

Appendix 1 (as supplied by the authors)

Table S1. International Classification of Diseases and Related Health Problems Tenth Revision, Canada (ICD-10-CA) and Canadian Classification of Health Interventions (CCI) codes used for the study.

Diagnosis/Procedure	ICD-10-CA	CCI	Study use
Single live birth	Z37.0		
Forceps delivery		5.MD.53	
Outlet forceps		5.MD.53.KJ, 5.MD.53.KH	
Low forceps		5.MD.53.KL, 5.MD.53.KK	
Mid forceps		5.MD.53.KN, 5.MD.53.KM	
Vacuum delivery		5.MD.54	
Outlet vacuum		5.MD.54.KJ, 5.MD.54.KH	
Low vacuum		5.MD.54.KL, 5.MD.54.KK	Inclusion criteria
Mid vacuum		5.MD.54.KN, 5.MD.54.KM	
Vacuum, NOS		5.MD.54.NF, 5.MD.54.NE	
Sequential instrumental delivery		5.MD.55	
Outlet vacuum/ forceps		5.MD.55.KJ, 5.MD.55.KH	
Low vacuum/ forceps		5.MD.55.KL, 5.MD.55.KK	
Mid vacuum/ forceps		5.MD.55.KN, 5.MD.55.KM	
Vacuum/forceps, NOS		5.MD.55.KR, 5.MD.55.KQ	
Cesarean delivery		5.MD.60.KE, 5.MD.60.JY, 5.MD.60.KB, 5.MD.60.KG, 5.MD.60.KF, 5.MD.60.AA, 5.MD.60.KT	
Breech presentation	O32.1, O64.1	5.MD.56	Exclusion criteria
Double forceps application (Scanzoni maneuver)		5.MD.53.KS, 5.MD.53.KP	
Forceps rotation only with manually assisted delivery (DeLee key-in-lock maneuver)		5.MD.53.JE, 5.MD.53.JD	
Parity	DAD element		Cohort definition
VBAC	O34.20, O66.40, O75.7		
Episiotomy		5.MD.53.KJ, 5.MD.53.KL, 5.MD.53.KN, 5.MD.54.KJ, 5.MD.54.KL, 5.MD.54.KN, 5.MD.54.NF, 5.MD.55.KN, 5.MD.55.KL, 5.MD.55.KJ, 5.MD.55.KR, 5.MD.50.GH, 5.PC.80.JN	Exposure (main independent variable)
Obstetric anal sphincter injury	O70.2, O70.3	5.PC.80.JQ	Primary outcome
Maternal age	DAD element		Confounder
Parity	DAD element		
Birth weight	DAD element		
Fiscal year	DAD element		
Maternal province of residence	DAD element		
Labour induction	5.AC.30		
Prolonged second stage	O63.1		
Fetal distress	O68, O69.0		

DAD, Discharge Abstract Database; NOS, Not otherwise specified; VBAC, Vaginal birth after cesarean.

Table S2. Numbers and rates of women with an episiotomy by mode of vaginal delivery, by region of residence and by year term, singleton, vaginal deliveries, Canada, 2004-2017

Characteristic	All deliveries			Deliveries with information on parity					
	No. deliveries	With episiotomy		Nulliparous		Parous, no previous CD		VBAC	
		No.	Rate (%)	No. deliveries	Rate (%)	No. deliveries	Rate (%)	No. deliveries	Rate (%)
All vaginal deliveries	2570847	374071 (14.6)	850776	217252 (25.5)	1079282	72976 (6.8)	68560	11240 (16.4)	
Spontaneous	2205056	206184 (9.4)	641809	107564 (16.8)	1016324	57281 (5.6)	55724	5891 (10.6)	
OVD	365791	167887 (45.9)	208967	109688 (52.5)	62958	15695 (24.9)	12836	5349 (41.7)	
Forceps Outlet	5615	3509 (62.5)	3236	2145 (66.3)	583	266 (45.6)	192	117 (60.9)	
- Low	48843	31274 (64.0)	30165	20462 (67.8)	4092	1935 (47.3)	1738	1059 (60.9)	
- Mid	34687	23501 (67.8)	22002	15578 (70.8)	3231	1644 (50.9)	1264	787 (62.3)	
Vacuum - Outlet	39475	13395 (33.9)	20437	7901 (38.7)	6869	1336 (19.5)	1217	356 (29.3)	
- Low	93183	35219 (37.8)	53850	23374 (43.4)	18671	3861 (20.7)	3374	1074 (31.8)	
- Mid	36820	13449 (36.5)	21151	9512 (45.0)	10267	1843 (18.0)	1653	520 (31.5)	
- NOS	88580	34994 (39.5)	46341	22282 (48.1)	17200	3847 (22.4)	2821	1073 (38.0)	
Sequential - Outlet	2366	1570 (66.4)	1407	990 (70.4)	204	97 (47.6)	60	36 (60.0)	
- Low	7742	5125 (66.2)	4848	3359 (69.3)	707	333 (47.1)	247	154 (62.4)	
- Mid	4486	3083 (68.7)	2949	2170 (73.6)	598	288 (48.2)	163	101 (62.0)	
- NOS	3994	2768 (69.3)	2581	1915 (74.2)	536	245 (45.7)	107	72 (67.3)	
Province - NL	38492	6048 (15.7)							
- PEI	10307	1050 (10.2)	.	..	.	..	.	..
- NS	79873	13426 (16.8)	.	..	.	..	.	..
- NB	63728	8262 (13.0)	.	..	.	..	.	..
- ON	1252544	207120 (16.5)	549919	147611 (26.8)	664216	52721 (7.9)	37957	6721 (17.7)	
- MB	156423	24414 (15.6)	58536	17854 (30.5)	90623	5192 (5.7)	7087	1358 (19.2)	
- SK	140091	16916 (12.1)	53610	12583 (23.5)	80487	3538 (4.4)	5938	785 (13.2)	
- AB	450310	53113 (11.8)	188711	39204 (20.8)	243956	11525 (4.7)	17578	2376 (13.5)	
- BC	363069	43072 (11.9)	.	..	.	..	.	..
- NWT	8292	391 (4.7)	.	..	.	..	.	..
- NU	3989	58 (1.5)	.	..	.	..	.	..
- YU	3729	201 (5.4)							
Year of delivery - 2004	166437	32626 (19.6)	56025	18086 (32.3)	69332	7247 (10.5)	4043	884 (21.9)	
- 2005	172408	30635 (17.8)	57219	17230 (30.1)	72040	6625 (9.2)	4178	775 (18.6)	
- 2006	175469	29955 (17.1)	58364	16851 (28.9)	72555	6160 (8.5)	4068	748 (18.4)	
- 2007	183960	30160 (16.4)	60649	17128 (28.2)	76498	6132 (8.0)	4357	794 (18.2)	
- 2008	187001	29375 (15.7)	61715	16859 (27.3)	77853	5968 (7.7)	4494	769 (17.1)	
- 2009	189408	28202 (14.9)	63064	16336 (25.9)	78375	5485 (7.0)	4875	853 (17.5)	
- 2010	186710	27151 (14.5)	61597	15836 (25.7)	78100	5222 (6.7)	4827	788 (16.3)	
- 2011	187692	26595 (14.2)	62193	15673 (25.2)	78616	5138 (6.5)	4904	773 (15.8)	
- 2012	187419	25850 (13.8)	62643	15349 (24.5)	79097	5025 (6.4)	5084	780 (15.3)	
- 2013	187077	24196 (12.9)	62629	14517 (23.2)	78336	4392 (5.6)	5330	835 (15.7)	
- 2014	188688	23590 (12.5)	63013	14164 (22.5)	79143	4203 (5.3)	5476	813 (14.9)	
- 2015	188365	22816 (12.1)	61820	13654 (22.1)	80184	3984 (5.0)	5481	802 (14.6)	
- 2016	186709	21987 (11.8)	60806	13111 (21.6)	79913	3830 (4.8)	5716	821 (14.4)	
- 2017	183504	20933 (11.4)	59039	12458 (21.1)	79240	3565 (4.5)	5727	805 (14.1)	

OVD, Operative vaginal deliveries; VBAC, Vaginal birth after cesarean; NOS, Not otherwise specified; CD, Cesarean delivery; †P-value for all bivariable comparisons <0.0001; derived from Chi-square test for difference in proportion of maternal/infant characteristics among deliveries with and without episiotomy in each respective parity and obstetric history group.

Table S3. Numbers and rates of women with an episiotomy by mode of vaginal delivery and by maternal and infant characteristics, showing standardized differences between groups, term, singleton, vaginal deliveries, Canada*, 2004-2017 (n=1 998 618)

Characteristic	Nulliparous			Parous, no previous CD			VBAC		
	With episiotomy 217 252	Without episiotomy 633 524	Std diff†	With episiotomy 72 976	Without episiotomy 1 006 306	Std diff†	With episiotomy 11 240	Without episiotomy 57 320	Std diff†
	No. (%)	No. (%)		No. (%)	No. (%)		No. (%)	No. (%)	
Spontaneous	107564 (49.5)	534245 (84.3)	0.80	57281 (78.5)	959043 (95.3)	0.51	5891 (52.4)	49833 (86.9)	0.81
Operative	109688 (50.5)	99279 (15.7)	0.80	15695 (21.5)	47263 (4.7)	0.51	5349 (47.6)	7487 (13.1)	0.81
Forceps	38185 (17.6)	17218 (2.7)	0.51	3845 (5.3)	4061 (0.4)	0.30	1963 (17.5)	1231 (2.1)	0.53
Outlet	2145 (1.0)	1091 (0.2)	0.11	266 (0.4)	317 (0.0)	0.07	117 (1.0)	75 (0.1)	0.12
Low	20462 (9.4)	9703 (1.5)	0.35	1935 (2.7)	2157 (0.2)	0.21	1059 (9.4)	679 (1.2)	0.37
Mid	15578 (7.2)	6424 (1.0)	0.31	1644 (2.3)	1587 (0.2)	0.19	787 (7.0)	477 (0.8)	0.32
Vacuum	63069 (29.0)	78710 (12.4)	0.42	10887 (14.9)	42120 (4.2)	0.37	3023 (26.9)	6042 (10.5)	0.43
Outlet	7901 (3.6)	12536 (2.0)	0.10	1336 (1.8)	5533 (0.5)	0.12	356 (3.2)	861 (1.5)	0.11
Low	23374 (10.8)	30476 (4.8)	0.22	3861 (5.3)	14810 (1.5)	0.21	1074 (9.6)	2300 (4.0)	0.22
Mid	9512 (4.4)	11639 (1.8)	0.15	1843 (2.5)	8424 (0.8)	0.13	520 (4.6)	1133 (2.0)	0.15
NOS	22282 (10.3)	24059 (3.8)	0.25	3847 (5.3)	13353 (1.3)	0.22	1073 (9.5)	1748 (3.0)	0.27
Sequential	8434 (3.9)	3351 (0.5)	0.23	963 (1.3)	1082 (0.1)	0.14	363 (3.2)	214 (0.4)	0.22
Outlet	990 (0.5)	417 (0.1)	0.08	97 (0.1)	107 (0.0)	0.05	36 (0.3)	24 (0.0)	0.07
Low	3359 (1.5)	1489 (0.2)	0.14	333 (0.5)	374 (0.0)	0.08	154 (1.4)	93 (0.2)	0.14
Mid	2170 (1.0)	779 (0.1)	0.12	288 (0.4)	310 (0.0)	0.08	101 (0.9)	62 (0.1)	0.11
NOS	1915 (0.9)	666 (0.1)	0.11	245 (0.3)	291 (0.0)	0.07	72 (0.6)	35 (0.1)	0.10
Maternal age (yr)									
< 20	14270 (6.6)	60164 (9.5)	0.11	440 (0.6)	13310 (1.3)	0.07	83 (0.7)	416 (0.7)	0.00
20-24	40491 (18.6)	138337 (21.8)	0.08	5126 (7.0)	124661 (12.4)	0.18	923 (8.2)	5242 (9.1)	0.03
25-29	75198 (34.6)	213014 (33.6)	0.02	17561 (24.1)	285866 (28.4)	0.10	2843 (25.3)	14941 (26.1)	0.02
30-34	63407 (29.2)	165530 (26.1)	0.07	29248 (40.1)	363102 (36.1)	0.08	4497 (40.0)	22157 (38.7)	0.03
35-39	20583 (9.5)	49199 (7.8)	0.06	16968 (23.3)	184173 (18.3)	0.12	2490 (22.2)	12261 (21.4)	0.02
40-44	3164 (1.5)	7027 (1.1)	0.03	3479 (4.8)	33788 (4.8)	0.07	389 (3.5)	2205 (3.8)	0.02
≥45	139 (0.1)	253 (0.0)	0.01	154 (0.2)	1406 (0.2)	0.02	15 (0.1)	98 (0.2)	0.01
Parity									
1	0 (0.0)	0 (0.0)	NE	59046 (80.9)	597922 (59.4)	0.48	8820 (78.5)	28215 (49.2)	0.64
2	0 (0.0)	0 (0.0)	NE	13130 (18.0)	344629 (34.2)	0.38	2284 (20.3)	22868 (39.9)	0.44
3	0 (0.0)	0 (0.0)	NE	800 (1.1)	63755 (6.3)	0.28	136 (1.2)	6237 (10.9)	0.41
Induction	57151 (26.3)	156452 (24.7)	0.04	17712 (24.3)	228992 (22.8)	0.04	1816 (16.2)	10418 (18.2)	0.05
Epidural	125166 (57.6)	350495 (55.3)	0.05	31809 (43.6)	379050 (37.7)	0.12	6281 (55.9)	27871 (48.6)	0.15
Prolonged 2 nd stage	30014 (13.8)	39435 (6.2)	0.25	2568 (3.5)	10530 (1.0)	0.17	1387 (12.3)	2803 (4.9)	0.27
Fetal distress	91783 (42.2)	171144 (27.0)	0.32	20659 (28.3)	168566 (16.8)	0.28	4898 (43.6)	14754 (25.7)	0.38
Birth weight (g)									
<2500	3571 (1.6)	13926 (2.2)	0.04	719 (1.0)	13376 (1.3)	0.03	160 (1.4)	858 (1.5)	0.01
2500-2499	34302 (15.8)	113683 (17.9)	0.06	8019 (11.0)	127689 (12.7)	0.05	1580 (14.1)	8160 (14.2)	0.01
2500-2999	90424 (41.6)	274602 (43.3)	0.03	26184 (35.9)	384506 (38.2)	0.05	4371 (38.9)	22673 (39.6)	0.01

3000-3499	68037 (31.3)	184641 (29.1)	0.05	25831 (35.4)	345889 (34.4)	0.02	3767 (33.5)	18959 (33.1)	0.01
3500-3999	18438 (8.5)	42023 (6.6)	0.07	10055 (13.8)	115043 (11.4)	0.07	1163 (10.3)	5682 (9.9)	0.01
≥4000	2480 (1.1)	4649 (0.7)	0.04	2168 (3.0)	19803 (2.0)	0.06	199 (1.8)	988 (1.7)	0.00
Province									
ON	147611 (67.9)	402308 (63.5)	0.09	52721 (72.2)	611495 (60.8)	0.25	6721 (59.8)	31236 (54.5)	0.11
MB	17854 (8.2)	40682 (6.4)	0.07	5192 (7.1)	85431 (8.5)	0.05	1358 (12.1)	5729 (10.0)	0.07
SK	12583 (5.8)	41027 (6.5)	0.03	3538 (4.8)	76949 (7.6)	0.12	785 (7.0)	5153 (9.0)	0.07
AB	39204 (18.0)	149507 (23.6)	0.14	11525 (15.8)	232431 (23.1)	0.19	2376 (21.1)	15202 (26.5)	0.13
Year of delivery									
2004	18086 (8.3)	37939 (6.0)	0.09	7247 (9.9)	62085 (6.2)	0.14	884 (7.9)	3159 (5.5)	0.09
2005	17230 (7.9)	39989 (6.3)	0.06	6625 (9.1)	65415 (6.5)	0.10	775 (6.9)	3403 (5.9)	0.04
2006	16851 (7.8)	41513 (6.6)	0.05	6160 (8.4)	66395 (6.6)	0.07	748 (6.7)	3320 (5.8)	0.04
2007	17128 (7.9)	43521 (6.9)	0.04	6132 (8.4)	70366 (7.0)	0.05	794 (7.1)	3563 (6.2)	0.03
2008	16859 (7.8)	44856 (7.1)	0.03	5968 (8.2)	71885 (7.1)	0.04	769 (6.8)	3725 (6.5)	0.01
2009	16336 (7.5)	46728 (7.4)	0.01	5485 (7.5)	72890 (7.2)	0.01	853 (7.6)	4022 (7.0)	0.02
2010	15836 (7.3)	45761 (7.2)	0.00	5222 (7.2)	72878 (7.2)	0.00	788 (7.0)	4039 (7.0)	0.00
2011	15673 (7.2)	46520 (7.3)	0.00	5138 (7.0)	73478 (7.3)	0.01	773 (6.9)	4131 (7.2)	0.01
2012	15349 (7.1)	47294 (7.5)	0.02	5025 (6.9)	74072 (7.4)	0.02	780 (6.9)	4304 (7.5)	0.02
2013	14517 (6.7)	48112 (7.6)	0.04	4392 (6.0)	73944 (7.3)	0.05	835 (7.4)	4495 (7.8)	0.02
2014	14164 (6.5)	48849 (7.7)	0.05	4203 (5.8)	74940 (7.4)	0.07	813 (7.2)	4663 (8.1)	0.03
2015	13654 (6.3)	48166 (7.6)	0.05	3984 (5.5)	76200 (7.6)	0.09	802 (7.1)	4679 (8.2)	0.04
2016	13111 (6.0)	47695 (7.5)	0.06	3830 (5.2)	76083 (7.6)	0.09	821 (7.3)	4895 (8.5)	0.05
2017	12458 (5.7)	46581 (7.4)	0.07	3565 (4.9)	75675 (7.5)	0.11	805 (7.2)	4922 (8.6)	0.05

VBAC, Vaginal birth after cesarean, NOS, Not otherwise specified; CD, cesarean delivery; Std. diff, standardized difference; NE, not estimable.

*Term singleton deliveries, Canada, 2002-2017, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

†Std. diff. values are a measure of the average difference between means expressed in standard deviation units.

The Std. diff is the difference between the two groups, divided by their average standard deviation. Std. diff values of > 0.1 are considered indicative of a significant difference between groups.

Table S4. Rate of episiotomy and rate differences among women delivering singleton term infants, Canada, 2004-2017

Mode of delivery	Rate of episiotomy per 100 deliveries															Rate diff	% Change	P-value*
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017				
All vaginal	19.6	17.8	17.1	16.4	15.7	14.9	14.5	14.2	13.8	12.9	12.5	12.1	11.8	11.4	-8.2	-41.8	<.0001	
SVD	13.5	12.2	11.3	10.8	10.3	9.7	9.4	9.2	8.8	8.1	7.7	7.3	7.0	6.5	-7.0	-51.9	<.0001	
OVD	53.1	50.3	49.8	48.7	47.0	45.2	45.8	43.9	43.8	43.3	43.0	43.2	42.1	43.2	-9.9	-18.6	<.0001	
Forceps	72.6	71.0	69.9	68.4	68.1	65.9	65.8	64.1	63.8	61.7	61.0	61.2	59.4	61.1	-11.5	-15.8	<.0001	
Outlet	68.6	66.8	62.3	67.3	65.4	61.3	63.8	61.4	61.8	60.1	59.5	59.3	58.9	57.5	-11.1	-16.2	0.08	
Low	72.0	70.5	69.1	69.2	67.8	66.7	65.8	63.2	61.8	60.7	58.9	59.2	57.1	59.5	-12.4	-17.4	<.0001	
Midpelvic	74.0	72.0	71.9	67.6	69.0	65.6	66.2	65.6	67.0	63.8	64.8	65.5	64.4	65.8	-8.1	-11.1	<.0001	
Vacuum	43.6	40.5	40.9	40.3	38.5	37.1	37.7	36.0	35.9	35.7	35.5	35.2	34.8	35.3	-8.3	-19.0	<.0001	
Outlet	39.5	34.6	33.0	35.2	35.0	34.1	35.1	33.9	34.9	32.9	31.3	31.4	31.5	32.5	-7.0	-17.7	0.006	
Low	43.0	40.0	40.6	40.7	39.4	38.6	39.4	37.6	36.5	36.3	35.6	35.2	34.3	34.7	-8.4	-19.3	<.0001	
Midpelvic	46.7	41.5	42.1	40.0	36.9	33.9	35.4	34.0	33.0	32.9	35.4	33.0	33.1	31.9	-14.7	-31.7	<.0001	
NOS	44.2	42.6	44.3	42.8	40.1	38.5	38.2	36.0	37.1	37.5	37.1	37.8	37.3	38.5	-5.7	-12.9	<.0001	
Sequential	73.5	70.1	69.6	67.8	66.9	66.2	68.4	63.5	65.5	64.8	64.9	68.1	64.2	68.3	-5.2	-7.1	0.01	
Outlet	75.5	71.9	69.0	65.5	65.8	70.1	66.7	62.3	71.3	69.1	58.7	59.7	53.3	64.2	-11.2	-15.0	0.01	
Low	71.1	70.2	68.1	68.6	66.4	63.7	67.2	61.9	63.1	62.6	62.1	66.5	63.6	71.1	0.0	0.0	0.6	
Midpelvic	73.9	63.9	70.9	66.9	69.5	67.7	68.8	64.0	65.2	72.3	69.2	75.0	67.4	68.8	-5.0	-6.9	0.4	
NOS	75.3	75.1	70.9	69.2	64.9	67.1	71.8	68.1	66.7	60.5	70.9	69.6	68.6	64.3	-10.9	-14.6	0.01	

*2-sided P-value of Cochran-Armitage test for linear trend in proportions comparing episiotomy rates in 2017 to those in 2004.

SVD, Spontaneous vaginal delivery; OVD, Operative vaginal delivery; CI, confidence interval; NOS, Not otherwise specified.

Table S5. Rate of episiotomy and rate differences among nulliparous women delivering singleton term infants, Canada*, 2004-2017

Mode of delivery	Rate of episiotomy per 100 deliveries														Rate diff	% Change	P-value†
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017			
All vaginal	32.3	30.1	28.9	28.2	27.3	25.9	25.7	25.2	24.5	23.2	22.5	22.1	21.6	21.1	-11.2	-34.7	<.0001
SVD	22.7	21.1	19.6	19.1	18.3	17.5	17.2	16.8	16.0	14.8	14.1	13.5	13.1	12.3	-10.4	-45.8	<.0001
OVD	58.9	56.4	55.5	55.0	53.8	51.4	52.4	50.6	51.1	50.5	49.8	49.9	48.8	50.4	-8.5	-14.4	<.0001
Forceps	74.1	73.2	72.3	71.4	72.2	68.8	68.8	66.9	67.8	66.5	64.5	65.6	65.5	66.2	-7.9	-10.7	<.0001
Outlet	68.7	66.7	67.0	68.4	72.2	64.7	65.3	65.3	66.8	67.7	59.0	64.3	66.0	65.4	-3.3	-4.8	0.08
Low	73.4	73.4	71.7	73.5	72.2	69.7	68.8	66.7	66.3	65.2	62.6	63.3	63.0	64.4	-9.0	-12.3	<.0001
Midpelvic	75.6	73.9	73.5	69.5	72.1	68.3	69.2	67.3	70.3	68.5	68.7	70.6	70.8	71.0	-4.6	-6.1	<.0001
Vacuum	50.3	47.2	47.1	47.1	45.4	43.5	44.9	43.2	43.4	43.0	42.6	41.8	41.0	42.6	-7.7	-15.3	<.0001
Outlet	45.9	38.9	35.8	40.5	40.0	36.8	38.5	39.0	42.1	38.2	36.2	36.8	36.1	38.3	-7.6	-16.6	0.006
Low	49.0	45.0	46.2	45.8	45.3	44.0	45.5	43.6	42.4	42.6	42.0	40.1	39.0	40.3	-8.7	-17.8	<.0001
Midpelvic	54.2	51.3	48.5	47.9	45.3	42.5	44.5	43.1	42.3	40.7	43.6	41.5	41.0	41.2	-13.0	-24.0	<.0001
NOS	50.7	49.8	51.2	50.8	48.3	46.9	47.9	45.3	46.0	46.9	45.6	46.8	46.0	48.6	-2.1	-4.1	<.0001
Sequential	76.8	74.1	72.8	71.2	70.1	69.6	69.9	67.2	71.3	69.8	70.9	73.1	70.3	72.8	-4.0	-5.2	0.01
Outlet	79.8	76.7	69.4	67.0	67.2	74.8	69.6	66.7	76.9	74.1	63.9	63.6	58.9	70.8	-9.1	-11.3	0.01
Low	74.1	74.0	69.5	68.8	68.5	65.3	65.8	64.0	68.6	68.4	69.1	71.5	68.4	74.8	0.8	0.9	0.6
Midpelvic	76.7	67.7	77.0	72.5	74.2	70.2	71.6	70.2	71.9	75.9	77.2	81.1	73.9	74.3	-2.3	-3.1	0.4
NOS	79.0	79.6	75.3	75.9	68.9	75.7	77.3	70.6	72.2	65.6	73.7	73.7	77.1	68.9	-10.1	-12.8	0.01

*Term, singleton deliveries, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

†2-sided P-value of Cochran-Armitage test for linear trend in proportions comparing episiotomy rates in 2017 to those in 2004.

SVD, Spontaneous vaginal delivery; OVD, Operative vaginal delivery; NOS, Not otherwise specified.

Table S6. Rate of episiotomy and rate differences among parous women without a previous cesarean delivery, Canada*, 2004-2017

Mode of delivery	Rate of episiotomy per 100 deliveries														Rate diff	% Change	P-value†
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017			
All vaginal	10.5	9.2	8.5	8.0	7.7	7.0	6.7	6.5	6.4	5.6	5.3	5.0	4.8	4.5	-6.0	-57.1	<.0001
SVD	9.1	7.9	7.1	6.8	6.5	5.9	5.6	5.5	5.3	4.7	4.2	3.9	3.8	3.5	-5.7	-61.5	<.0001
OVD	30.7	29.2	28.7	27.2	25.3	23.9	24.3	23.4	23.4	22.1	22.9	22.3	22.8	22.9	-7.8	-25.4	<.0001
Forceps	55.8	56.0	53.0	52.3	46.2	45.4	48.0	44.9	43.6	46.0	48.2	45.4	45.0	46.4	-9.3	-16.8	<.0001
Outlet	58.2	64.1	34.6	57.1	50.0	37.0	53.7	43.2	38.7	37.5	46.3	39.0	36.8	37.5	-20.7	-35.6	0.006
Low	55.1	52.7	49.5	50.2	48.7	44.3	46.0	45.2	40.2	46.3	45.0	45.8	44.6	45.7	-9.4	-17.1	0.0003
Midpelvic	56.0	58.8	59.5	53.8	42.3	48.2	49.3	44.7	48.4	46.9	53.4	46.1	47.3	50.4	-5.7	-10.0	0.0004
Vacuum	24.9	23.3	23.7	22.5	21.3	20.1	20.0	20.0	20.1	17.7	18.6	18.0	19.0	19.0	-5.9	-23.7	<.0001
Outlet	21.7	24.8	21.2	19.9	19.4	19.8	21.4	21.2	18.4	18.2	17.2	14.8	19.4	17.4	-4.3	-19.8	0.0009
Low	22.4	22.0	21.4	23.1	23.0	20.8	22.0	21.8	21.3	17.7	18.8	18.6	19.1	18.8	-3.6	-16.1	<.0001
Midpelvic	25.1	19.6	24.0	22.8	17.5	16.7	17.5	15.9	16.3	15.9	15.9	13.9	15.6	15.3	-9.8	-39.0	<.0001
NOS	27.2	25.7	26.4	22.7	23.0	21.8	18.9	19.9	22.0	18.6	20.4	21.0	20.5	22.0	-5.2	-19.1	<.0001
Sequential	50.3	45.5	54.0	45.6	50.9	42.0	51.8	41.2	42.9	43.7	44.4	51.4	46.2	48.8	-1.5	-3.0	0.4
Outlet	43.8	42.1	66.7	60.0	71.4	35.7	52.4	41.7	77.8	52.9	34.8	40.0	30.8	33.3	-10.4	-24.0	0.1
Low	39.6	39.5	63.9	51.0	50.0	42.6	65.9	36.2	48.1	38.1	46.0	48.4	51.1	46.7	7.1	17.9	0.9
Midpelvic	67.9	42.9	49.1	40.0	47.9	43.2	42.9	38.6	46.0	55.9	39.5	60.5	47.1	55.2	-12.8	-18.7	0.8
NOS	43.5	55.1	48.7	40.0	48.9	42.4	44.4	53.6	22.9	37.8	51.1	50.0	44.7	51.4	7.9	18.2	0.8

*Term, singleton deliveries, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

†2-sided P-value of Cochran-Armitage test for linear trend in proportions comparing episiotomy rates in 2017 to those in 2004.

SVD, Spontaneous vaginal delivery; OVD, Operative vaginal delivery; NOS, Not otherwise specified.

Table S7. Rate of episiotomy and rate differences among parous women with a VBAC, Canada*, 2004-2017

Mode of delivery	Rate of episiotomy per 100 deliveries														Rate diff	% Change	P-value†
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017			
All vaginal	21.9	18.6	18.4	18.2	17.1	17.5	16.3	15.8	15.3	15.7	14.9	14.6	14.4	14.1	-7.8	-35.6	<.0001
SVD	15.6	13.3	12.5	12.4	11.3	11.5	10.3	10.2	9.8	9.8	9.1	8.8	8.6	8.1	-7.5	-48.1	<.0001
OVD	46.8	42.3	43.1	44.7	41.4	43.3	40.7	39.9	39.4	40.5	40.0	41.7	39.9	41.6	-5.3	-11.1	0.002
Forceps	69.5	61.3	66.7	58.8	65.4	62.6	62.9	60.3	59.4	57.7	60.2	62.0	58.4	57.9	-11.5	-16.7	0.006
Outlet	85.7	58.3	50.0	53.9	33.3	55.6	56.3	53.9	66.7	50.0	75.0	66.7	75.0	66.7	-19.0	-22.2	0.4
Low	70.5	62.7	70.4	57.1	64.7	66.4	66.1	59.0	57.7	58.0	58.7	60.9	56.4	53.8	-16.7	-23.7	0.001
Midpelvic	66.4	59.8	65.2	60.9	70.5	59.0	60.4	62.5	60.8	58.2	60.6	62.8	60.3	64.5	-1.9	-2.9	0.5
Vacuum	36.3	33.9	34.0	38.2	33.0	35.7	31.4	31.8	32.6	32.9	31.3	32.2	31.6	34.0	-2.3	-6.3	0.03
Outlet	30.6	21.3	16.7	22.2	39.6	31.9	29.6	27.7	24.6	34.8	28.6	34.4	31.1	26.3	-4.3	-14.1	0.3
Low	35.4	33.5	29.4	41.2	28.0	37.2	26.3	31.4	31.5	30.4	30.3	28.1	33.3	32.6	-2.8	-7.9	0.3
Midpelvic	42.2	27.9	32.4	38.4	32.8	33.1	33.3	31.8	28.8	29.7	29.1	27.3	20.6	29.8	-12.4	-29.4	0.003
NOS	35.4	39.3	44.3	41.5	34.7	37.8	37.4	34.9	41.2	36.7	34.9	39.0	34.6	41.5	6.1	17.2	0.7
Sequential	73.7	57.6	47.6	64.2	54.1	59.5	82.4	51.5	50.0	64.6	64.6	72.2	68.1	68.8	-4.9	-6.6	0.2
Outlet	100.0	66.7	25.0	80.0	33.3	75.0	100.0	50.0	50.0	60.0	0.0	100.0	42.9	40.0	-60.0	-60.0	0.2
Low	78.6	66.7	47.6	60.0	56.3	56.5	68.8	63.6	47.1	55.0	62.5	73.3	68.4	76.2	-2.4	-3.1	0.3
Midpelvic	58.3	66.7	60.0	55.0	53.9	50.0	90.9	41.7	40.0	83.3	66.7	50.0	80.0	71.4	13.1	22.5	0.2
NOS	75.0	33.3	42.9	75.0	60.0	100.0	100.0	50.0	66.7	63.6	85.7	72.7	72.7	62.5	-12.5	-16.7	0.3

*Term, singleton deliveries, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

†2-sided P-value of Cochran-Armitage test for linear trend in proportions comparing episiotomy rates in 2017 to those in 2004.

SVD, Spontaneous vaginal delivery; OVD, Operative vaginal delivery; NOS, Not otherwise specified.

Table S8. Rate of obstetric anal sphincter injury (OASI) per 100 deliveries among vaginal deliveries, Canada*, 2004-2017

Mode of vaginal delivery	Rate of OASI per 100 deliveries														Rate diff	P-value†
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
Nulliparous - Epis	6.0	6.2	6.1	5.9	6.0	6.4	6.9	7.0	7.1	6.9	6.9	6.9	7.4	7.2	1.2	<0.0001
Nulliparous + Epis	10.4	9.8	9.6	10.6	10.5	10.6	11.2	11.4	11.2	11.1	12.0	12.0	11.7	11.1	0.7	<0.0001
Parous no CD - Epis	1.2	1.2	1.2	1.1	1.2	1.3	1.3	1.3	1.4	1.4	1.4	1.3	1.4	1.4	0.2	<0.0001
Parous no CD + Epis	3.5	3.6	4.0	3.4	4.0	4.2	4.3	4.9	4.7	5.4	4.8	4.5	4.9	5.0	1.5	<0.0001
VBAC - Epis	5.0	4.8	5.4	4.4	4.8	5.7	6.2	6.9	5.3	6.4	6.1	5.7	6.1	5.9	0.9	<0.0001
VBAC + Epis	11.4	11.1	12.4	10.0	9.6	10.9	12.7	11.9	12.6	11.9	11.9	13.1	11.1	12.1	0.7	<0.0001
Nulliparous women																
Mode of vaginal delivery	Rate of OASI per 100 deliveries														Rate diff	P-value†
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2014	2016	2017		
SVD - Epis	4.2	4.2	4.1	4.2	4.2	4.5	4.9	4.9	5.1	4.8	4.9	5.1	5.4	5.3	1.1	<0.0001
SVD + Epis	5.8	5.8	5.3	5.5	5.8	5.7	6.4	6.5	5.8	6.1	7.1	6.2	6.3	6.0	0.2	0.0003
Forceps - Epis	23.3	25.8	26.1	24.4	26.7	26.3	29.3	28.1	29.4	32.1	29.1	29.3	32.9	32.6	9.3	<0.0001
Forceps + Epis	16.5	16.7	16.0	18.3	17.6	18.1	19.8	19.0	19.6	19.6	20.0	23.2	20.3	19.2	2.7	<0.0001
Vacuum - Epis	13.4	13.6	13.6	12.4	12.2	13.0	14.5	14.6	14.9	14.6	14.5	13.5	14.7	14.3	0.9	<0.0001
Vacuum + Epis	13.1	11.2	11.4	13.0	12.4	12.8	13.1	13.6	13.7	12.4	13.7	12.2	13.0	11.7	-1.4	0.3
Sequential - Epis	26.3	30.9	30.3	30.5	34.8	39.6	38.2	35.0	37.0	30.1	30.9	35.5	36.4	40.9	14.6	0.006
Sequential + Epis	22.7	22.2	21.1	25.4	25.0	26.6	23.1	26.8	25.5	27.8	24.2	24.5	26.0	23.4	0.7	0.06
Parous women without previous cesarean delivery																
Mode of vaginal delivery	Rate of OASI per 100 deliveries														Rate diff	P-value†
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2014	2016	2017		
SVD - Epis	1.1	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.1	1.2	1.1	1.2	1.2	0.1	<0.0001
SVD + Epis	2.5	2.5	2.7	2.3	2.7	2.9	3.1	3.5	3.3	3.8	3.4	2.9	2.9	3.1	0.6	<0.0001
Forceps - Epis	7.6	5.9	8.3	9.1	11.8	6.5	12.2	11.1	11.1	12.8	12.3	9.0	15.3	16.9	9.3	<0.0001
Forceps + Epis	9.3	10.1	11.5	8.9	12.3	12.7	10.0	12.8	10.4	11.7	12.0	12.0	14.7	14.4	5.1	0.02
Vacuum - Epis	4.0	4.3	3.6	3.7	4.0	4.1	4.5	5.1	4.2	5.5	4.8	4.3	4.9	5.0	1	0.0002
Vacuum + Epis	6.4	6.3	7.1	7.0	7.1	7.0	8.0	8.5	9.2	9.4	7.4	7.8	8.5	7.1	0.7	0.03
Sequential - Epis	14.8	16.5	14.3	7.4	21.3	17.5	8.7	13.0	10.5	16.5	18.1	9.9	19.7	11.1	-3.7	0.9
Sequential + Epis	17.1	19.7	17.6	13.2	20.5	19.0	17.6	20.4	17.5	25.8	14.7	14.7	21.3	28.3	11.2	0.3

Women with a VBAC																
Mode of vaginal delivery	Rate of OASI per 100 deliveries														Rate diff	P-value†
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2014	2016	2017		
SVD - Epis	4.1	3.2	3.9	3.3	3.4	4.1	4.3	5.4	3.8	4.5	4.5	3.9	4.3	4.4	0.3	0.003
SVD + Epis	8.5	7.3	8.3	6.3	5.6	6.0	5.3	8.9	7.6	8.6	8.4	7.3	6.0	6.3	-2.2	0.7
Forceps - Epis	12.3	25.3	20.9	24.0	20.0	25.3	28.2	26.3	29.9	34.3	26.5	30.0	32.1	29.3	17	0.002
Forceps + Epis	14.2	17.6	25.4	15.9	15.9	18.0	25.7	18.1	21.3	20.4	18.8	21.5	15.7	17.8	3.6	0.7
Vacuum - Epis	10.5	12.5	13.9	9.4	11.2	14.2	15.7	14.3	11.7	14.7	15.2	15.8	15.2	12.3	1.8	0.03
Vacuum + Epis	15.8	14.8	11.4	11.9	11.7	15.7	14.7	13.6	15.0	12.2	12.4	13.8	13.2	15.2	-0.6	0.9
Sequential - Epis	30.0	42.9	18.2	26.3	35.3	29.4	50.0	37.5	36.8	35.3	17.7	30.0	20.0	60.0	30	0.5
Sequential + Epis	17.9	26.3	20.0	26.5	30.0	16.0	35.7	11.8	31.6	12.9	19.4	42.3	37.5	30.3	12.4	0.1

*Term, singleton deliveries, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

†2-sided P-value of Cochran-Armitage test for linear trend in proportions comparing episiotomy rates in 2014 to those in 2004.

SVD, Spontaneous vaginal delivery; OVD, Operative vaginal delivery; NOS, Not otherwise specified.

Table S9. Adjusted rate ratios (ARR) and 95% confidence intervals (CI) expressing the association between episiotomy and obstetric anal sphincter injury (OASI) among term, singleton, vaginal deliveries, Canada, 2004-2017

	SVD			Forceps			Vacuum			Sequential		
	OASI rate (%)		ARR* (95% CI)	OASI rate (%)		ARR (95% CI)	OASI rate (%)		ARR* (95% CI)	OASI rate (%)		ARR* (95% CI)
	Epis no	Epis yes		Epis no	Epis yes		Epis no	Epis yes		Epis no	Epis yes	
Newfoundland	1.1	1.8	1.52 (1.06-2.18)	22.4	10.4	0.42 (0.28-0.62)	4.5	4.9	1.10 (0.77-1.57)	28.4	12.4	0.22 (0.07-0.64)†
PEI	2.2	7.2	3.24 (2.17-4.84)	36.1	33.0	1.76 (0.73-4.25)	4.0	8.7	1.25 (1.03-1.52)	28.6	21.7	0.33 (0.02-4.52)
Nova Scotia	2.3	4.6	1.96 (1.70-2.27)	27.0	24.0	0.89 (0.71-1.12)	9.4	11.6	1.81 (1.47-2.23)	28.3	35.0	1.60 (0.98-2.62)
New Brunswick	2.5	5.2	1.75 (1.46-2.11)	24.3	21.8	0.77 (0.60-0.99)	9.5	15.6	1.08 (1.03-1.12)	30.5	33.7	1.22 (0.75-1.98)
Ontario	2.3	4.2	1.84 (1.78-1.91)	20.2	14.3	0.65 (0.61-0.70)	10.5	11.1	1.07 (0.92-1.24)	25.3	20.3	0.76 (0.67-0.87)
Manitoba	2.5	5.6	2.11 (1.92-2.31)	33.4	27.9	0.81 (0.65-0.99)	11.1	13.2	1.27 (1.14-1.40)	34.4	31.9	0.81 (0.50-1.32)
Saskatchewan	2.8	6.6	2.47 (2.22-2.74)	30.6	34.5	1.34 (1.12-1.60)	14.2	17.2	1.34 (1.25-1.45)	43.5	35.9	0.75 (0.60-0.94)
Alberta	2.7	7.7	2.92 (2.75-3.11)	30.2	24.0	0.74 (0.68-0.80)	9.9	13.1	1.34 (1.25-1.45)	27.5	24.7	0.90 (0.75-1.08)
BC	2.7	5.1	1.92 (1.77-2.07)	25.6	20.6	0.76 (0.69-0.83)	9.2	11.9	1.33 (1.23-1.44)	24.6	25.3	1.08 (0.88-1.33)
Territories	1.9	5.2	2.79 (1.43-5.44)	41.7	30.0	0.29 (0.05-1.87)	8.6	15.8	1.84 (1.08-3.14)	38.9	29.2	0.57 (0.13-2.48)‡
CANADA	2.4	4.8	2.06 (2.00-2.11)	24.3	18.1	0.74 (0.71-0.77)	10.2	11.9	1.19 (1.16-1.23)	28.0	24.6	0.87 (0.80-0.94)

SVD, Spontaneous vaginal delivery; CD, cesarean delivery; VBAC, vaginal birth after cesarean; Epis, episiotomy.

*The reference group included deliveries without episiotomy within each respective delivery group, i.e., reference group for forceps deliveries among nulliparous women included forceps deliveries without episiotomy among nulliparous women.

Models adjusted for maternal age, labour induction, prolonged 2nd stage of labour, epidural anesthesia, infant birth weight, and year of birth

†Adjusted for labour induction, prolonged 2nd stage of labour, epidural anesthesia, and infant birth weight.

‡Adjusted for labour induction, prolonged 2nd stage of labour and epidural anesthesia.

Table S10. Adjusted rate ratios (ARR) and 95% confidence intervals (CI) expressing the association between episiotomy and obstetric anal sphincter injury (OASI) among term, singleton, vaginal deliveries, Canada, 2004-2017

	Nulliparous			Parous					
				No previous CD			VBAC		
	OASI rate (%)		ARR* (95% CI)	OASI rate (%)		ARR* (95% CI)	OASI rate (%)		ARR* (95% CI)
Epis No	Epis Yes	Epis No		Epis Yes	Epis No		Epis Yes		
All vaginal deliveries	6.7	10.9	1.57 (1.55-1.60)	1.3	4.3	3.12 (2.99-3.25)	5.7	11.6	2.03 (1.90-2.18)
SVD	4.7	6.0	1.25 (1.21-1.28)	1.1	2.9	2.55 (2.42-2.69)	4.1	7.2	1.77 (1.58-1.97)
All OVD	17.0	15.7	0.90 (0.88-0.93)	5.2	9.2	1.83 (1.71-1.96)	16.2	16.5	1.03 (0.93-1.13)
Forceps	28.4	18.7	0.63 (0.61-0.66)	10.6	11.4	1.16 (1.00-1.34)	26.8	19.1	0.71 (0.60-0.85)
Outlet	24.8	16.3	0.58 (0.48-0.70)	12.3	8.6	0.62 (0.34-1.12)	28.0	18.8	0.47 (0.23-1.00)
Low	28.6	18.7	0.61 (0.58-0.65)	10.3	11.7	1.22 (1.00-1.50)	26.5	18.5	0.70 (0.55-0.89)
Mid	28.8	19.2	0.65 (0.61-0.70)	10.6	11.5	1.16 (0.92-1.47)	27.0	19.8	0.73 (0.55-0.97)
Vacuum	13.8	12.7	0.88 (0.85-0.91)	4.4	7.6	1.71 (1.57-1.87)	13.5	13.7	1.00 (0.88-1.14)
Outlet	13.3	11.2	0.80 (0.73-0.88)	4.0	6.4	1.74 (1.33-2.27)	13.2	9.8	0.69 (0.45-1.05)
Low	14.1	13.0	0.88 (0.84-0.93)	4.7	8.3	1.83 (1.58-2.10)	13.3	13.7	0.99 (0.80-1.25)
Mid	15.2	13.4	0.83 (0.77-0.90)	4.2	7.5	1.77 (1.43-2.19)	13.9	16.9	1.21 (0.89-1.64)
NOS	13.1	12.5	0.92 (0.87-0.97)	4.5	7.2	1.58 (1.36-1.83)	13.7	13.4	0.95 (0.75-1.19)
Sequential	33.8	24.4	0.66 (0.60-0.72)	14.4	18.9	1.51 (1.18-1.92)	32.2	25.9	0.70 (0.47-1.05)
Outlet	27.1	22.4	0.73 (0.55-0.96)	14.0	18.6	1.00 (0.42-2.34)	29.2	27.8	0.95 (0.29-3.12)
Low	37.4	24.8	0.58 (0.51-0.67)	16.6	17.7	1.17 (0.77-1.79)	33.3	27.9	0.69 (0.37-1.30)
Mid	31.1	24.3	0.71 (0.59-0.85)	12.3	19.1	2.17 (1.33-3.55)	33.9	19.8	0.38 (0.15-0.97)
NOS	33.3	25.0	0.69 (0.57-0.84)	14.1	20.4	1.49 (0.92-2.41)	28.6	29.2	0.91 (0.31-2.64)

SVD, Spontaneous vaginal delivery; Operative vaginal delivery, (OVD); CD, cesarean delivery; VBAC, vaginal birth after cesarean; Ref, reference.

The reference group included deliveries without episiotomy within each respective delivery group, i.e., reference group for forceps deliveries among nulliparous women included forceps deliveries without episiotomy among nulliparous women.

Models adjusted for maternal age, labour induction, prolonged 2nd stage of labour, epidural anesthesia, infant birth weight, province and year of birth.

Table S11. Adjusted rate differences (ARDs) and 95% confidence intervals (CI) expressing the association between episiotomy and obstetric anal sphincter injury (OASI) by mode of delivery, and adjusted numbers needed to treat (NNTs), among vaginal deliveries, Canada*, 2004-2017

	Nulliparous		Parous			
	ARD (95% CI)	NNT/NNH	No previous CD		VBAC	
			ARD (95% CI)	NNT/NNH	ARD (95% CI)	NNT/NNH
SVD	1.18 (0.99 – 1.32)	-85	1.71 (1.56 – 1.86)	-59	3.16 (2.38 – 3.98)	-32
OVD	-1.70 (-2.04 – -1.19)	59	4.32 (3.69 – 4.99)	-23	0.49 (-1.13 – 2.11)	-206
Forceps	-10.5 (-11.1 – -9.66)	10	1.70 (0.00 – 3.60)	-59	-7.77 (-10.7 – -4.02)	13
Outlet	-10.4 (-12.9 – -7.44)	10	-4.67 (-8.12 – 1.48)	21	-14.8 (-21.6 – 0.00)	7
Low	-11.2 (-12.0 – -10.0)	9	2.27 (0.00 – 5.15)	-44	-7.95 (-11.9 – -2.92)	13
Mid	-10.1 (-11.2 – -8.64)	10	1.70 (-0.85 – 4.98)	-59	-7.29 (-12.2 – -0.81)	14
Vacuum	-1.66 (-2.07 – -1.24)	60	3.12 (2.51 – 3.83)	-32	0.00 (-1.62 – 1.89)	NE
Outlet	-2.66 (-3.59 – -1.60)	38	2.96 (1.32 – 5.08)	-34	-4.09 (-7.26 – 0.66)	24
Low	-1.69 (-2.54 – -0.99)	59	3.90 (2.73 – 5.17)	-26	-0.13 (-2.66 – 3.33)	752
Mid	-2.58 (-3.50 – -1.52)	39	3.23 (1.81 – 5.00)	-31	2.92 (-1.53 – 8.90)	-34
NOS	-1.05 (-1.70 – -0.39)	95	2.61 (1.62 – 3.74)	-38	-0.69 (-3.43 – 2.60)	146
Sequential	-11.5 (-13.5 – -9.46)	9	7.34 (2.59 – 13.3)	-14	-9.66 (-17.1 – 1.61)	10
Outlet	-7.32 (-12.2 – -1.08)	14	0.00 (-8.12 – 18.8)	NE	-1.46 (-20.7 – 61.9)	68
Low	-15.7 (-18.3 – -12.3)	6	2.82 (-3.82 – 13.1)	-35	-10.3 (-21.0 – 9.99)	10
Mid	-9.02 (-12.8 – -4.67)	11	14.4 (4.06 – 31.4)	-7	-21.0 (-28.8 – -1.02)	5
NOS	-10.3 (-14.3 – -5.33)	10	6.91 (-1.13 – 19.9)	-14	-2.57 (-19.7 – 46.9)	39

SVD, Spontaneous vaginal delivery; OVD, Operative vaginal delivery; CD, Cesarean delivery; VBAC, Vaginal birth after cesarean; Ref, Reference.

NNTs represent the number of women who deliver with an episiotomy vs without an episiotomy in order to avoid one case of OASI. Negative NNT values represent a number needed to harm (NNH), or the number of women who deliver with an episiotomy who would have to deliver without an episiotomy in order to avoid one case of OASI. For e.g., an NNT of 10 among nulliparous women, shows that 10 forceps deliveries with an episiotomy (rather than without an episiotomy) would have to be carried out to avoid one case of OASI.

The reference group includes deliveries without episiotomy within each OVD group, i.e., reference group for forceps deliveries is forceps deliveries without episiotomy.

Models adjusted for maternal age, labour induction, prolonged 2nd stage of labour, epidural anesthesia, infant birth weight, province and year of birth. ARDs calculated from baseline OASI rates and using adjusted rate ratios.

*Term, singleton deliveries, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

Table S12. Adjusted rate ratios (ARR) and 95% confidence intervals (CI) expressing the association between episiotomy and 3rd-degree and 4th-degree perineal lacerations among vaginal deliveries, Canada*, 2004-2017

	3 rd degree			4 th degree		
	OASI rate (%)		ARR* (95% CI)	OASI rate (%)		ARR* (95% CI)
	Epis No	Epis Yes		Epis No	Epis Yes	
Nulliparous						
SVD	4.3	5.2	1.20 (1.17-1.24)	0.4	0.7	1.56 (1.44-1.69)
OVD	14.6	13.3	0.91 (0.88-0.93)	2.2	2.1	0.91 (0.86-0.89)
Forceps	24.0	16.0	0.67 (0.64-0.70)	4.0	2.4	0.60 (0.54-0.66)
Vacuum	12.0	10.8	0.87 (0.84-0.90)	1.6	1.7	0.98 (0.90-1.06)
Sequential	26.4	20.2	0.74 (0.67-0.81)	6.9	3.8	0.54 (0.45-0.65)
Parous without previous CD						
SVD	1.1	3.7	2.54 (2.40-2.69)	0.1	0.4	2.99 (2.57-3.49)
OVD	4.3	7.8	1.87 (1.73-2.01)	0.8	1.3	1.47 (1.23-1.75)
Forceps	8.7	9.5	1.19 (1.02-1.39)	1.7	1.6	0.92 (0.65-1.30)
Vacuum	3.8	6.4	1.72 (1.56-1.89)	0.6	1.1	1.55 (1.24-1.94)
Sequential	10.6	16.5	1.83 (1.40-2.39)	3.8	2.2	0.58 (0.34-1.00)
VBAC						
SVD	5.1	10.1	1.76 (1.56-1.97)	0.3	0.7	1.89 (1.33-2.70)
OVD	14.2	14.2	1.00 (0.91-1.12)	1.8	2.2	1.21 (0.93-1.56)
Forceps	22.9	16.4	0.74 (0.61-0.89)	3.7	2.5	0.70 (0.46-1.07)
Vacuum	12.0	11.8	0.97 (0.84-1.12)	1.3	1.7	1.32 (0.91-1.90)
Sequential	25.7	21.5	0.69 (0.45-1.07)	6.5	4.4	0.66 (0.32-1.38)

SVD, Spontaneous vaginal delivery; OVD, Operative vaginal delivery; CD, cesarean delivery; VBAC, vaginal birth after cesarean; Ref, reference.

Reference group is deliveries without episiotomy within each respective OVD group, i.e., reference group for forceps deliveries is forceps deliveries without episiotomy.

Models adjusted for maternal age, induction, epidural, prolonged 2nd stage, infant birth weight, province of maternal residence and year of birth.

*Term, singleton deliveries, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

Table S13. Adjusted rate ratios (ARR) and 95% confidence intervals (CI) expressing the association between episiotomy and obstetric anal sphincter injury (OASI) among vaginal deliveries with fetal distress, Canada*, 2004-2017

	Nulliparous			Parous					
				No previous CD			VBAC		
	OASI Rate (%)		ARR* (95% CI)	OASI Rate (%)		ARR* (95% CI)	OASI Rate (%)		ARR* (95% CI)
Epis No	Epis Yes	Epis No		Epis Yes	Epis No		Epis Yes		
All vaginal deliveries	9.6	12.9	1.37 (1.33-1.40)	2.1	6.3	3.10 (2.89-3.31)	8.5	13.9	1.72 (1.55-1.91)
SVD	5.5	6.9	1.25 (1.19- 1.32)	1.3	3.8	2.88 (2.58-3.23)	4.9	7.3	1.54 (1.24-1.91)
OVD	16.4	15.6	0.94 (0.91-0.97)	5.0	9.1	1.87 (1.71-2.04)	15.1	16.9	1.14 (1.01-1.29)
Forceps	28.6	19.0	0.64 (0.60-0.67)	10.8	11.5	1.14 (0.95-1.37)	26.6	20.0	0.77 (0.62-0.96)
Outlet	26.1	16.0	0.55 (0.42-0.71)	11.3	11.1	0.97 (0.42-2.20)	34.0	22.2	0.30 (0.14-1.07) [†]
Low	28.8	19.1	0.63 (0.58-0.71)	11.1	11.3	1.09 (0.75-1.40)	25.6	19.3	0.76 (0.55-1.04)
Mid	28.8	19.1	0.64 (0.59-0.70)	10.4	11.7	1.21 (0.90-1.61)	26.9	20.5	0.78 (0.55-1.10)
Vacuum	13.2	12.2	0.89 (0.85-0.93)	4.3	7.2	1.67 (1.49-1.86)	12.4	13.8	1.10 (0.94-1.30)
Outlet	12.7	10.8	0.83 (0.74-0.93)	4.0	6.7	1.76 (1.28-2.43)	11.4	9.6	0.68 (0.39-1.19)
Low	13.5	12.6	0.90 (0.84-0.96)	4.7	7.8	1.69 (1.41-2.02)	12.3	14.5	1.17 (0.89-1.53)
Mid	14.1	13.0	0.87 (0.78-0.96)	4.0	7.1	1.73 (1.34-2.24)	13.7	15.8	1.11 (0.78-1.59)
NOS	12.5	11.9	0.92 (0.85-0.99)	4.3	6.9	1.60 (1.31-1.94)	11.9	13.4	1.11 (0.81-1.51)
Sequential	32.6	25.2	0.73 (0.65-0.82)	14.4	20.2	1.65 (1.23-2.22)	34.6	25.7	0.59 (0.35-0.97)
Outlet	27.1	24.1	0.76 (0.53-1.11)	13.2	17.5	1.17 (0.36-3.79)	30.8	36.4	1.29 (0.30-5.56) [‡]
Low	34.8	26.1	0.70 (0.59-0.83)	16.7	17.5	1.11 (0.67-1.85)	40.4	26.8	0.54 (0.27-1.08) [‡]
Mid	31.3	23.5	0.68 (0.54-0.86)	12.5	20.6	2.26 (1.26-4.05)	30.0	18.4	0.31 (0.10-0.96)
NOS	32.8	26.2	0.77 (0.60-1.01)	13.6	24.8	1.94 (1.03-3.63)	29.4	31.0	1.08 (0.31-3.69) [‡]

SVD, Spontaneous vaginal delivery; OVD, Operative vaginal delivery; CD, Cesarean delivery; VBAC, Vaginal birth after cesarean; NE, Not estimable due to small numbers. Reference group is deliveries without episiotomy within each respective OVD group, i.e., reference group for forceps deliveries is forceps deliveries without episiotomy. Models adjusted for maternal age, labour induction, prolonged 2nd stage of labour, epidural anesthesia, infant birth weight, province and year of birth.

*Term, singleton deliveries, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

[†]Models adjusted for maternal age, labour induction, prolonged 2nd stage of labour, epidural anesthesia, and infant birth weight.

[‡] Models unadjusted.

Table S14. Adjusted rate ratios (ARR) and 95% confidence intervals (CI) expressing the association between episiotomy and obstetric anal sphincter injury (OASI) in vaginal deliveries among parous women with one previous vaginal or cesarean delivery, Canada*, 2004-2017

	One previous vaginal delivery			One previous cesarean delivery (vaginal nulliparous)		
	OASI rate (%)		ARR* (95% CI)	OASI rate (%)		ARR* (95% CI)
	Epis No	Epis Yes		Epis No	Epis Yes	
All vaginal deliveries	1.3	4.3	3.12 (2.99-3.25)	5.7	11.6	2.03 (1.90-2.18)
SVD	1.1	2.9	2.55 (2.42-2.69)	4.1	7.2	1.77 (1.58-1.97)
OVD	5.2	9.2	1.83 (1.71-1.96)	16.2	16.5	1.03 (0.93-1.13)
Forceps	10.6	11.4	1.16 (1.00-1.34)	26.8	19.1	0.71 (0.60-0.85)
Outlet	12.3	8.7	0.61 (0.34-1.08)	28.0	18.8	0.60 (0.30-1.18)
Low	10.3	11.7	1.22 (0.99-1.50)	26.5	18.5	0.70 (0.55-0.89)
Mid	10.6	11.5	1.16 (0.92-1.47)	27.0	19.8	0.73 (0.55-0.97)
Vacuum	4.4	7.6	1.71 (1.57-1.87)	13.5	13.7	1.00 (0.88-1.14)
Outlet	4.0	6.4	1.74 (1.33-2.27)	13.2	9.8	0.69 (0.45-1.05)
Low	4.7	8.3	1.58 (1.32-1.90)	13.3	13.7	0.99 (0.80-1.25)
Mid	4.2	7.5	1.77 (1.43-2.19)	13.9	16.9	1.21 (0.89-1.64)
NOS	4.5	7.2	1.58 (1.36-1.83)	13.7	13.4	0.95 (0.75-1.19)
Sequential	14.4	18.9	1.51 (1.18-1.92)	32.2	25.9	0.70 (0.47-1.05)
Outlet	14.0	18.6	1.04 (0.45-2.42)	29.2	27.8	0.93 (0.30-2.93) [†]
Low	16.6	17.7	1.17 (0.77-1.79)	33.3	27.9	0.78 (0.44-1.35) [†]
Mid	12.3	19.1	2.17 (1.33-3.55)	33.9	19.8	0.43 (0.19-0.99)
NOS	14.1	20.4	1.49 (0.92-2.41)	28.6	29.2	1.03 (0.42-2.51) [†]

SVD, Spontaneous vaginal delivery; OVD, Operative vaginal delivery; CD, cesarean delivery; VBAC, vaginal birth after cesarean.

Reference group is deliveries without episiotomy within each respective OVD group, i.e., reference group for forceps deliveries is forceps deliveries without episiotomy.

Models adjusted for maternal age, labour induction, prolonged 2nd stage of labour, epidural anesthesia, infant birth weight, province and year of birth.

*Term, singleton deliveries, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

[†]Crude OR is reported because ARR was undefined due to small numbers.

Table S15. Adjusted rate ratios (ARR) and 95% confidence intervals (CI) expressing the association between episiotomy and obstetric anal sphincter injury (OASI) among term, singleton, vaginal deliveries by institutional delivery volume, Canada*, 2004-2014

	Institutional delivery volume								
	Low			Medium			High		
	OASI rate (%)		ARR [†] (95% CI)	OASI rate (%)		ARR [†] (95% CI)	OASI rate (%)		ARR [†] (95% CI)
	Epis no	Epis yes		Epis no	Epis yes		Epis no	Epis yes	
Nulliparous	n = 209 082			n = 264 958			n = 142 265		
SVD	3.8	5.2	1.37 (1.29-1.46)	5.1	5.9	1.14 (1.08-1.20)	4.7	6.4	1.42 (1.33-1.52)
Forceps	18.9	14.8	0.74 (0.66-0.82)	31.1	18.3	0.50 (0.46-0.54)	30.9	19.9	0.70 (0.63-0.77)
Vacuum	10.5	10.9	1.04 (0.97-1.11)	15.6	14.3	0.89 (0.84-0.94)	14.7	12.5	0.78 (0.72-0.84)
Sequential	27.1	21.2	0.76 (0.63-0.91)	38.6	25.6	0.62 (0.52-0.73)	31.8	26.3	0.75 (0.61-0.93)
Parous no CD	n = 264 013			n = 330 142			n = 184 237		
SVD	0.9	2.5	2.55 (2.27-2.85)	1.2	2.9	2.37 (2.15-2.60)	1.0	3.2	3.44 (3.06-3.86)
Forceps	7.2	8.6	1.26 (0.88-1.81)	10.0	11.2	1.13 (0.87-1.48)	13.3	11.7	1.25 (0.91-1.71)
Vacuum	3.2	5.6	1.81 (1.48-2.23)	5.1	8.6	1.74 (1.50-2.00)	4.4	8.1	1.90 (1.53-2.36)
Sequential	11.4	13.0	1.34 (0.74-2.40)	15.5	18.5	1.24 (0.81-1.89)	15.8	24.3	1.74 (0.97-3.14)
VBAC	n = 21 623			n = 14 941			n = 11 223		
SVD	3.7	6.4	1.83 (1.50-2.23)	4.8	8.4	1.84 (1.49-2.27)	3.9	6.9	1.56 (1.16-2.11)
Forceps	24.4	14.9	0.50 (0.34-0.75)	25.5	22.4	1.03 (0.73-1.45)	26.9	20.1	0.57 (0.37-0.89)
Vacuum	12.3	10.0	0.82 (0.64-1.05)	15.2	16.5	1.13 (0.86-1.49)	13.3	17.5	1.20 (0.86-1.66)
Sequential	30.9	19.6	0.55 (0.27-1.10) [‡]	27.7	25.9	0.92 (0.38-2.21) [‡]	34.0	21.4	0.53 (0.24-1.16) [‡]

SVD, Spontaneous vaginal delivery; CD, cesarean delivery; VBAC, vaginal birth after cesarean; Epis, episiotomy.

*Term, singleton deliveries, includes data from Alberta, Manitoba, Ontario and Saskatchewan.

†The reference group included deliveries without episiotomy within each respective delivery group, i.e., reference group for forceps deliveries among nulliparous women included forceps deliveries without episiotomy among nulliparous women.

Models adjusted for maternal age, labour induction, prolonged 2nd stage of labour, epidural anesthesia, infant birth weight, and year of birth

‡Unadjusted ARR due to low frequency of observations.

Table S16. E-values expressing the required rate ratio (RR) for any unmeasured confounder to overcome the observed association of episiotomy and OASI (obstetric anal sphincter injury) in this study

	Nulliparous		Parous				Parous (only one previous delivery)			
			No previous CD		VBAC		One previous vaginal delivery		One previous cesarean delivery	
	E-value		E-value		E-value		E-value		E-value	
	Point estimate (RR)	Upper confidence bound	Point estimate (RR)	Upper confidence bound	Point estimate (RR)	Upper confidence bound	Point estimate (RR)	Upper confidence bound	Point estimate (RR)	Upper confidence bound
SVD	1.81	1.71	4.54	4.27	2.94	2.54	4.54	4.27	2.94	2.54
Forceps	2.55	2.40	1.59	1.00	2.17	1.63	1.59	1.00	2.17	1.63
Vacuum	1.53	1.43	2.81	2.52	1.00	1.00	2.81	2.52	1.00	1.00
Sequential	2.40	2.12	2.39	1.64	2.21	2.21	2.39	1.64	2.21	1.00

SVD, Spontaneous vaginal delivery; CD, Cesarean delivery; VBAC, Vaginal birth after cesarean.

The E-value of the point estimate is the minimum strength of association on the rate ratio scale that an unmeasured confounder would need to have with both the exposure and the outcome, conditional on the measured covariates, to fully explain away a specific exposure-outcome association.

The E-value of the 95% upper confidence bound expresses the extent of unmeasured confounding that would be required to shift the confidence interval so that it includes a rate ratio of 1.00 (i.e., no association).

