Appendix 1A (as supplied by the authors): Diagnostic and procedural codes used to create the study cohort, identify exposure, comorbidity and outcome variables.

Assessment	Procedure, disease or demographic	Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS): CCI procedure codes or ICD-10-CA diagnosis codes	Ontario Health Insurance Plan (OHIP) Database: Professional Fee Code or ICD-9 diagnostic code	Other source
Cohort inclusion criteria	Induced abortion (IA) procedures between January 1, 2003 and December 31, 2015	CCI: 5CA89, 5CA88, 5CA20FK, 5CA24 and ICD-10: O04, O08	a) Fee Code: S785, A920, P001 and ICD-9: 635, 895; b) Fee Code: S752 and ICD-9: 635, 895	
Cohort exclusion criteria for mothers	Pharmaceutically induced abortion	CCI: 5CA88 and ICD-10: O04, O08;	Fee Code: A920, P001 and ICD-9: 635, 895;	
	Missing or invalid information on sex	--	--	RPDB
	Aged < 15 or > 49 years on index date	--	--	RPDB
	Missing information on neighborhood income	--	--	RPDB
	Missing information on gestation age	Variable "gestwks" in CHII DAD, NACRS	Fee Code: S752 (early IA <15 weeks gestation), S785 (late IA ≥15 weeks gestation)	
	Could not be linked to a physician		Physnum	
	Missing sex of the physician			
	Missing country of graduation of the physician			IPDB
Main exposure	Physician IA procedure volume		Surgical IA recorded in OHIP -- a) Fee Code: S785 and ICD-9: 635, 895; b) Fee Code: S752 and ICD-9: 635, 895	IPDB
Covariates	Woman's age on index date			RPDB
	Rural or urban residence			RPDB

Appendix to: Liu N, Vigod SN, Farrugia MM, et al. Physician procedure volume and related adverse events after surgically induced abortion: a population-based cohort study. *CMAJ* 2019. doi: 10.1503/cmaj.181288.

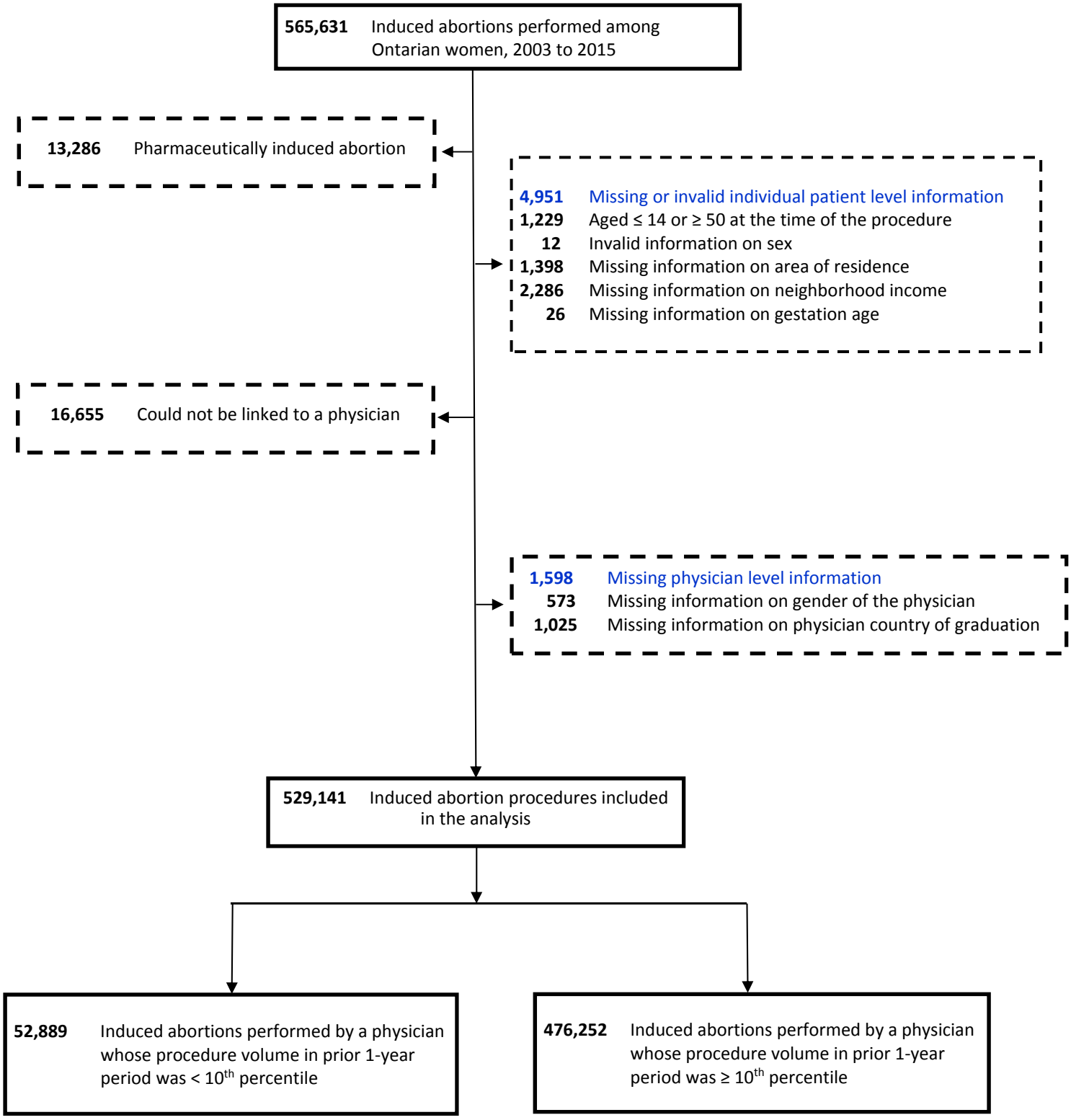
Appendix 1A (as supplied by the authors): Diagnostic and procedural codes used to create the study cohort, identify exposure, comorbidity and outcome variables.				
Assessment	**Procedure, disease or demographic**	**Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS):** CCI procedure codes or ICD-10-CA diagnosis codes	**Ontario Health Insurance Plan (OHIP) Database:** Professional Fee Code or ICD-9 diagnostic code	**Other source**
	Residential income			RPDB
	World region of origin			IRCC
	Pre-existing health problems in the 2 years before estimated index induced abortion procedure date, denoted by 29 Johns Hopkins Aggregated Diagnostic Groups	All ICD-9 and ICD-10 diagnosis codes identified from CIHI DAD and NACRS in the 2 years before EDC were supplied to the Johns Hopkins ACG System	All ICD-9 diagnosis codes from OHIP were supplied to the Johns Hopkins ACG System	
	Gestation weeks of induced abortion	Variable "gestwks" in CHII DAD, NACRS	Fee Code: S752 (early IA <15 weeks gestation), A920 (unknown gestation), P001 (late IA ≥15 weeks gestation), S785 (late IA ≥15 weeks gestation)	
	Nulliparous (Parity)			MOMBABY
	No. of prior IA	a) CCI: 5CA89, 5CA88, 5CA20FK, 5CA24 and ICD-10: O04, O08; b) CCP: 81.01, 87.0, 87.1, 87.21, 87.29 and ICD-9: 635 ; c) Variable "prevthabort" in DAD or NACRS.	a) Fee Code: S785, A920, P001 and ICD-9: 635, 895; b) Fee Code: S752 and ICD-9: 635, 895	
	Year when IA was performed	Varaibles "Indate1"-"indate20" in DAD/NACRS	Servdate in OHIP	
	Physician sex			IPDB
	Physician country of graduation			IPDB
	Physician's year of graduation			IPDB
	Physician specialty			IPDB
	Physician age			IPDB

Appendix 1A (as supplied by the authors): Diagnostic and procedural codes used to create the study cohort, identify exposure, comorbidity and outcome variables.				
Assessment	**Procedure, disease or demographic**	**Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS):** CCI procedure codes or ICD-10-CA diagnosis codes	**Ontario Health Insurance Plan (OHIP) Database:** Professional Fee Code or ICD-9 diagnostic code	**Other source**
Study outcomes	Severe adverse event 1) Severe maternal morbidity 2) Maternal end organ damage, or 3) Intensive care unit admission 4) Death	1) Severe maternal morbidity ICD-10: O22.5, O87.3, O29.0, O29.1, O29.2, O89.0, O89.1, O89.2, O74.0, O74.1, O74.2, O74.3, O71.0, O71.1, O72, O75.1, R57, T80.5, T88.6, O75.4, O85, O88, O90.4, N17, N19, N99.0, J80, K35, K37, K65, N73.3,N73.5, K71, K72, R96, R97, R98, R99 2) Maternal end organ damage ICD-10: I26, I46, I50, I97.8, I97.9, O75.4, K72.0, K72.9, O26.6, I21, I22, N17, O90.4, J80, J952, J95.3, J95.8, J95.9, J96.0, J96.9, R09.2, K72.9, R40.29, F05.0, F05.8, F05.9, D65, O72.3, G97.8, G97.9, I63, I97.9, O22.5, O22.8, O22.9, O87.3, O99.4, I50.1, J81, O88, A40, A41, B37.7, O75.3, R65.1, O75.1 R57, R65.1, T78.2, T80.5, T81.1, T88.2, T88.6 3) Intensive care unit admission CIHI DAD variable “SCU” with any of the value (10, 20, 25, 30, 35, 40, 45, 60, 80, 70) 4) Death from RPDB		RPDB

Appendix 1A (as supplied by the authors): Diagnostic and procedural codes used to create the study cohort, identify exposure, comorbidity and outcome variables.				
Assessment	**Procedure, disease or demographic**	**Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS):** CCI procedure codes or ICD-10-CA diagnosis codes	**Ontario Health Insurance Plan (OHIP) Database:** Professional Fee Code or ICD-9 diagnostic code	**Other source**
	Any adverse event 1) Severe adverse event 2) Haemorrhage 3) Retained products of conception 4) Infection 5) Red cell blood transfusion 6) Other	1) Severe adverse event as listed above 2) Haemorrhage ICD-10: O04.1, O04.6, O08.13 3) Retained products of conception ICD-10: O04.4 on transfer or readmission 4) Infection ICD-10: O04.0, O04.5, O080.3 5) Red cell blood transfusion CIHI DAD or NACRS variable "BTREDBC" = 1 6) Other ICD-10: O04.2, O04.3, O04.7, O04.8, O08.23, O08.33, O08.43, O08.53, O08.63, O08.73, O08.83, O08.93		

CCI: Canadian Classification of Health Interventions (CCI) codes
ICD-10-CA: International Classification of Diseases, 10th Revision, Canada;
RPDB: Registered Persons Database
IPDB: ICES Physician Database
IRCC: Immigration, Refugees and Citizenship Canada Permanent Resident database

Appendix 1B (as supplied by the authors): Flow chart of formation of the study cohort. Dashed boxes represent exclusions.



Appendix 1C (as supplied by the authors): Details of the methods for Analyses 1, and 3 to 10

Analysis 1: To assess the appropriateness of using the 10th percentile cut-point to define the "low" and "higher" physician procedure volume, this analysis treated physician procedure volume as a continuous variable, and used fractional polynomial methods to select the best-fitting transformation of this variable for describing its relation with both severe and any adverse event after induced abortion[21]. Generalized estimating equations (GEEs) with binomial distribution, logit link, exchangeable correlation structure, and robust standard errors generated the predicted probability of having severe and any adverse event with each unit increase in physician procedure volume, using the best-fitting transformation of physician procedure volume as the main predictor, adjusting for all covariates, and accounting for multiple procedures clustered within the same physician[22,23].

Analysis 3: To minimize misclassification on the exposure, the main model was further restricted to procedures performed by physicians who had been practicing in Ontario for the full 1-year period preceding the index procedure date.

Analyses 4a and 4b: The main model was also stratified by several procedure- and physician-level characteristics: the woman's age, immigrant status, parity, number of prior induced abortions, comorbidity scores, timing of the procedure, physician specialty, and location of the procedure.

Analysis 5: The main model was re-run by examining procedure volumes at < 5th, or 5th to 9th percentile, each relative to ≥ 10th percentile.

Analysis 6: The main model was re-run a broader threshold of low-volume group at < 10th, or 10th to 19th percentile, each relative to ≥ 20th percentile.

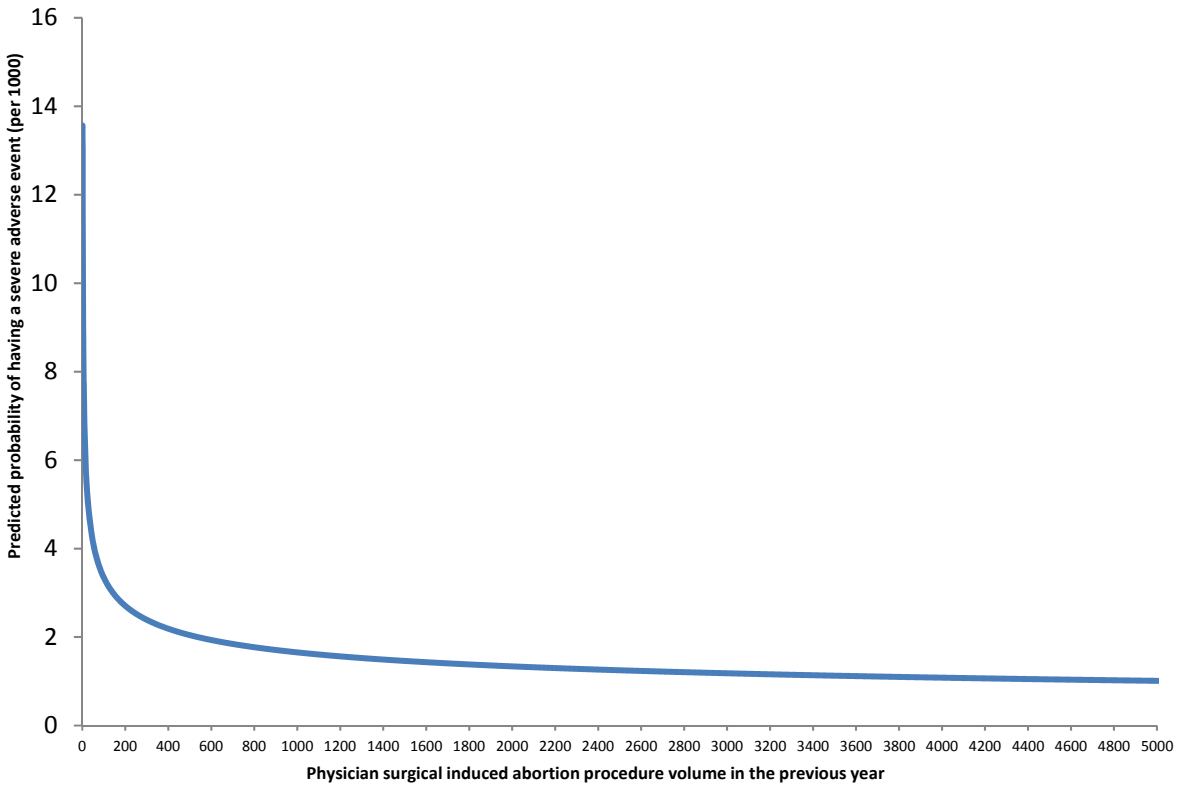
Analysis 7: Analysis 7 was restricted to procedures performed by physicians who had been practicing in Ontario for the full 2-year period preceding the index procedure date, and compared adverse events for procedures performed by a physician with a persistently low procedure volume versus procedures by a physician with a persistently higher volume.

"Persistently low procedure volume" was defined as that < 10th percentile between -730 days and -366 days before the index procedure date and also that in the period between -366 days and -1 day before the index procedure date. "Persistently higher procedure volume" was defined as that ≥ 10th percentile in both of the aforementioned antecedent time periods.

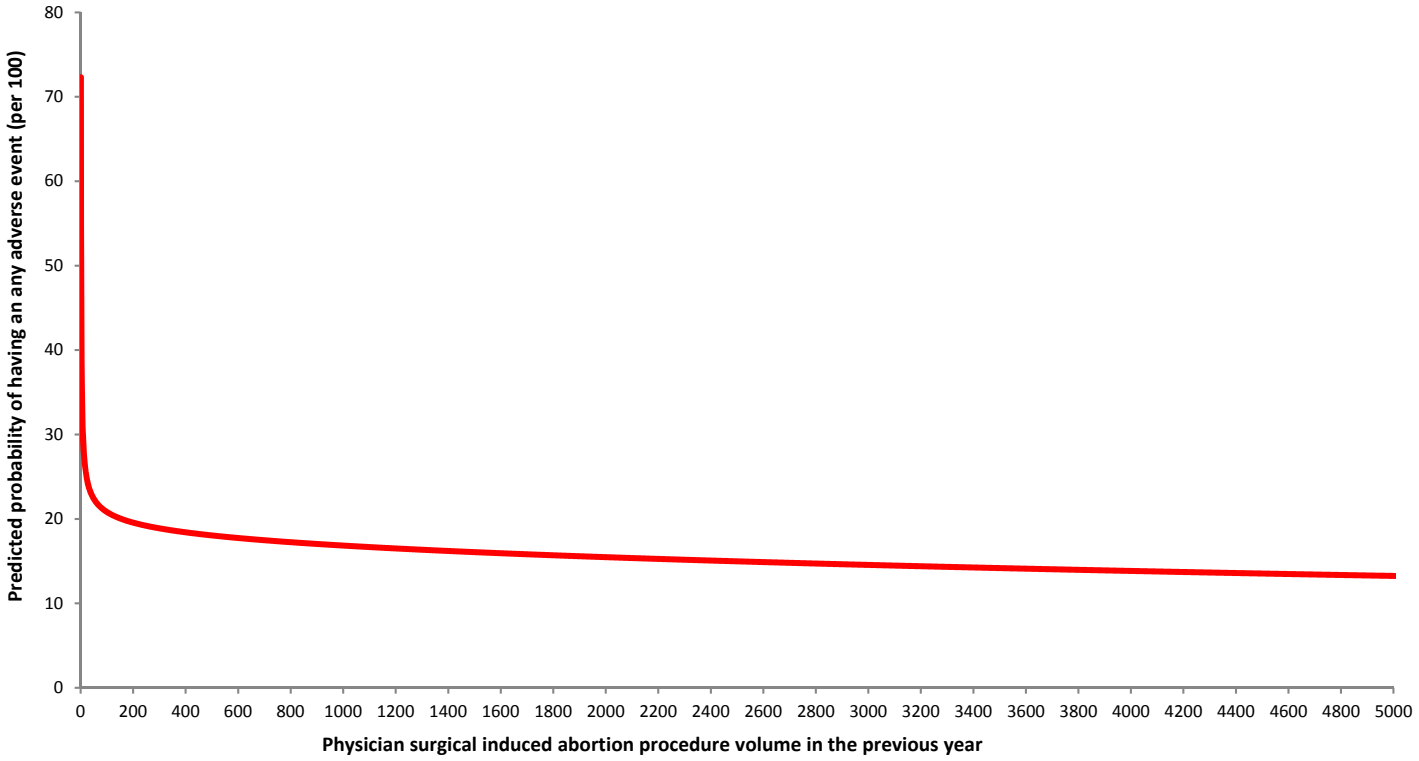
Analysis 8: It is unknown if, within a given woman who had multiple induced abortions, her risk of an adverse event might differ by her physician's procedure volume preceding each induced abortion. Accordingly, this analysis was limited to women who had ≥ 2 induced abortions during the study period, with at least one performed by a low-volume physician, and another by a higher-volume physician. For each woman, two induced abortions were randomly selected, one from a low-volume physician and the other from a higher-volume physician. GEE was used to compare the odds of an adverse event when the induced abortion was done by a low- vs. a higher-volume physician, accounting for two induced abortions clustered within the same woman.

Analyses 9 and 10: A sequence of multilevel logistic regression models were conducted to further explore heterogeneity for rates of severe adverse event (Analysis 9), and of any adverse event (Analysis 10) between different physicians, and variation in adverse event rates between physicians explained by patient/procedure-level and physician-level characteristics. In these models, the effect of physicians were assumed to follow a normal distribution and modeled as random effects (Model A). Procedure-level characteristics (Model B), and then also physician-level characteristics (Model C), were sequentially added to Model A. We calculated the variance of the physician-specific random effects in each model, and computed the proportion of physician-level variation explained by adding individual procedure-level and physician-level characteristics[24]. The median odds ratio (MOR), calculated from the variance of the physician-specific random effect in each model, quantified the heterogeneity in adverse event rates between different physicians[24]. The MOR is the median increase in the odds of having an adverse event when an induced abortion is performed by a higher-risk than lower-risk physician[24].

Appendix 1D (as supplied by the authors): Analysis 1. Relation between physician surgical induced abortion procedure volume in the previous year and the predicted probability (per 1000) of having a severe adverse event after a surgical induced abortion. This analysis modeled physician procedure volume as a continuous variable using fractional polynomials method.



Appendix 1E (as supplied by the authors): Analysis 1. Relation between physician surgical induced abortion procedure volume in the previous year and the predicted probability (per 1000) of having an any adverse event after a surgical induced abortion. This analysis modeled physician procedure volume as a continuous variable using fractional polynomials method.



Appendix 1F (as supplied by the authors): Analysis 3. Odds of having a severe (upper blue) or any (lower red) adverse event within 42 days after a surgical induced abortion (IA) in relation to the volume of surgical IA performed by that physician in the preceding 1 year being < 10th vs. ≥ 10th percentile. This analysis was restricted to 528,295 IA procedures performed by a physician who had been practicing in Ontario for the full 1-year period preceding the index IA date.

Outcome	Physician IA procedure volume	No. (%) with an adverse outcome	Event rate per 1000 (95% CI)	Crude odds ratio (95% CI) [c]	Adjusted odds ratio not accounting for clustering effect (95% CI) [d]	Adjusted odds ratio accounting for clustering effect (95% CI) [e]
Severe adverse event [a]	*≥ 10th percentile (N = 475,483)*	656 (0.1)	1.4 (1.3 to 1.5)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
	< 10th percentile (N = 52,812)	191 (0.4)	3.6 (3.1 to 4.1)	2.63 (2.24 to 3.09)	1.90 (1.57 to 2.30)	1.87 (1.37 to 2.55)
Any adverse event [b]	*≥ 10th percentile (N = 475,483)*	4583 (1.0)	9.6 (9.4 to 9.9)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
	< 10th percentile (N = 52,812)	1067 (2.0)	20.2 (19.0 to 21.4)	2.12 (1.98 to 2.27)	1.43 (1.33 to 1.55)	1.20 (1.03 to 1.40)

[a] Comprises any of the following: Maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.
[b] Comprises any of the following: Haemorrhage, infection, retained products of conception, other, red cell blood transfusion, maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.
[c] Results from univariate logistic regression models.
[d] Results from multivariable logistic regression models, adjusted for a woman's age, rural/urban residence, neighborhood income quintile, world region of origin, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis Groups in the 2 years before the index IA, gestational age and year when the IA was performed, sex of the physician, physician specialty, and number of years since the physician graduated.
[e] Results from multivariable logistic regression models, with generalized estimating equation applied to take into account multiple IA procedures clustered within the same physician. Adjusted for a woman's age, rural/urban residence, neighborhood income quintile, world region of origin, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis
Groups in the 2 years before the index IA, gestational age and year when the IA was performed, sex of the physician, physician specialty, and number of years since the physician graduated.

Appendix 1G (as supplied by the authors): Analysis 5. Odds of having a severe (upper blue) or any (lower red) adverse event within 42 days after a surgical induced abortion (IA) in relation to the volume of surgical IA performed by that practitioner in the preceding 1 year being < 5th or 5th to 9th percentile vs. ≥ 10th percentile.

Outcome	Physician IA procedure volume	No. (%) with an adverse outcome	Event rate per 1000 (95% CI)	Crude odds ratio (95% CI) [c]	Adjusted odds ratio not accounting for clustering effect (95% CI) [d]	Adjusted odds ratio accounting for clustering effect (95% CI) [e]
Severe adverse event[a]	*≥ 10th percentile (N = 476,252)*	656 (0.1)	1.4 (1.3 to 1.5)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
	5th to 9th percentile (N = 26,446)	54 (0.2)	2.0 (1.5 to 2.6)	1.48 (1.12 to 1.96)	1.22 (0.91 to 1.64)	1.22 (0.83 to 1.79)
	< 5th percentile (N = 26,443)	140 (0.5)	5.3 (4.4 to 6.2)	3.86 (3.21 to 4.63)	2.56 (2.06 to 3.17)	2.50 (1.80 to 3.46)
Any adverse event[b]	*≥ 10th percentile (N = 476,252)*	4596 (1.0)	9.7 (9.4 to 9.9)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
	5th to 9th percentile (N = 26,446)	405 (1.5)	15.3 (13.8 to 16.8)	1.60 (1.44 to 1.77)	1.14 (1.03 to 1.28)	1.03 (0.85 to 1.24)
	< 5th percentile (N = 26,443)	663 (2.5)	25.1 (23.2 to 27.0)	2.64 (2.43 to 2.87)	1.70 (1.55 to 1.86)	1.43 (1.20 to 1.70)

[a] Comprises any of the following: Maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.

[b] Comprises any of the following: Haemorrhage, infection, retained products of conception, other, red cell blood transfusion, maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.

[c] Results from univariate logistic regression models.

[d] Results from multivariable logistic regression models, adjusted for a woman's age, rural/urban residence, neighborhood income quintile, world region of origin, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis Groups in the 2 years before the index IA, gestational age and year when the IA was performed, sex of the physician, physician specialty, and number of years since the physician graduated.

[e] Results from multivariable logistic regression models, with generalized estimating equation applied to take into account multiple IA procedures clustered within the same physician. Adjusted for a woman's age, rural/urban residence, neighborhood income quintile, world region of origin, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis Groups in the 2 years before the index IA, gestational age and year when the IA was performed, sex of the physician, physician specialty, and number of years since the physician graduated.

Appendix 1H (as supplied by the authors): Analysis 6. Odds of having a severe (upper blue) or any (lower red) adverse event within 42 days after a surgical induced abortion (IA) in relation to the volume of surgical IA procedures performed by that physician in the preceding 1 year being < 10th or 10th to 19th percentile vs. ≥ 20th percentile.

Outcome	Physician IA procedure volume	No. (%) with an adverse outcome	Event rate per 1000 (95% CI)	Crude odds ratio (95% CI) [c]	Adjusted odds ratio not accounting for clustering effect (95% CI) [d]	Adjusted odds ratio accounting for clustering effect (95% CI) [e]
Severe adverse event[a]	*≥ 20th percentile (N = 476,252)*	537 (0.1)	1.3 (1.2 to 1.4)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
	10th to 19th percentile (N = 26,446)	119 (0.2)	2.2 (1.8 to 2.7)	1.77 (1.45 to 2.16)	1.55 (1.24 to 1.93)	1.44 (1.08 to 1.92)
	< 10th percentile (N = 26,443)	194 (0.4)	3.7 (3.2 to 4.2)	2.90 (2.46 to 3.42)	2.26 (1.84 to 2.79)	2.20 (1.65 to 2.95)
Any adverse event[b]	*≥ 20th percentile (N = 476,252)*	3683 (0.9)	8.7 (8.4 to 9.0)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
	10th to 19th percentile (N = 26,446)	913 (1.7)	17.2 (16.1 to 18.4)	2.00 (1.86 to 2.15)	1.52 (1.40 to 1.66)	1.08 (0.87 to 1.35)
	< 10th percentile (N = 26,443)	1068 (2.0)	20.2 (19.0 to 21.4)	2.35 (2.19 to 2.52)	1.68 (1.54 to 1.82)	1.25 (1.05 to 1.50)

[a] Comprises any of the following: Maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.

[b] Comprises any of the following: Haemorrhage, infection, retained products of conception, other, red cell blood transfusion, maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.

[c] Results from univariate logistic regression models.

[d] Results from multivariable logistic regression models, adjusted for a woman's age, rural/urban residence, neighborhood income quintile, world region of origin, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis Groups in the 2 years before the index IA, gestational age and year when the IA was performed, sex of the physician, physician specialty, and number of years since the physician graduated.

[e] Results from multivariable logistic regression models, with generalized estimating equation applied to take into account multiple IA procedures clustered within the same physician. Adjusted for a woman's age, rural/urban residence, neighborhood income quintile, world region of origin, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis Groups in the 2 years before the index IA, gestational age and year when the IA was performed, sex of the physician, physician specialty, and number of years since the physician graduated.

Appendix 1I (as supplied by the authors): Analysis 7. Odds of having a severe (upper blue) or any (lower red) adverse event within 42 days after a surgical induced abortion (IA) in relation to persistently low physician surgical IA procedure volume (< 10th percentile in the period between -730 and -366 days before the index IA date and in the period between -365 and -1 day before the index IA date) vs. a persistently higher volume group (≥ 10th percentile in the period between -730 and -366 days before the index IA date and in the period between -365 and -1 day before the index IA date. This analysis was restricted to 524,661 IA procedures performed by a physician who had been practicing in Ontario for the full 2-year period preceding the index IA date.

Outcome	Physician surgical IA procedure volume	No. (%) with an adverse outcome	Event rate per 1000 (95% CI)	Crude odds ratio (95% CI) [c]	Adjusted odds ratio not accounting for clustering effect (95% CI) [d]	Adjusted odds ratio accounting for clustering effect (95% CI) [e]
Severe adverse event [a]	*≥ 10th percentile between -730 to -366 d before the index IA date and ≥ 10th percentile between -365 d to -1 d before the index IA date (N = 459,087)*	618 (0.1)	1.3 (1.2 to 1.5)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
	< 10th percentile between -730 and -366 d before the index IA date and ≥ 10th percentile between -365 d to -1 d before the index IA date (N = 15,891)	37 (0.2)	2.3 (1.6 to 3.1)	1.73 (1.24 to 2.41)	1.52 (1.08 to 2.13)	1.45 (0.88 to 2.40)
	≥ 10th percentile between -730 d to -366 d before the index IA date and < 10th percentile between -365 d to -1 d before the index IA date (N = 3881)	7 (0.2)	1.8 (0.5 to 3.1)	1.34 (0.64 to 2.83)	1.28 (0.60 to 2.72)	1.29 (0.62 to 2.69)
	< 10th percentile between -730 d to -366 d before the index IA date and < 10th percentile between -365 d to -1 d before the index IA date (N = 45,802)	179 (0.4)	3.9 (3.3 to 4.5)	2.91 (2.46 to 3.44)	2.08 (1.70 to 2.54)	2.06 (1.48 to 2.86)
Any adverse event [b]	*≥ 10th percentile between -730 d to -366 d before the index IA date and ≥ 10th percentile between -365 d to -1 d before the index IA date (N = 459,087)*	4348 (0.9)	9.5 (9.2 to 9.8)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)

Appendix 1I (as supplied by the authors): Analysis 7. Odds of having a severe (upper blue) or any (lower red) adverse event within 42 days after a surgical induced abortion (IA) in relation to persistently low physician surgical IA procedure volume (< 10th percentile in the period between -730 and -366 days before the index IA date and in the period between -365 and -1 day before the index IA date) vs. a persistently higher volume group (≥ 10th percentile in the period between -730 and -366 days before the index IA date and in the period between -365 and -1 day before the index IA date. This analysis was restricted to 524,661 IA procedures performed by a physician who had been practicing in Ontario for the full 2-year period preceding the index IA date.

Outcome	Physician surgical IA procedure volume	No. (%) with an adverse outcome	Event rate per 1000 (95% CI)	Crude odds ratio (95% CI) [c]	Adjusted odds ratio not accounting for clustering effect (95% CI) [d]	Adjusted odds ratio accounting for clustering effect (95% CI) [e]
	< 10th percentile between -730 d to -366 d before the index IA date and ≥ 10th percentile between -365 d to -1 d before the index IA date (N = 15,891)	235 (1.5)	14.8 (12.9 to 16.7)	1.57 (1.38 to 1.79)	1.32 (1.15 to 1.51)	1.09 (0.90 to 1.31)
	≥ 10th percentile between -730 d to -366 d before the index IA date and < 10th percentile between -365 d to -1 d before the index IA date (N = 3881)	43 (1.1)	11.1 (7.8 to 14.4)	1.17 (0.87 to 1.58)	1.02 (0.75 to 1.39)	1.07 (0.85 to 1.34)
	< 10th percentile between -730 d to -366 d before the index IA date and < 10th percentile between -365 d to -1 d before the index IA date (N = 45,802)	971 (2.1)	21.2 (19.9 to 22.5)	2.27 (2.11 to 2.43)	1.50 (1.38 to 1.63)	1.30 (1.09 to 1.56)

[a] Comprises any of the following: Maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.

[b] Comprises any of the following: Haemorrhage, infection, retained products of conception, other, red cell blood transfusion, maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.

[c] Results from univariate logistic regression models.

[d] Results from multivariable logistic regression models, adjusted for a woman's age, rural/urban residence, neighborhood income quintile, world region of origin, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis Groups in the 2 years before the index IA, gestational age and year when the IA was performed, sex of the physician, physician specialty, and number of years since the physician graduated.

[e] Results from multivariable logistic regression models, with generalized estimating equation applied to take into account multiple IA procedures clustered within the same physician. Adjusted for a woman's age, rural/urban residence, neighborhood income quintile, world region of origin, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis Groups in the 2 years before the index IA, gestational age and year when the IA was performed, sex of the physician, physician specialty, and number of years since the physician graduated.

Appendix 1J (as supplied by the authors): Analysis 8. Odds of having a severe (upper blue) or any (lower red) adverse event within 42 days after a surgical induced abortion in relation to her physician's surgical IA procedure volume in the preceding 1 year being < 10th vs. ≥ 10th percentile, among women with a repeat IA. This analysis was restricted to 27,556 surgical IA procedures in 13,778 women, in which 1 IA was performed by a physician whose procedure volume in the preceding 1 year was < 10th percentile (low), and the other IA was done by a physician whose procedure volume in the preceding 1 year was ≥ 10th percentile (higher).

Outcome	Physician surgical IA procedure volume	No. (%) with an adverse outcome	Event rate per 1000 (95% CI)	Crude odds ratio (95% CI) [c]	Adjusted odds ratio not accounting for clustering effect (95% CI) [d]	Adjusted odds ratio accounting for clustering effect (95% CI) [e]
Severe adverse event [a]	*≥ 10th percentile at the time of one of the IA (N = 13,778)*	28 (0.2)	2.0 (1.3 to 2.8)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
	< 10th percentile at the time of the second IA (N = 13,778)	38 (0.3)	2.8 (1.9 to 3.6)	1.36 (0.83 to 2.21)	1.51 (0.92 to 2.48)	1.51 (0.90 to 2.52)
Any adverse event [b]	*≥ 10th percentile at the time of one of the IA (N = 13,778)*	215 (1.6)	15.6 (13.5 to 17.7)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
	< 10th percentile at the time of the other IA (N = 13,778)	258 (1.9)	18.7 (16.4 to 20.1)	1.20 (1.00 to 1.45)	1.25 (1.04 to 1.50)	1.25 (1.04 to 1.50)

[a] Comprises any of the following: Maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.

[b] Comprises any of the following: Haemorrhage, infection, retained products of conception, other, red cell blood transfusion, maternal end organ damage, severe maternal morbidity, intensive care unit admission or death.

[c] Results from univariate logistic regression models.

[d] Results from multivariable logistic regression models, adjusted for a woman's age, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis Groups in the 2 years before the index IA, and gestational age when the IA was performed.

[e] Results from multivariable logistic regression models, with generalized estimating equation to account for 2 IA procedures clustered within the same woman. Adjusted for a woman's age, nulliparous status, number of prior IA, total number of Adjusted Aggregated Diagnosis Groups in the 2 years before the index IA, and gestational age when the IA was performed.

Appendix 1K (as supplied by the authors): Analysis 9. Odds of having a severe adverse event (see Table 1 for details) within 42 days after a surgical induced abortion (IA) in relation to the volume of surgical IA performed by that physician in the preceding 1 year being < 10th vs. ≥ 10th percentile (the referent). Odds ratios were estimated from multilevel logistic regression models, where the effect of the physician is modeled as random effects[a]. This analysis provides details of the heterogeneity in having a severe adverse event after IA between physicians (Model A, denoted by the median odds ratios), and the physician-level variation in severe adverse events explained by individual IA procedure level characteristics (Model B), and by both individual IA procedure level and physician level characteristics (Model C).

Variable	Model A: Null model only incorporating physician-specific random effects	Model B: physician-specific random effects + individual IA procedure level characteristics	Model C: physician-specific random effects + individual IA procedure level characteristics + physician characteristics
Woman's age group vs. age group 25-29 y			
< 20		0.96 (0.76 to 1.23)	0.96 (0.75 to 1.22)
20 to 24		0.81 (0.66 to 0.98)	0.81 (0.66 to 0.98)
30 to 34		0.88 (0.71 to 1.10)	0.88 (0.71 to 1.10)
35 to 39		1.04 (0.82 to 1.31)	1.03 (0.82 to 1.31)
≥ 40		1.04 (0.76 to 1.42)	1.03 (0.76 to 1.41)
Rural vs. urban residence		1.51 (1.19 to 1.91)	1.50 (1.19 to 1.90)
Neighborhood income quintile (Q) vs. highest Q5			
Q1 (lowest)		1.19 (0.95 to 1.50)	1.18 (0.94 to 1.49)
Q2		0.98 (0.77 to 1.25)	0.97 (0.76 to 1.24)
Q3		0.96 (0.75 to 1.23)	0.96 (0.75 to 1.23)
Q4		1.00 (0.77 to 1.28)	0.99 (0.77 to 1.28)
World region of origin vs. Canadian-born			
Africa		0.78 (0.49 to 1.26)	0.79 (0.49 to 1.27)
Caribbean		1.10 (0.76 to 1.58)	1.11 (0.77 to 1.59)
East Asia		0.64 (0.44 to 0.95)	0.63 (0.43 to 0.92)
Hispanic America		0.69 (0.41 to 1.16)	0.69 (0.41 to 1.16)
Middle East		1.04 (0.66 to 1.64)	1.05 (0.67 to 1.65)
South Asia		0.51 (0.36 to 0.72)	0.51 (0.36 to 0.72)
Western		1.05 (0.73 to 1.51)	1.06 (0.73 to 1.52)
Parous vs. nulliparous		1.10 (0.94 to 1.28)	1.08 (0.93 to 1.26)
Total No. of Adjusted Aggregated Diagnosis Groups (ADG) vs. ADG 0-2			
3-4		1.05 (0.84 to 1.32)	1.05 (0.84 to 1.31)
5-6		1.45 (1.16 to 1.80)	1.44 (1.16 to 1.78)
≥ 7		2.28 (1.87 to 2.79)	2.26 (1.85 to 2.77)
Late IA at ≥ 15 vs. early IA at < 15 weeks' gestation		2.86 (2.07 to 3.96)	2.83 (2.07 to 3.88)
No. of prior IA vs. none			
1		1.12 (0.95 to 1.32)	1.12 (0.95 to 1.33)
2		0.97 (0.76 to 1.22)	0.97 (0.77 to 1.23)

Appendix 1K (as supplied by the authors): Analysis 9. Odds of having a severe adverse event (see Table 1 for details) within 42 days after a surgical induced abortion (IA) in relation to the volume of surgical IA performed by that physician in the preceding 1 year being < 10th vs. ≥ 10th percentile (the referent). Odds ratios were estimated from multilevel logistic regression models, where the effect of the physician is modeled as random effects[a]. This analysis provides details of the heterogeneity in having a severe adverse event after IA between physicians (Model A, denoted by the median odds ratios), and the physician-level variation in severe adverse events explained by individual IA procedure level characteristics (Model B), and by both individual IA procedure level and physician level characteristics (Model C).

Variable	Model A: Null model only incorporating physician-specific random effects	Model B: physician-specific random effects + individual IA procedure level characteristics	Model C: physician-specific random effects + individual IA procedure level characteristics + physician characteristics
≥ 3		0.81 (0.64 to 1.02)	0.82 (0.65 to 1.03)
Year when the IA was performed vs. 2003			
2004		0.73 (0.49 to 1.08)	0.72 (0.48 to 1.07)
2005		1.16 (0.81 to 1.66)	1.15 (0.80 to 1.64)
2006		0.74 (0.49 to 1.10)	0.73 (0.49 to 1.09)
2007		0.91 (0.63 to 1.33)	0.89 (0.61 to 1.30)
2008		1.03 (0.71 to 1.49)	1.00 (0.69 to 1.45)
2009		0.96 (0.65 to 1.41)	0.94 (0.64 to 1.37)
2010		1.45 (1.02 to 2.07)	1.39 (0.97 to 1.98)
2011		1.51 (1.06 to 2.14)	1.44 (1.01 to 2.06)
2012		1.65 (1.17 to 2.34)	1.58 (1.12 to 2.25)
2013		1.92 (1.36 to 2.71)	1.86 (1.32 to 2.63)
2014		1.80 (1.27 to 2.55)	1.74 (1.22 to 2.47)
2015		1.79 (1.25 to 2.56)	1.76 (1.23 to 2.52)
Physician IA procedure volume in the previous 1 year < 10th vs. ≥ 10th percentile			1.76 (1.31 to 2.38)
Female vs. male physician			1.16 (0.81 to 1.67)
Family physician/Other vs. Obstetrician-Gynecologist			0.64 (0.44 to 0.94)
Physician graduated ≥ 26 vs. ≤ 25 y ago			1.14 (0.88 to 1.48)
Explained physician-level variation	--	38.4%	63.4%
Median odds ratio for physician effects	3.44 (2.64 to 4.28)	2.64 (2.07 to 3.20)	2.11 (1.69 to 2.51)

[a] Shown in the table are cluster-specific odds ratios of individual IA procedure level characteristics, and physician level characteristics.

Appendix 1L (as supplied by the authors): Analysis 10. Odds of having any adverse event, regardless of severity (see Table 1 for details) within 42 days after a surgical induced abortion (IA) in relation to the volume of surgical IA performed by that physician in the preceding 1 year being < 10th vs. ≥ 10th percentile (the referent). Odds ratios were estimated from multilevel logistic regression models, where the effect of the physician is modeled as random effects[a]. This analysis provides details of the heterogeneity in having a any adverse event after IA between physicians (Model A, denoted by the median odds ratios), and the physician-level variation in any adverse event explained by individual IA procedure level characteristics (Model B), and by both individual IA procedure level and physician level characteristics (Model C).

Variable	Model A: Null model only incorporating physician-specific random effects	Model B: Physician-specific random effects + individual IA procedure level characteristics	Model C: Physician-specific random effects + individual IA procedure level characteristics + physician characteristics
Woman's age group vs. age group 25-29 y			
< 20		1.04 (0.95 to 1.14)	1.04 (0.95 to 1.14)
20 to 24		1.04 (0.97 to 1.12)	1.04 (0.97 to 1.12)
30 to 34		0.83 (0.76 to 0.91)	0.83 (0.76 to 0.91)
35 to 39		0.85 (0.77 to 0.94)	0.85 (0.77 to 0.94)
≥ 40		0.73 (0.63 to 0.85)	0.73 (0.63 to 0.84)
Rural vs. urban residence		1.12 (1.02 to 1.23)	1.12 (1.02 to 1.24)
Neighborhood income quintile (Q) vs. highest Q5			
Q1 (lowest)		1.14 (1.04 to 1.25)	1.14 (1.04 to 1.25)
Q2		1.09 (0.99 to 1.19)	1.08 (0.99 to 1.19)
Q3		0.99 (0.89 to 1.09)	0.99 (0.89 to 1.09)
Q4		1.02 (0.92 to 1.13)	1.02 (0.92 to 1.13)
World region of origin vs. Canadian-born			
Africa		0.70 (0.57 to 0.86)	0.70 (0.57 to 0.86)
Caribbean		0.64 (0.52 to 0.77)	0.64 (0.52 to 0.77)
East Asia		0.71 (0.61 to 0.83)	0.70 (0.60 to 0.82)
Hispanic America		0.70 (0.57 to 0.87)	0.70 (0.57 to 0.87)
Middle East		0.86 (0.70 to 1.06)	0.86 (0.70 to 1.05)
South Asia		0.52 (0.45 to 0.60)	0.52 (0.45 to 0.60)
Western		1.01 (0.87 to 1.18)	1.01 (0.87 to 1.18)
Parous vs. nulliparous		1.16 (1.10 to 1.24)	1.16 (1.09 to 1.23)
Total No. of Adjusted Aggregated Diagnosis Groups (ADG) vs. ADG 0-2			
3-4		1.24 (1.14 to 1.35)	1.24 (1.14 to 1.35)
5-6		1.71 (1.57 to 1.87)	1.71 (1.57 to 1.86)
≥ 7		2.42 (2.23 to 2.62)	2.41 (2.22 to 2.62)
Late IA at ≥ 15 vs. early IA at < 15 weeks' gestation		1.66 (1.43 to 1.92)	1.65 (1.42 to 1.91)
No. of prior IA vs. none			
1		0.96 (0.90 to 1.03)	0.96 (0.90 to 1.03)

Appendix 1L (as supplied by the authors): Analysis 10. Odds of having any adverse event, regardless of severity (see Table 1 for details) within 42 days after a surgical induced abortion (IA) in relation to the volume of surgical IA performed by that physician in the preceding 1 year being < 10th vs. ≥ 10th percentile (the referent). Odds ratios were estimated from multilevel logistic regression models, where the effect of the physician is modeled as random effects[a]. This analysis provides details of the heterogeneity in having a any adverse event after IA between physicians (Model A, denoted by the median odds ratios), and the physician-level variation in any adverse event explained by individual IA procedure level characteristics (Model B), and by both individual IA procedure level and physician level characteristics (Model C).

Variable	Model A: Null model only incorporating physician-specific random effects	Model B: Physician-specific random effects + individual IA procedure level characteristics	Model C: Physician-specific random effects + individual IA procedure level characteristics + physician characteristics
2		0.96 (0.87 to 1.05)	0.96 (0.88 to 1.05)
≥ 3		0.76 (0.69 to 0.84)	0.76 (0.70 to 0.84)
Year when the IA was performed vs. 2003			
2004		1.05 (0.90 to 1.22)	1.04 (0.90 to 1.21)
2005		1.09 (0.94 to 1.27)	1.09 (0.94 to 1.27)
2006		1.04 (0.89 to 1.21)	1.04 (0.89 to 1.21)
2007		1.02 (0.87 to 1.19)	1.02 (0.87 to 1.19)
2008		1.10 (0.95 to 1.28)	1.09 (0.94 to 1.27)
2009		1.24 (1.06 to 1.44)	1.23 (1.06 to 1.43)
2010		1.24 (1.07 to 1.45)	1.22 (1.04 to 1.43)
2011		1.58 (1.37 to 1.84)	1.55 (1.33 to 1.81)
2012		2.29 (1.99 to 2.64)	2.25 (1.95 to 2.60)
2013		2.29 (1.99 to 2.65)	2.25 (1.95 to 2.61)
2014		2.11 (1.83 to 2.44)	2.07 (1.78 to 2.40)
2015		2.26 (1.95 to 2.62)	2.21 (1.90 to 2.58)
Physician IA procedure volume in the previous 1 year < 10th vs. ≥ 10th percentile			1.18 (1.00 to 1.40)
Female vs. male physician			1.11 (0.83 to 1.48))
Family physician/Other vs. Obstetrician-Gynecologist			0.40 (0.29 to 0.56)
Physician graduated ≥ 26 vs. ≤ 25 years ago			1.09 (0.97 to 1.23)
Explained physician-level variation	--	18.3%	36.8%
Median odds ratio for physician effects	2.99 (2.57 to 3.42)	2.69 (2.32 to 3.06)	2.39 (2.08 to 2.70)

[a] Shown in the table were cluster-specific odds ratios of individual IA procedure level characteristics, and physician level characteristics.