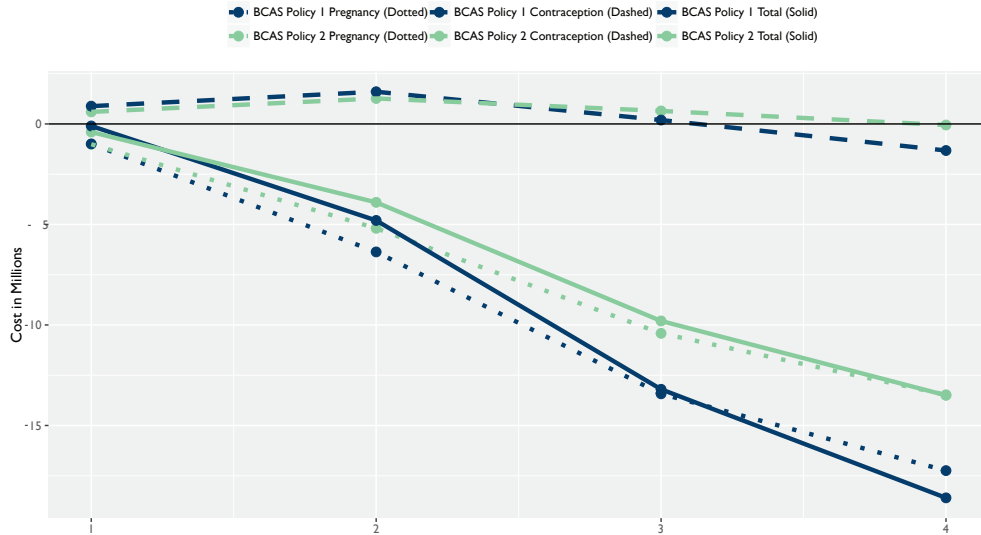# Costs Differences when Comparing BCAS Policy to Status Quo

Cost Difference when providing BCAS Policy for all women by responsible government and health authority division

MEDICAL SERVICES PLAN		Year 1	Year 2	Year 3	Year 4
Status Quo	Pregnancy Cost	170,226,000	168,557,000	168,046,000	168,191,000
	Contraception Cost	4,704,000	4,704,000	4,702,000	4,845,000
	Combined Total Cost	174,930,000	173,261,000	172,748,000	173,036,000
BCAS Policy 1	Pregnancy Cost	169,234,000	162,191,000	154,621,000	150,946,000
	Contraception Cost	5,589,000	6,306,000	4,895,000	3,524,000
	Combined Total Cost	174,823,000	168,497,000	159,517,000	154,470,000
BCAS Policy 2	Pregnancy Cost	169,216,000	163,366,000	157,629,000	154,716,000
	Contraception Cost	5,348,000	5,971,000	5,350,000	4,792,000
	Combined Total Cost	174,564,000	169,337,000	162,979,000	159,508,000
Difference: Policy 1 vs Status Quo	Pregnancy Cost	(992,000)	(6,366,000)	(13,425,000)	(17,245,000)
	Contraception Cost	885,000	1,602,000	193,000	(1,321,000)
	Combined Total Cost	(107,000)	(4,764,000)	(13,231,000)	(18,566,000)
Difference: Policy 2 vs Status Quo	Pregnancy Cost	(1,010,000)	(5,191,000)	(10,417,000)	(13,475,000)
	Contraception Cost	644,000	1,267,000	648,000	(53,000)
	Combined Total Cost	(366,000)	(3,924,000)	(9,769,000)	(13,528,000)

PHARMAEUTICAL SERVICES		Year 1	Year 2	Year 3	Year 4
Status Quo	Pregnancy Cost	4,103,000	4,063,000	4,050,000	4,054,000
	Contraception Cost	3,367,000	3,268,000	3,088,000	3,241,000
	Combined Total Cost	7,470,000	7,331,000	7,138,000	7,295,000
BCAS Policy 1	Pregnancy Cost	4,082,000	3,916,000	3,735,000	3,645,000
	Contraception Cost	43,532,000	49,992,000	38,839,000	27,956,000
	Combined Total Cost	47,614,000	53,908,000	42,574,000	31,601,000
BCAS Policy 2	Pregnancy Cost	4,081,000	3,944,000	3,807,000	3,737,000
	Contraception Cost	30,670,000	32,616,000	26,242,000	21,348,,000
	Combined Total Cost	34,752,000	36,560,000	30,050,000	25,084,000
Difference: Policy 1 vs Status Quo	Pregnancy Cost	(21,000)	(147,000)	(315,000)	(409,000)
	Contraception Cost	40,165,000	46,724,000	35,751,000	24,715,000
	Combined Total Cost	40,144,000	46,577,000	35,436,000	24,306,000
Difference: Policy 2 vs Status Quo	Pregnancy Cost	(22,000)	(119,000)	(243,000)	(317,000)
	Contraception Cost	27,303,000	29,348,000	23,154,000	18,107,000
	Combined Total Cost	27,282,000	29,229,000	22,912,000	17,789,000

HEALTH AUTHORITY		Year 1	Year 2	Year 3	Year 4
Status Quo	Pregnancy Cost	231,756,000	229,518,000	228,852,000	229,069,000
	Contraception Cost	17,214,000	17,214,000	17,214,000	17,214,000
	Combined Total Cost	248,970,000	246,732,000	246,066,000	246,283,000
BCAS Policy 1	Pregnancy Cost	230,180,000	220,199,000	209,785,000	204,837,000
	Contraception Cost	15,069,000	10,779,000	8,634,000	8,634,000
	Combined Total Cost	245,248,000	230,977,000	218,419,000	213,471,000
BCAS Policy 2	Pregnancy Cost	230,157,000	221,829,000	213,857,000	209,948,000
	Contraception Cost	17,214,000	17,214,000	17,214,000	17,214,000
	Combined Total Cost	247,371,000	239,043,000	231,070,000	227,162,000
Difference: Policy 1 vs Status Quo	Pregnancy Cost	(1,576,000)	(9,319,000)	(19,067,000)	(24,232,000)
	Contraception Cost	(2,145,000)	(6,435,000)	(8,580,000)	(8,580,000)
	Combined Total Cost	(3,722,000)	(15,755,000)	(27,647,000)	(32,812,000)
Difference: Policy 2 vs Status Quo	Pregnancy Cost	(1,599,000)	(7,689,000)	(14,995,000)	(19,121,000)
	Contraception Cost	0	0	0	0
	Combined Total Cost	(1,599,000)	(7,689,000)	(14,996,000)	(19,121,000)

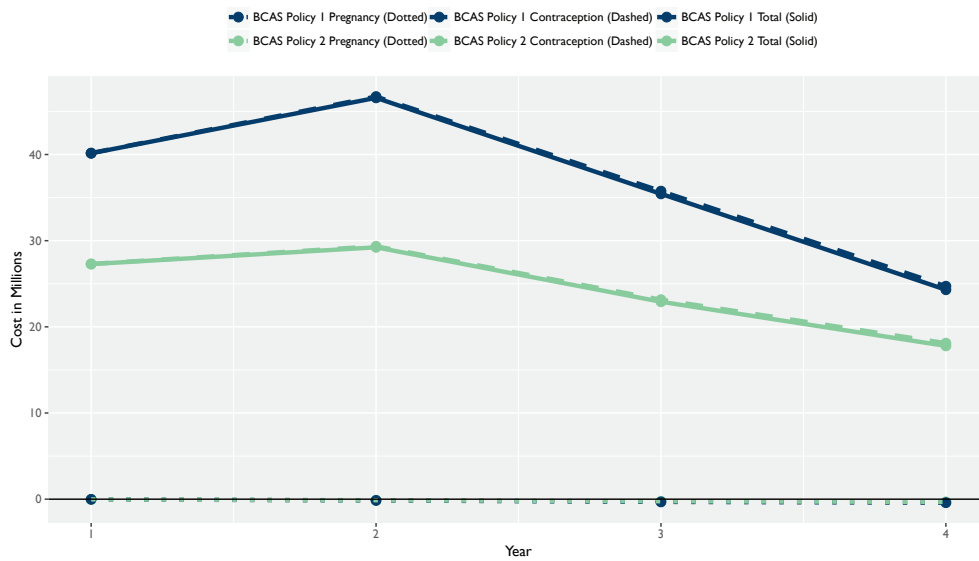**Status Quo:** Results expected with no policy change
BCAS 1: Results expected with a policy of subsidy for contraception for all BC residents
BCAS 2: Results expected with a policy of subsidy for contraception among BC residents under age 30 years
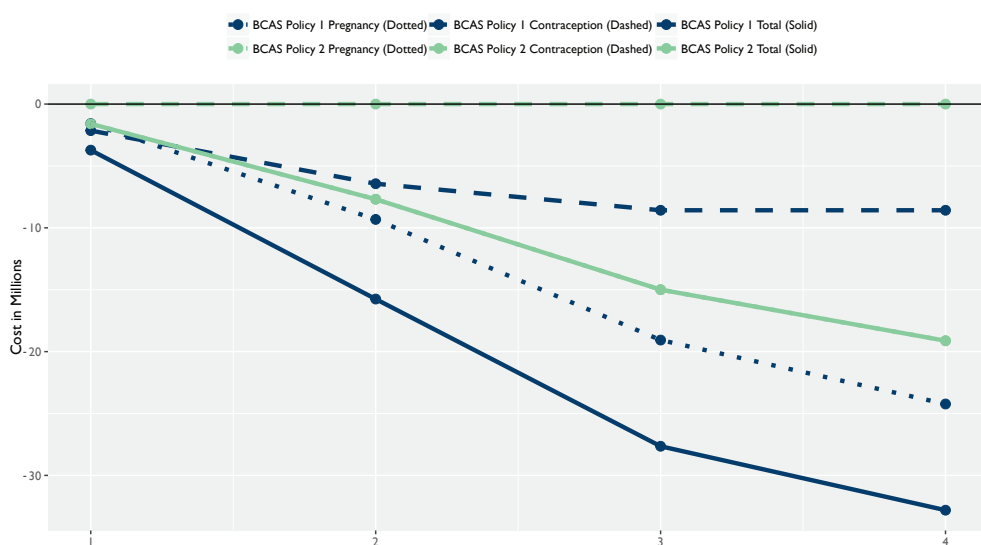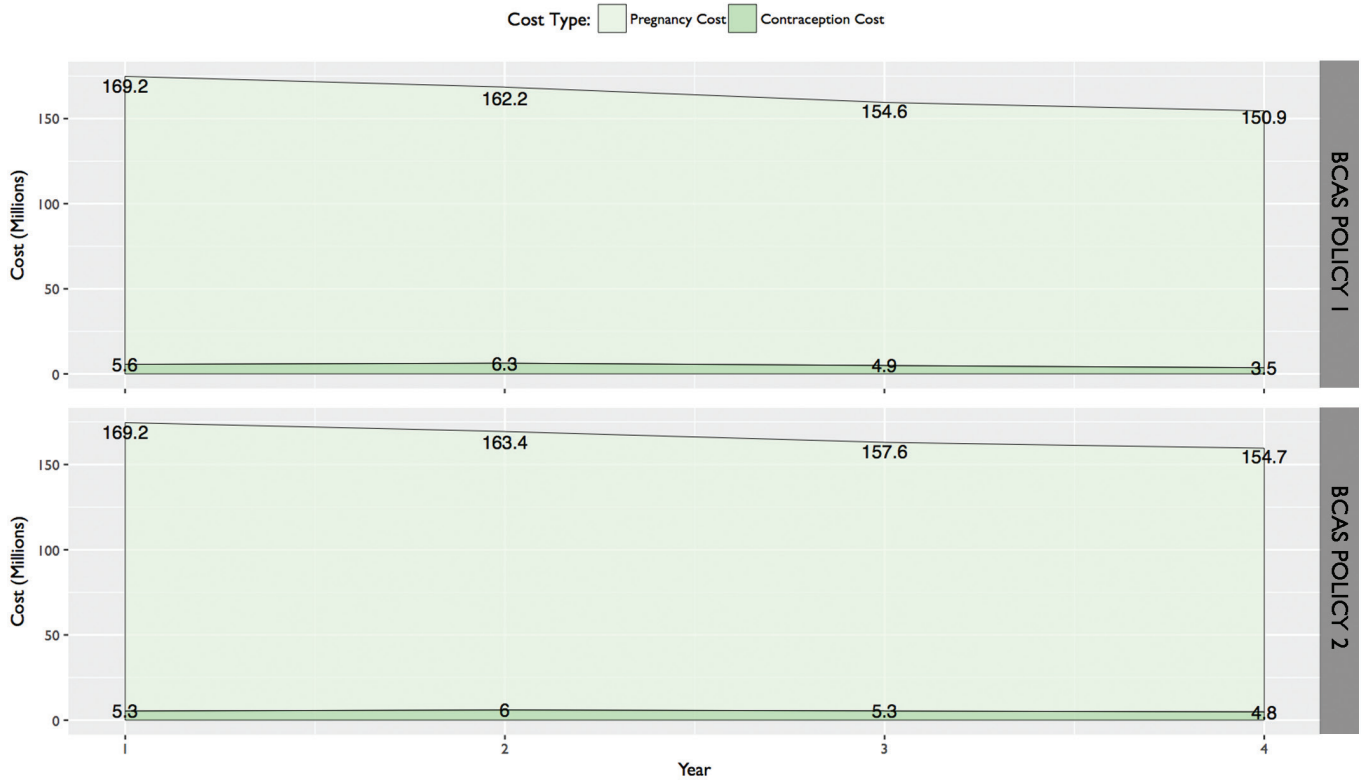
Difference in Cost Structure for MSP

Legend: BCAS Policy 1 Pregnancy (Dotted), BCAS Policy 1 Contraception (Dashed), BCAS Policy 1 Total (Solid), BCAS Policy 2 Pregnancy (Dotted), BCAS Policy 2 Contraception (Dashed), BCAS Policy 2 Total (Solid)

Difference in Cost Structure for Pharmaceutical Services

Legend: BCAS Policy 1 Pregnancy (Dotted), BCAS Policy 1 Contraception (Dashed), BCAS Policy 1 Total (Solid), BCAS Policy 2 Pregnancy (Dotted), BCAS Policy 2 Contraception (Dashed), BCAS Policy 2 Total (Solid)

Difference in Cost Structure for Health Authorities

Legend: BCAS Policy 1 Pregnancy (Dotted), BCAS Policy 1 Contraception (Dashed), BCAS Policy 1 Total (Solid), BCAS Policy 2 Pregnancy (Dotted), BCAS Policy 2 Contraception (Dashed), BCAS Policy 2 Total (Solid)

Cost Structure for MSP Assuming BCAS Policy Options

Cost Type: ▢ Pregnancy Cost ▢ Contraception Cost

BCAS POLICY 1

Cost (Millions)

169.2   162.2   154.6   150.9

5.6   6.3   4.9   3.5

BCAS POLICY 2

Cost (Millions)

169.2   163.4   157.6   154.7

5.3   6   5.3   4.8

Year

Cost Structure for Pharmaceutical Services Assuming BCAS Policy Options

Cost Type: ▢ Pregnancy Cost ▢ Contraception Cost

BCAS POLICY 1

Cost (Millions)

4.1   3.9   3.7   3.6

43.5   50   38.8   28

BCAS POLICY 2

Cost (Millions)

4.1   3.9   3.8   3.7

30.7   32.6   26.2   21.3

Year
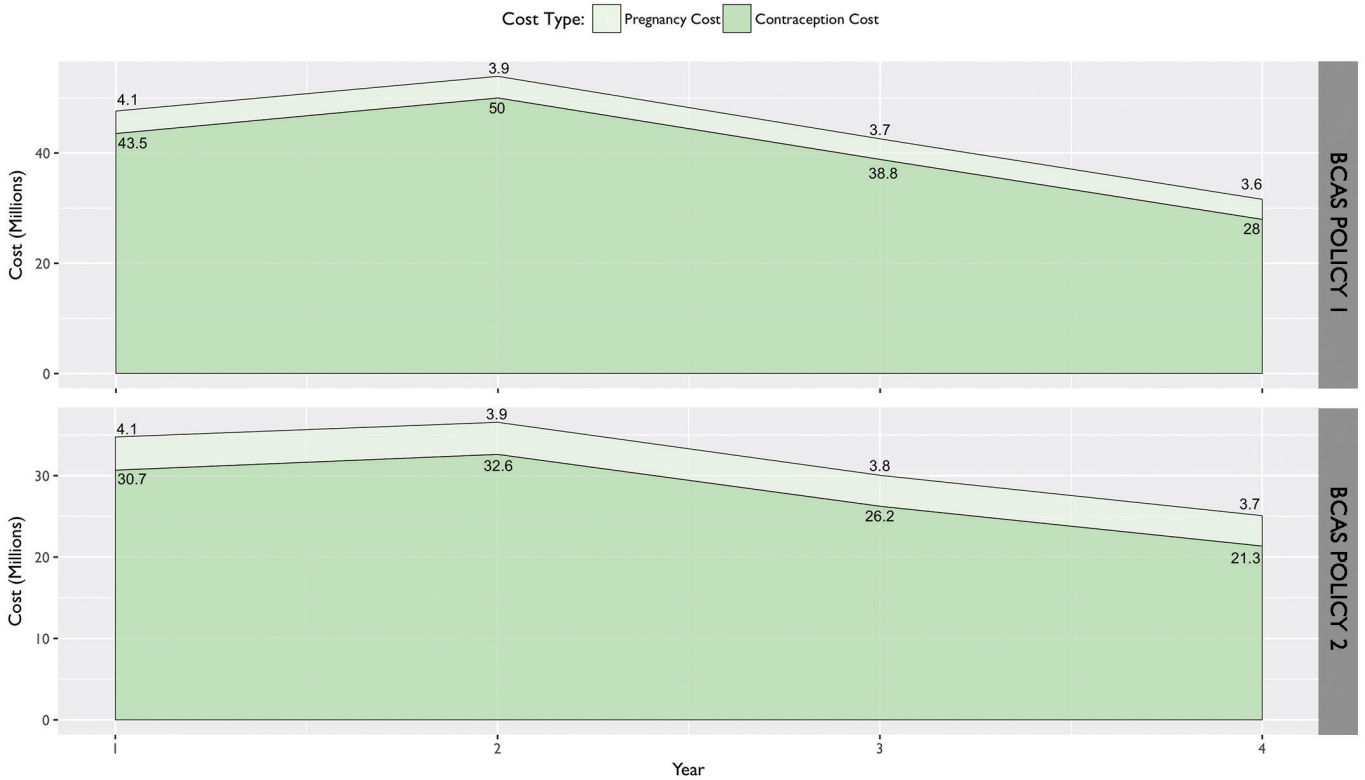
Cost Structure for Health Authorities Assuming BCAS Policy Options
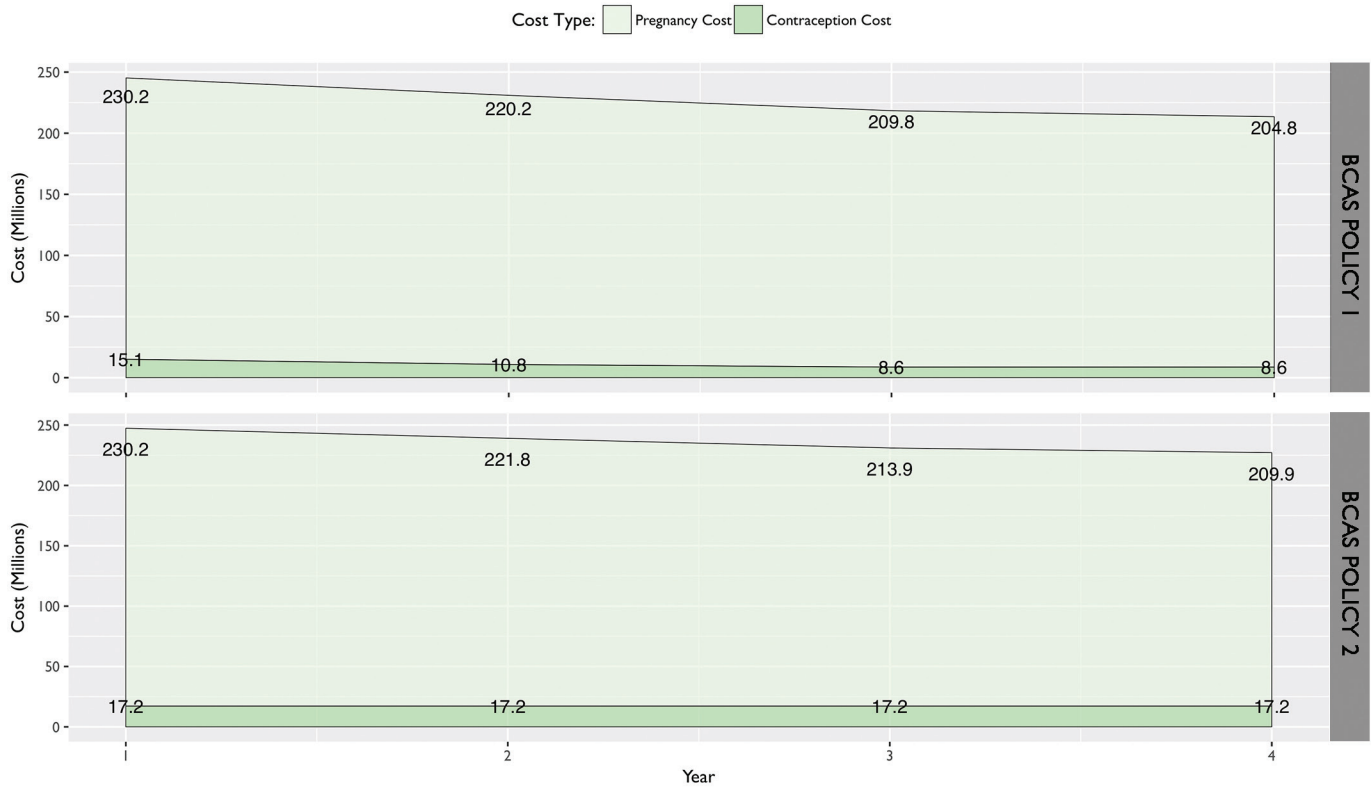
Cost Type: ☐ Pregnancy Cost ☐ Contraception Cost

Status Quo: Results expected with no policy change
BCAS 1: Results expected with a policy of subsidy for contraception for all BC residents
BCAS 2: Results expected with a policy of subsidy for contraception among BC residents under age 30 years

Appendix II

References

1. Norman WV, Bryan S, Samaidaluie S, Kaczorowski J, Brant R, Dunn S, et al. British Columbia 2015 Sexual Health Indicators: Rates and determinants among 14 to 49 year old females. Vancouver, British Columbia, Canada: University of British Columbia 2017 June 15.

2. British_Columbia. Putting Our Minds Together: Research and Knowledge Management Strategy. Victoria, British Columbia, Canada: Government of British Columbia; 2018 2018-03-08.

3. Kendall P. Report on the Health and Well Being of the Women of British Columbia. Victoria, British Columbia, Canada: Ministry of Health, Government of British Columbia; 2011.

4. Ten great public health achievements - United States, 1900-1999 (Reprinted from MMWR, vol 48, pg 241-243, 1999). Jama-Journal of the American Medical Association. 1999;281(16):1481-.

5. Mavranezouli I, Group LGD. The cost-effectiveness of long-acting reversible contraceptive methods in the UK: analysis based on a decision-analytic model developed for a National Institute for Health and Clinical Excellence (NICE) clinical practice guideline. Human reproduction (Oxford, England). 2008;23(6):1338-45.

6. Finer LB, Darroch JE, Frost JJ. U.S. agencies providing publicly funded contraceptive services in 1999. Perspect Sex Reprod Health. 2002;34(1):15-24.

7. Frost JJ, Singh S, Finer LB. Factors associated with contraceptive use and nonuse, United States, 2004. Perspect Sex Reprod Health. 2007;39(2):90-9.

8. Frost JJ, Finer LB, Tapales A. The impact of publicly funded family planning clinic services on unintended pregnancies and government cost savings. Journal of health care for the poor and underserved. 2008;19(3):778-96.

9. Frost JJ, Sonfield A, Zolna MR, Finer LB. Return on investment: a fuller assessment of the benefits and cost savings of the US publicly funded family planning program. The Milbank quarterly. 2014;92(4):696-749.

10. Brown SS, Eisenberg L. The best intentions: Unintended pregnancy and the well-being of children and families. Washington, DC: National Academies Press; 1995.

11. Cleland K, Peipert JF, Westhoff C, Spear S, Trussell J. Family planning as a cost-saving preventive health service. The New England journal of medicine. 2011;364(18):e37.

12. Trussell J. The cost of unintended pregnancy in the United States. Contraception. 2007;75(3):168-70.

13. Trussell J, Lalla AM, Doan QV, Reyes E, Pinto L, Gricar J. Cost effectiveness of contraceptives in the United States. Contraception. 2009;79(1):5-14.

14. Trussell J. Contraceptive failure in the United States. Contraception. 2011;83(5):397-404.

15. Trussell J. Update on and correction to the cost-effectiveness of contraceptives in the United States. Contraception. 2012;85(6):611.

16. Trussell J, Henry N, Hassan F, Prezioso A, Law A, Filonenko A. Burden of unintended pregnancy in the United States: potential savings with increased use of long-acting reversible contraception. Contraception. 2013;87(2):154-61.

17. Burlone S, Edelman AB, Caughey AB, Trussell J, Dantas S, Rodriguez MI. Extending contraceptive coverage under the Affordable Care Act saves public funds. Contraception. 2013;87(2):143-8.

18. Montouchet C, Trussell J. Unintended pregnancies in England in 2010: costs to the National Health Service (NHS). Contraception. 2013;87(2):149-53.

19. Henry N, Schlueter M, Lowin J, Lekander I, Filonenko A, Trussell J, et al. Cost of unintended pregnancy in Norway: a role for long-acting reversible contraception. The journal of family planning and reproductive health care. 2015;41(2):109-15.

20. Sundaram A, Vaughan B, Kost K, Bankole A, Finer L, Singh S, et al. Contraceptive Failure in the United States: Estimates from the 2006-2010 National Survey of Family Growth. Perspect Sex Reprod Health. 2017;49(1):7-16.

21. Singh S, Darroch J, Ashford L, Vlassoff M, UN-Pop-Fund. Adding It Up: The Costs and Benefits of Investing in Family Planning and Maternal and Newborn Health. New York: Guttmacher Institute and United Nations Population Fund; 2009.

22. Tsui AO, McDonald-Mosley R, Burke AE. Family planning and the burden of unintended pregnancies. Epidemiologic reviews. 2010;32(1):152-74.

23. Norman W, Shoveller J, Kaczorowski J. Contraception & Abortion in BC: Experience guiding Research guiding Care. Report on the 2nd provincial stakeholders conference. Vancouver, BC, Canada: University of British Columbia; 2011.

24. Saewyc E, Taylor D, Homma Y, Ogilvie G. Trends in sexual health and risk behaviours among adolescent students in British Columbia. Can J Hum Sexuality. 2008;17(1-2):1-13.

25. Devries KM, Free CJ, Morison L, Saewyc E. Factors associated with the sexual behavior of Canadian Aboriginal young people and their implications for health promotion. American journal of public health. 2009;99(5):855-62.

26. Disant M-J, Côté M-O. Bilan de la recherchéen santé des premières nations et des inuits du Québec de 1986 à 2006. Quebec, Canada: Institutional de santé publique du Québec; 2009.

27. Dietz PM, Spitz AM, Anda RF, Williamson DF, McMahon PM, Santelli JS, et al. Unintended pregnancy among adult women exposed to abuse or household dysfunction during their childhood. Jama. 1999;282(14):1359-64.

28. Hellerstedt WL, Pirie PL, Lando HA, Curry SJ, McBride CM, Grothaus LC, et al. Differences in preconceptional and prenatal behaviors in women with intended and unintended pregnancies. American journal of public health. 1998;88(4):663-6.

29. Silverman JG, Decker MR, McCauley HL, Gupta J, Miller E, Raj A, et al. Male perpetration of intimate partner violence and involvement in abortions and abortion-related conflict. American journal of public health. 2010;100(8):1415-7.

30. Miller E, Decker MR, McCauley HL, Tancredi DJ, Levenson RR, Waldman J, et al. Pregnancy coercion, intimate partner violence and unintended pregnancy. Contraception. 2010;81(4):316-22.

31. Miller E, Jordan B, Levenson R, Silverman JG. Reproductive coercion: connecting the dots between partner violence and unintended pregnancy. Contraception. 2010;81(6):457-9.

32. Guo N, Robakis T, Miller C, Butwick A. Prevalence of Depression Among Women of Reproductive Age in the United States. Obstetrics and gynecology. 2018;131(4):671-9.

33. Holliday CN, Miller E, Decker MR, Burke JG, Documet PI, Borrero SB, et al. Racial Differences in Pregnancy Intention, Reproductive Coercion, and Partner Violence among Family Planning Clients: A Qualitative Exploration. Women's health issues : official publication of the Jacobs Institute of Women's Health. 2018;28(3):205-11.

34. Scholmerich VL, Erdem O, Borsboom G, Ghorashi H, Groenewegen P, Steegers EA, et al. The association of neighborhood social capital and ethnic (minority) density with pregnancy outcomes in the Netherlands. PloS one. 2014;9(5):e95873.

35. Pallitto CC, Campbell JC, O'Campo P. Is intimate partner violence associated with unintended pregnancy? A review of the literature. Trauma, Violence, & Abuse. 2005;6(3):217-35.

36. Sarkar N. The impact of intimate partner violence on women's reproductive health and pregnancy outcome. Journal of Obstetrics and Gynaecology. 2008;28(3):266-71.

37. Kost K, Forrest JD. Intention status of U.S. births in 1988: differences by mothers' socioeconomic and demographic characteristics. Family planning perspectives. 1995;27(1):11-7.

38. Kost K, Landry DJ, Darroch JE. The effects of pregnancy planning status on birth outcomes and infant care. Family planning perspectives. 1998;30(5):223-30.

39. Sonfield A, Kost K, Gold RB, Finer LB. The public costs of births resulting from unintended pregnancies: national and state-level estimates. Perspect Sex Reprod Health. 2011;43(2):94-102.

40. Sonfield A, Kost K, Gold RB, Finer LB. The public costs of births resulting from unintended pregnancies: National and state-level estimates. Perspectives on sexual and reproductive health. 2011;43(2):94-102.

41. Finer LB, Henshaw SK. Disparities in rates of unintended pregnancy in the United States, 1994 and 2001. Perspect Sex Reprod Health. 2006;38(2):90-6.

42. Henshaw SK. Unintended pregnancy and abortion in the USA: epidemiology and public health impact. Management of unintended and abnormal pregnancy: comprehensive abortion care. 2009:24-35.

43. Paul M, Lichtenberg S, Borgatta L, Grimes DA, Stubblefield PG, Creinin MD. Management of unintended and abnormal pregnancy: comprehensive abortion care: John Wiley & Sons; 2011.

44. Dunn S, Wise MR, Johnson LM, Anderson GM, Ferris LE, Bierman AS. Chapter 10: Abortion in Ontario, POWER Report. Toronto, Ontario; 2011.

45. Fisher WA, Singh SS, Shuper PA, Carey M, Otchet F, MacLean-Brine D, et al. Characteristics of women undergoing repeat induced abortion. CMAJ. 2005;172(5):637-41.

46. Kendall P. Report on the Health of British Columbians. Provincial Health Officer's Annual Report 2001. The Health and Well-being of Aboriginal People in British Columbia. Victoria, B.C. : Government of British Columbia, Ministry-of-Health; 2002.

47. Norman WV, Dunn S, Guilbert E, Soon J, Hulme J. Setting a Canadian Family Planning Research Agenda: Opportunities and Priorities. Contraception. 2012;86(3):304-5.

48. Hulme J, Dunn S, Guilbert E, Soon J, Norman W. Barriers and facilitators to family planning access in Canada. Healthc Policy. 2015;10(3):48-63.

49. Foster DG, Jackson RA, Cosby K, Weitz TA, Darney PD, Drey EA. Predictors of delay in each step leading to an abortion. Contraception. 2008;77(4):289-93.

50. Dehlendorf C, Foster DG, de Bocanegra HT, Brindis C, Bradsberry M, Darney P. Race, ethnicity and differences in contraception among low-income women: methods received by Family PACT Clients, California, 2001-2007. Perspect Sex Reprod Health. 2011;43(3):181-7.

51. Wilkinson P, French R, Kane R, Lachowycz K, Stephenson J, Grundy C, et al. Teenage conceptions, abortions, and births in England, 1994–2003, and the national teenage pregnancy strategy. The Lancet. 2006;368(9550):1879-86.

52. Cheng D, Schwarz EB, Douglas E, Horon I. Unintended pregnancy and associated maternal preconception, prenatal and postpartum behaviors. Contraception. 2009;79(3):194-8.

53. D'Angelo DV, Gilbert BC, Rochat RW, Santelli JS, Herold JM. Differences between mistimed and unwanted pregnancies among women who have live births. Perspectives on sexual and reproductive health. 2004;36(5):192-7.

54. Mohllajee AP, Curtis KM, Morrow B, Marchbanks PA. Pregnancy intention and its relationship to birth and maternal outcomes. Obstetrics and gynecology. 2007;109(3):678-86.

55. Finer LB, Sonfield A. The evidence mounts on the benefits of preventing unintended pregnancy. Contraception. 2013;87(2):126-7.

56. Finer LB, Zolna MR. Shifts in intended and unintended pregnancies in the United States, 2001-2008. American journal of public health. 2014;104 Suppl 1:S43-8.

57. Finer LB, Philbin JM. Sexual initiation, contraceptive use, and pregnancy among young adolescents. Pediatrics. 2013;131(5):886-91.

58. Finer LB, Philbin JM. Trends in ages at key reproductive transitions in the United States, 1951-2010. Women's health issues : official publication of the Jacobs Institute of Women's Health. 2014;24(3):e271-9.

59. Sonfield A, Tapales A, Jones RK, Finer LB. Impact of the federal contraceptive coverage guarantee on out-of-pocket payments for contraceptives: 2014 update. Contraception. 2015;91(1):44-8.

60. Field N, Mercer CH, Sonnenberg P, Tanton C, Clifton S, Mitchell KR, et al. Associations between health and sexual lifestyles in Britain: findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). Lancet (London, England). 2013;382(9907):1830-44.

61. Macdowall W, Gibson LJ, Tanton C, Mercer CH, Lewis R, Clifton S, et al. Lifetime prevalence, associated factors, and circumstances of non-volitional sex in women and men in Britain: findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). Lancet (London, England). 2013;382(9907):1845-55.

62. Mercer CH, Tanton C, Prah P, Erens B, Sonnenberg P, Clifton S, et al. Changes in sexual attitudes and lifestyles in Britain through the life course and over time: findings from the National Surveys of Sexual Attitudes and Lifestyles (Natsal). Lancet (London, England). 2013;382(9907):1781-94.

63. Mitchell KR, Mercer CH, Ploubidis GB, Jones KG, Datta J, Field N, et al. Sexual function in Britain: findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). Lancet (London, England). 2013;382(9907):1817-29.

64. Sonnenberg P, Clifton S, Beddows S, Field N, Soldan K, Tanton C, et al. Prevalence, risk factors, and uptake of interventions for sexually transmitted infections in Britain: findings from the National Surveys of Sexual Attitudes and Lifestyles (Natsal). Lancet (London, England). 2013;382(9907):1795-806.

65. Wellings K, Jones KG, Mercer CH, Tanton C, Clifton S, Datta J, et al. The prevalence of unplanned pregnancy and associated factors in Britain: findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). Lancet (London, England). 2013;382(9907):1807-16.

66. Erens B, Phelps A, Clifton S, Mercer CH, Tanton C, Hussey D, et al. Methodology of the third British national survey of sexual attitudes and lifestyles (Natsal-3). Sexually transmitted infections. 2014;90(2):84-9.

67. French RS, Geary R, Jones K, Glasier A, Mercer CH, Datta J, et al. Where do women and men in Britain obtain contraception? Findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). The journal of family planning and reproductive health care. 2017.

68. Scott RH, Bajos N, Slaymaker E, Wellings K, Mercer CH. Understanding differences in conception and abortion rates among under-20 year olds in Britain and France: Examining the contribution of social disadvantage. PloS one. 2017;12(10):e0186412.

69. French RS, Geary R, Jones K, Glasier A, Mercer CH, Datta J, et al. Where do women and men in Britain obtain contraception? Findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). BMJ Sexual & Reproductive Health. 2018;44:16-26.

70. Santelli J, Lindberg LD, Finer LB, Rickert VI, Bensyl D, Posner S, et al. Comparability of contraceptive prevalence etimates for women from the 2002 Behavioral Risk Factor Surveillance System. Public health reports. 2008;123(2):147-54.

71. Upson K, Reed SD, Prager SW, Schiff MA. Factors associated with contraceptive nonuse among US women ages 35-44 years at risk of unwanted pregnancy. Contraception. 2010;81(5):427-34.

72. Pazol K, Robbins CL, Black LI, Ahrens KA, Daniels K, Chandra A, et al. Receipt of Selected Preventive Health Services for Women and Men of Reproductive Age - United States, 2011-2013. Morbidity and mortality weekly report Surveillance summaries (Washington, DC : 2002). 2017;66(20):1-31.

73. Lepkowski JM, Mosher WD, Davis KE. National Survey of Family Growth, cycle 6; sample design, weighting, imputation and variance estimation. 2006.

74. Mosher WD, Jones J. Use of contraception in the United States: 1982–2008. National Center for Health Statistics. 2010;23(29).

75. Layte R, McGee H, Quail A, Rundle K, Cousins G, Donnelly C, et al. The Irish Study of Sexual Health and Relationships: Summary Report. Dublin, Ireland: Trinity University; 2007.

76. McCarthy FP, O'Keeffe LM, Khashan AS, North RA, Poston L, McCowan LM, et al. Association between maternal alcohol consumption in early pregnancy and pregnancy outcomes. Obstetrics and gynecology. 2013;122(4):830-7.

77. Smith AMA, Rissel CE, Richters J, Grulich AE, de Visser RO. Sex in Australia: The rationale and methods of the Australian Study of Health and Relationships. Australian and New Zealand Journal of Public Health. 2006;27(2):106-17.

78. Smith AM, Pitts MK, Shelley JM, Richters J, Ferris J. The Australian longitudinal study of health and relationships. BMC public health. 2007;7:139.

79. Mazza D, Harrison C, Taft A, Brijnath B, Britt H, Hobbs M, et al. Current contraceptive management in Australian general practice: an analysis of BEACH data. The Medical journal of Australia. 2012;197(2):110-4.

80. Shankar M, Black KI, Goldstone P, Hussainy S, Mazza D, Petersen K, et al. Access, equity and costs of induced abortion services in Australia: a cross-sectional study. Aust N Z J Public Health. 2017;41(3):309-14.

81. Skouby SO. Contraceptive use and behavior in the 21st century: a comprehensive study across five European countries. The European journal of contraception & reproductive health care : the official journal of the European Society of Contraception. 2010;15 Suppl 2:S42-53.

82. Moreau C, Bohet A, Trussell J, Bajos N, group F. Estimates of unintended pregnancy rates over the last decade in France as a function of contraceptive behaviors. Contraception. 2014;89(4):314-21.

83. Wellings K, Brima N, Sadler K, Copas AJ, McDaid L, Mercer CH, et al. Stopping and switching contraceptive methods: findings from Contessa, a prospective longitudinal study of women of reproductive age in England. Contraception. 2015;91(1):57-66.

84. (EPF)" EPFoPD. Contraception Atlas | ContraceptionInfo. eu. European Parliamentary Forum on Population & Development (EPF); 2018.

85. Black A, Yang Q, Wen SW, Lalonde A, Guilbert ER, Fischer W. Contraceptive Use Among Canadian Women of Reproductive Age: Results of a National Survey. JOGC. 2009;31(7):13.

86. Hansen L, Mann J, McMahon S, Wong T. Sexual Health. BMC women's health. 2004;4 Suppl 1:S24.

87. Fisher WA, Black A. Contraception in Canada: a review of method choices, characteristics, adherence and approaches to counselling. CMAJ. 2007;176(7):953-61.

88. Black AY, Guilbert E, Hassan F, Chatziheofilou I, Lowin J, Jeddi M, et al. The Cost of Unintended Pregnancies in Canada: Estimating Direct Cost, Role of Imperfect Adherence, and the Potential Impact of Increased Use of Long-Acting Reversible Contraceptives. (1701-2163 (Print)).

89. Norman WV. Induced abortion in Canada 1974-2005: trends over the first generation with legal access. Contraception. 2012;85(2):185-91.

90. Norman W, Abi-Jaoude A, Shaw D, Davies C. Contraception & Abortion in BC: Experience guiding Research guiding Care. Report on the 3rd provincial stakeholders conference. Vancouver, BC, Canada: University of British Columbia; 2014.

91. Munro S, Norman W. Contraception & Abortion in BC: Experience guiding Research guiding Care. Report on the 4th provincial stakeholders conference. Vancouver, BC, Canada: University of British Columbia; 2016.

92. Devane C, Davies C, Munro S, Renner R, Webster G, Kendall T, et al. Contraception & Abortion in BC: Experience guiding research guiding care. Report on the 5th provincial stakeholders conference. Vancouver, BC, Canada: University of British Columbia; 2018 2018 March 9. Report No.: 5.

93. Sedgh G, Singh S, Shah IH, Åhman E, Henshaw SK, Bankole A. Induced abortion: incidence and trends worldwide from 1995 to 2008. The Lancet. 2012;379(9816):625-32.

94. (UK) NCCfWsaCsH. Long-acting Reversible Contraception: The Effective and Appropriate Use of Long-Acting Reversible Contraception. RCOG Clinical Practice Guidelines. 2005;CPG 30(October).

95. Cook L, Fleming C. What is the actual cost of providing the intrauterine system for contraception in a UK community sexual and reproductive health setting? The journal of family planning and reproductive health care. 2014;40(1):46-53.

96. ASPE. The Cost of Covering Contraceptives through Health Insurance. Issue Brief. US Department of Health & Human Services, Evaluation ASfPa; 2012.

97. Center-for-Reproductive-Rights. European Standards on Subsidizing Contraception. CFRR; 2009.