Appendix 1 (as supplied by the authors): Supplemental material

Multiple imputation results

Dataset with missing data (for imputation) included 6,445 survey responses. Imputation for 420 missing values (<7% of the full dataset). We imputed data for the following covariates: household education (n=322), race/ethnicity (n=54), immigration (n=31), marital status (n=16).

Supplemental Table S1. Pooled effect estimates for the odds of contraceptives use based on the effect of lower household income using datasets with missing data imputed, from the Canadian Community Health Survey (2009–2010 and 2013–2014).

Outcome	***Pooled RR***	***95% CI***
Oral contraceptives	0.86	0.80, 0.92
Injectable contraceptives	1.68	1.00, 2.83
Condoms only	1.33	1.09, 1.63
Non-users	1.20	0.96, 1.51
Condom plus OCs or DMPA	0.83	0.74, 0.93

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Two alternate definitions of household income

The original 5-level categorical variable for household income from the CCHS was also assessed in bivariate and logistic regression models with the outcomes of interest. Further, we refined the household income variable by adjusting for the number of individuals living in the household using the relevant CCHS categorical variable for household size. Because only categorical data was available for both household income and household size, we first created a continuous variable for household income using the midpoint of the range (except for the highest range, which was assigned as $100,000). Then, we assigned household size based on the categorical variable from the CCHS (1-person household = 1, … 5-person household = 5). The adjusted per-person household income was calculated based on commonly used approaches: an "equivalence scale"[1,2] adjustment to account for economies of scale in larger households, which would impact a per-person "adjusted household income". Adjusted household income in this study was calculated as follows:

$$\textit{Adjusted household income} = \textit{Household income} / (\textit{Household size})^{0.5}$$

Descriptive statistics and prevalence estimates for both household income variables are shown in Table S2-1 below. Adjusted and unadjusted logistic regression model estimated odds ratios using the 5-level categorical household income variable and adjusted household income are shown in Table S2-2.

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[1] Smeeding TM. Poor People in Rich Nations: The United States in Comparative Perspective. Ssrn. 2005;20(1):69–90.
[2] Kochhar R, Cohn D. Fighting Poverty in a Bad Economy, Americans Move in with Relatives. Pew Research Center's Social & Demographic Trends Project. 2011.

Supplemental Table S2-1. Descriptive statistics and population prevalence estimates for contraceptive outcomes by household income and adjusted income among female youth, from the Canadian Community Health Survey (2009–2010 and 2013–2014).

Income variables	*Survey responses (N=6025)*[†] *n*	*Population estimates (N= 826 711) n (%)*	*Oral contraceptives % (95% CI)*	*Injectable DMPA % (95% CI)*	*Condoms*[*] *% (95% CI)*	*Non-users % (95% CI)*
Yearly household income[‡]						
None or <$20,000	681	94 298 (11.4)	48.1 (42.2, 53.9)	4.2 (2.4, 6.0)	19.0 (14.6, 23.5)	19.8 (15.4, 24.1)
$20,000–$39,999	1030	143 975 (17.4)	52.2 (47.2, 57.3)	3.0 (1.4, 4.6)	17.5 (14.0, 21.0)	17.7 (14.0, 21.3)
$40,000–$59,999	1047	146 608 (17.7)	54.5 (49.7, 59.4)	3.4 (1.8, 5.1)	18.2 (14.5, 21.8)	13.7 (10.5, 16.9)
$60,000–$79,999	931	131 361 (15.9)	56.9 (51.4, 62.3)	1.7 (0.6, 2.8)	21.2 (16.3, 26.1)	12.0 (8.7, 15.4)
$80,000 or more	2336	310 470 (37.6)	69.0 (66.0, 71.9)	1.5 (0.8, 2.2)	13.3 (11.0, 15.6)	10.5 (8.5, 12.5)
Household size-adjusted income[§]						
less than $20,000 pp[**]	1159	158 009 (19.1)	45.9 (41.1, 50.6)	4.3 (2.8, 5.8)	20.0 (16.3, 23.6)	21.0 (17.5, 24.5)
20-<40k pp	1888	273 599 (33.1)	56.7 (53.1, 60.3)	2.3 (1.3, 3.3)	17.7 (15.1, 20.4)	14.0 (11.5, 16.6)
40-<60k pp	2696	359 083 (43.4)	65.7 (62.8, 68.6)	1.7 (1.0, 2.4)	15.5 (13.1, 17.9)	10.4 (8.6, 12.2)
60k pp or more	282	36 021 (4.4)	71.4 (63.9, 78.8)	2.9 (0.2, 5.7)	9.1 (5.2, 13.0)	10.0 (4.2, 15.9)

[*] Includes those reporting usually using only spermicide and/or condoms
[†] N for this analysis, 6 cases excluded due to missing data for household size
[‡] Original yearly household income variable from CCHS
[§] Adjusted household income based on household size
[5] pp = per person

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Supplemental Table S2-2. Effect of yearly household income and household size-adjusted income on contraceptives used by female youth (ages 15–24 years), from the Canadian Community Health Survey (2009–10 and 2013–14), adjusted and unadjusted regression models.

Covariate (main exposure only)	***Oral contraceptives***		***Injectable DPMA***		***Condoms only***		***Non-users***	
	Crude RR[*] (95% CI[†])	*Adjusted[‡] RR (95% CI)*	*Crude RR (95% CI)*	*Adjusted RR (95% CI)*	*Crude RR (95% CI)*	*Adjusted RR (95% CI)*	*Crude RR (95% CI)*	*Adjusted RR (95% CI)*
Model 1: Yearly household income								
≥ $80,000	baseline	baseline	baseline	baseline	baseline	baseline	baseline	baseline
$60,000 – $79,999	0.82 (0.74, 0.92)	0.86 (0.78, 0.96)	1.11 (0.51, 2.44)	1.05 (0.46, 2.38)	1.59 (1.19, 2.12)	1.59 (1.20, 2.10)	1.14 (0.81, 1.60)	1.03 (0.74, 1.45)
$40,000 – $59,999	0.79 (0.72, 0.87)	0.86 (0.78, 0.95)	2.23 (1.14, 4.34)	1.97 (1.01, 3.81)	1.36 (1.05, 1.78)	1.32 (1.01, 1.72)	1.30 (0.96, 1.76)	1.06 (0.78, 1.44)
$20,000 – $39,999	0.76 (0.68, 0.84)	0.85 (0.76, 0.94)	1.97 (0.99, 3.96)	1.74 (0.85, 3.56)	1.31 (1.01, 1.71)	1.23 (0.93, 1.61)	1.68 (1.27, 2.22)	1.34 (1.00, 1.81)
None – $19,999	0.70 (0.61, 0.79)	0.81 (0.72, 0.92)	2.72 (1.45, 5.08)	2.23 (1.15, 4.33)	1.43 (1.07, 1.91)	1.25 (0.91, 1.71)	1.88 (1.40, 2.52)	1.48 (1.08, 2.02)
Model 2: Household size-adjusted income								
≥ $60,000 or more	baseline	baseline	baseline	baseline	baseline	baseline	baseline	baseline
$40,000 – $59,999	0.92 (0.82, 1.03)	0.89 (0.80, 1.00)	0.58 (0.21, 1.61)	0.58 (0.21, 1.58)	1.71 (1.08, 2.70)	1.52 (0.95, 2.45)	1.03 (0.56, 1.90)	1.07 (0.60, 1.92)
$20,000 – $39,999	0.79 (0.70, 0.90)	0.83 (0.73, 0.94)	0.78 (0.28, 2.21)	0.71 (0.25, 1.98)	1.95 (1.24, 3.08)	1.70 (1.07, 2.71)	1.40 (0.76, 2.58)	1.26 (0.69, 2.28)
none – $19,999	0.64 (0.56, 0.74)	0.72 (0.62, 0.83)	1.46 (0.54, 3.97)	1.22 (0.45, 3.26)	2.20 (1.38, 3.51)	1.75 (1.07, 2.85)	2.09 (1.14, 3.85)	1.70 (0.94, 3.07)

[*] Risk ratio
[†] 95% confidence intervals (CI) using robust standard errors.
[‡] Adjusted for: household income, age, race/ethnicity, recent immigrant, student, marital status, household level of education, northern residence

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Stratification by Quebec

To examine whether results may differ in Quebec, we ran all analysis stratified by for the province of Quebec only (n=1278 surveys) compared to all other provinces/territories (n=4747 surveys). Table S3-1 presents the prevalence estimates using weighted populations for all contraceptive outcomes when the survey was stratified by Quebec compared with the rest of Canada. Table S3-2 presents results from regression models predicting risk of contraceptive use in stratified groups.

Supplemental Table S3-1. Stratified for Quebec versus rest of Canada: descriptive statistics and population prevalence estimates for contraceptive outcomes by 2-level household income and adjusted income among female youth, from the Canadian Community Health Survey (2009–2010 and 2013–2014).

Household income	***Surveys*** n	***Population estimates*** n (%)	***Oral contraceptives***	***Injectable DPMA***	***Condoms only***	***Non-users***
Quebec Only	(n=1278)	(n= 207 135)	63.1 (59.1, 67.1)	1.9 (0.9, 2.9)	15.8 (12.8, 18.7)	9.2 (6.8, 11.6)
Household income						
higher income group	440	70 450 (34.0)	79.2 (74.3, 84.1)	1.0 (0.0, 2.0)	8.8 (5.4, 12.3)	5.4 (2.7, 8.1)
lower income group	838	136 685 (66.0)	54.8 (49.6, 60.0)	2.4 (0.9, 3.8)	19.3 (15.2, 23.4)	11.2 (7.9, 14.5)
Rest of Canada	(n=4747)	(n=619 576)	57.9 (55.6, 60.2)	2.6 (2.0, 3.3)	17.2 (15.4, 19.0)	15.1 (13.5, 16.7)
Household income						
higher income group	1896	240 020 (38.7)	65.9 (62.5, 69.4)	1.7 (0.8, 2.6)	14.6 (11.9, 17.4)	12.0 (9.5, 14.5)
lower income group	2851	379 556 (61.3)	52.8 (49.7, 55.8)	3.2 (2.3, 4.2)	18.8 (16.4, 21.2)	17.0 (14.9, 19.2)

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Supplemental Table S3-2. Stratified by Quebec versus rest of Canada: effect of low household income (<80,000$/year) on contraceptives used by female youth, from the Canadian Community Health Survey (2009–2010 and 2013–2014), adjusted and unadjusted regression models.

	Quebec only		***Rest of Canada***	
Primary outcomes	***Crude RR*** [*] ***(95% CI*** [†]***)*** *for low income group*	***Adjusted RR*** [‡] ***(95% CI)***	***Crude RR (95% CI)*** *for low income group*	***Adjusted RR*** [3] ***(95% CI)***
Oral contraceptives	0.69 (0.62, 0.77)	0.75 (0.67, 0.84)	0.8 (0.74, 0.87)	0.89 (0.82, 0.96)
Injections (DMPA)	2.38 (0.74, 7.68)	2.20 (0.71, 6.84)	1.92 (1.07, 3.43)	1.61 (0.88, 2.94)
Condoms only	2.18 (1.4, 3.41)	2.12 (1.35, 3.31)	1.28 (1.02, 1.61)	1.23 (0.98, 1.55)
Non-users	2.07 (1.16, 3.69)	not estimable[§]	1.42 (1.11, 1.8)	1.14 (0.88, 1.47)
Multiple methods				
Condom plus OCs or DMPA	0.67 (0.52, 0.86)	not estimable[4]	0.67 (0.58, 0.77)	0.82 (0.71, 0.94)

[*] Risk ratio
[†] 95% confidence intervals (CI) using robust standard errors.
[‡] Adjusted for: household income, age, race/ethnicity, recent immigrant, student status, marital status, household level of education, northern residence (rest of Canada group only)
[§] Model was not estimable for income status due to low cell counts for outcome of interest (household income)

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Addendum to Table 2

Supplemental Table S4. Estimated population prevalence (%) for dual-method use (condoms plus OCs or DMPA), by various covariates, from Canadian Community Health Survey (2009–2010 and 2013–2014). Addendum to Table 2.

Covariates	*Multiple method: Condom + OCs or DMPA % (95% CI)*
Household income	
<$80,000/year	24.5 (22.3, 26.6)
≥ $80,000/year	36.6 (33.7, 39.6)
Age	
15 to 17 years	42.8 (38.5, 47.1)
18 to 19 years	33.0 (29.1, 36.9)
20 to 24 years	25.7 (23.5, 27.8)
Race or ethnicity	
White	31.0 (29.0, 33.0)
visible minority	21.2 (17.6, 24.8)
Current student	
no	22.6 (20.1, 25.1)
yes	34.2 (31.8, 36.7)
Married or common-law	
no	32.0 (30.0, 34.0)
yes	15.7 (11.8, 19.6)
Recent immigrant*	
No	29.5 (27.7, 31.3)
Yes	18.7 (9.8, 27.7)
Highest level education – Household	
< secondary	12.6 (7.2, 18.1)
secondary grad	25.2 (20.1, 30.3)
some post-sec	23.3 (18.0, 28.6)
post-sec grad	31.0 (28.9, 33.0)
Consulted a doctor or nurse in past 12 months	
No	20.7 (15.8, 25.6)
Yes	30.3 (28.4, 32.2)
Has family doctor	
No	21.1 (17.6, 24.7)
Yes	31.0 (29.0, 33.0)
Resident of the northern territories†	
No	29.1 (27.3, 30.8)
Yes	20.7 (13.9, 27.6)
Quebec‡	
no	29.4 (27.4, 31.5)
yes	27.8 (24.2, 31.4)

* Immigrated to Canada within the last 10 years
† Province of residence was one of the Yukon, Northwest Territories or Nunavut
‡ Quebec has a publicly-funded prescription benefit program; contraceptives are covered for youth who do not have coverage under a private drug plan

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Stratification by living arrangement

Our study population included female youth who lived with their parents (59%), a partner/spouse (12%), partner/spouse and own child/children (5%), or their own child/children (3%). Together, these groups account for 79% of our study population.

On the other hand, household income may be difficult to interpret for those in the "unattached either alone or other or single" living arrangement group (21%), which may include those living with roommates or on their own. To examine the impact of combining these groups in our primary analysis, we conducted a sensitivity analysis with the subgroup of 79% of our study sample excluding the 'unattached/other' group. We could not report on the 'unattached/other' group directly, because individual cell sizes with this smaller sample do not meet CCHS reporting criteria (20,21). Table S5-1 presents the prevalence estimates using weighted populations for all contraceptive outcomes for a subgroup of our study population who were not in the 'other' or 'unattached alone' living arrangement group (79%). Table S5-2 presents results from regression models predicting risk of contraceptive use in this subgroup only.

Supplemental Table S5-1. Subgroup excluding those who identified as living arrangement 'unattached/other or alone': descriptive statistics and population prevalence estimates for contraceptive outcomes by 2-level household income and adjusted income among female youth, from the Canadian Community Health Survey (2009–2010 and 2013–2014).

	Surveys (n=5124) n	***Population estimates*** (N= 666 627) n (%)	***Oral contraceptives*** ***% (95% CI)***	***Injectable contraceptives*** ***% (95% CI)***	***Condoms only*** ***% (95% CI)***	***Non-users*** ***% (95% CI)***
Household income						
higher income group	2249	295 964 (44.4)	69.1 (66.1, 72.1)	1.4 (0.7, 2.1)	13.2 (10.9, 15.5)	10.7 (8.6, 12.8)
lower income group	2875	370 663 (55.6)	52.3 (49.3, 55.2)	2.9 (2.0, 3.7)	18.4 (16.1, 20.7)	17.0 (14.8, 19.2)

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Supplemental Table S5-2. Subgroup excluding those who identified as living arrangement 'unattached/other or alone': effect of low household income (<80,000$/year) on contraceptives used by female youth, from the Canadian Community Health Survey (2009–2010 and 2013–2014), adjusted and unadjusted regression models.

	Subgroup excluding 'unattached/other or alone' living arrangements	
Primary outcomes	***Crude RR**** ***(95% CI†)*** *for low income group*	***Adjusted RR‡*** ***(95% CI)***
Oral contraceptives	0.76 (0.7, 0.81)	0.83 (0.77, 0.89)
Injections (DMPA)	2.09 (1.15, 3.79)	1.75 (0.95, 3.21)
Condoms only	1.39 (1.12, 1.73)	1.39 (1.12, 1.73)
Non-users	1.59 (1.26, 2.01)	1.28 (0.99, 1.64)
Multiple methods		
Condom plus OCs or DMPA	0.64 (0.57, 0.73)	0.80 (0.70, 0.91)

* Risk ratio
† 95% confidence intervals (CI) using robust standard errors.
‡ Adjusted for: household income, age, race/ethnicity, recent immigrant, student status, marital status, household level of education, northern residence

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CCHS contraception/sexual behaviors variables

The following CCHS variables were used to define the study population and for the outocmes of interest. Variables were recoded/recategorized as described in the methods section. SXB_09 ("It is important to me to avoid getting pregnant right now?"); SXB_1 ("Have you ever had sexual intercourse?"); SXB_11 ("In the past 12 months, did you and your partner usually use birth control?"); ("What kind of birth control did you and your partner usually use?") SXB_12A, SXB_12B, SXB_12C, SXB_12D, SXB_12E, SXB_12F (condom (male or female), pill, diaphragm, spermicide or foam, injection, other).

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