Supplementary Online Content

Dossa F, Simpson AN, Sutradhar R, et al. Sex-based disparities in the hourly earnings of surgeons in the fee-for-service system in Ontario, Canada. *JAMA Surg*. Published online October 2, 2019. doi:10.1001/jamasurg.2019.3769

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Differences in remuneration for similar gynecologic and urologic procedures based on the OHIP Schedule of Benefits. Monetary values are in Canadian dollars.

Sex	Procedure	OHIP Code	Fee	Difference (female – male)
Male	Biopsy of penis	Z702	23.55	27.35
Female	Biopsy of vulva	Z475	50.90	
Male	Excision, penile condylomata	Z767	78.60	36.50
Female	Excision of vulvar condylomata	Z769	115.10	
Male	Biopsy prostate	Z712	85.45	-51.40
Female	Biopsy endometrium	Z770	34.05	
Male	Hypospadius one stage repair (with meatus but not into glans)	S578	287.75	-163.80
Female	Excision congenital vaginal septum	S702	123.70	
Male	Resection of scrotum	S618	215.80	41.25
Female	Simple vulvectomy	S703	257.05	
Male	Drain prostate abscess	Z713	92.10	0.20
Female	Drain vaginal abscess	Z728	92.30	
Male	Excision hydrocele	S611/S630	205.35	-93.35
Female	Excision bartholins gland	S706	112.00	
Male	Excision of sperm cord lesion	S630/S631	205.35	-93.35
Female	Excision of Bartholins	S706	112.00	
Male	Penile amputation, partial	S574	170.65	86.40
Female	Simple vulvectomy	S703	257.05	
Male	Orchidectomy	S589	170.65	136.20

Female	Oophorectomy	S745	306.85	
Male	Radical orchidectomy for malignancy	S598	235.35	71.50
Female	Oophorectomy	S745	306.85	
Male	Epididymectomy	S602	170.65	136.20
Female	Salpingectomy	S738	306.85	
Male	Vasectomy	S626	107.40	48.30
Female	Tubal occlusion	S741	155.70	
Male	Retroperitoneal LN dissection for testicular tumor	S590	834.25	-36.80
Female	Radical resection pelvic and para-aortic nodes for cancer	S750	797.45	
Male	Reduce testis torsion	S600	235.35	-103.90
Female	Reduce ovarian torsion (diagnostic laparoscopy)	Z552	131.45	
Male	Remove penis and LN	S576	552.30	-120.85
Female	Radical vulvectomy	S704	431.45	
Male	Vasovasostomy	S623	215.80	143.75
Female	Salpingostomy	S736	359.55	
Male	TURP	S655	450.60	-66.70
Female	Hysteroscopic myomectomy	S764	383.90	
Male	Suprapubic/retropubic prostactectomy	S647/S650	600.75	-137.75
Female	TAH	S757	463.00	
Male	Radical retropubic prostatectomy	S651	1008.35	-114.80
Female	Radical hysterectomy/TAH	S763	893.55	

Male	Perineal approach prostatectomy	S645	574.60	-111.60
Female	Simple vaginal hysterectomy	S816	463.00	
Male	Perineal prostactectomy with vesiculectomy	S646	875.00	18.55
Female	Radical vaginal hysterectomy	S763	893.55	

eTable 2. Data Sources

Database	Description	Data elements extracted
Ontario Health Insurance Plan database	Claims submitted for services rendered by physicians	Date of procedure Procedure type Anesthesia time units billed Reimbursement to surgeon Patient age at the time of surgery Patient sex Patient comorbidities (American Society of Anesthesiologists category)
Canadian Institute of Health Information Discharge Abstract Database	In-patient hospitalization records. Reporting by all hospitals is mandatory. Patient demographics, clinical information, and administrative variables are included in the database, including diagnosis and procedure codes.	Procedure dates Patient comorbidities
Same Day Surgery database	Records of patients who underwent same-day procedures	Procedure dates Patient comorbidities
Corporate Provider Database	Demographics and practice-related data for surgeons	Surgeon demographics (age, sex, years in practice) Surgeon specialty
Registered Persons Database	Vital statistics registry	Patient age at time of surgery

Patient comorbidities were captured through the Canadian Institute of Health Information Discharge Abstract Database, the Same Day Surgery database, and the Ontario Health Insurance Plan database

eTable 3. Demonstration of overdispersion and underestimation of standard errors in the Poisson model for the primary outcome of the association between surgeon sex and hourly earnings. The Lagrange Multiplier Test was used to assess for overdispersion (p<0.0001).

Covariate	Point Estimate	Lower Confidence Limit	Upper Confidence Limit	p-value
Surgeon sex				
Poisson	0.7607	0.7605	0.7609	<0.0001
Negative Binomial	0.7626	0.7366	0.7895	<0.0001
Surgeon years in practice				
Poisson	0.9982	0.9982	0.9982	<0.0001
Negative Binomial	0.9996	0.9983	1.0009	0.5274
Hospital type				
Poisson	1.0096	1.0094	1.0097	<0.0001
Negative Binomial	1.0125	0.9831	1.0427	0.4095
Average patient age				
Poisson	1.0037	1.0037	1.0037	<0.0001
Negative Binomial	1.0092	1.0076	1.0108	<0.0001
High ADGs				
Poisson	1.6693	1.6674	1.6712	<0.0001
Negative Binomial	1.0039	0.8907	1.1316	0.9486
High ASA				
Poisson	1.5021	1.5012	1.5029	<0.0001
Negative Binomial	1.5283	1.4220	1.6424	<0.0001
Obesity				
Poisson	1.1810	1.1798	1.1823	<0.0001
Negative Binomial	0.8724	0.7120	1.0689	0.1674
Marginalization				
Poisson	0.8797	0.8794	0.8801	<0.0001
Negative Binomial	0.9573	0.9078	1.0095	0.1069

eTable 4. Multivariable analysis of the association between surgeon gender and earnings per hour of operating time with surgical specialty included as a covariate

	Adjusted RR	***95% Confidence Interval***	***p-value***
Surgeon gender			
Male	Reference	-	-
Female	0.86	0.83 – 0.89	<0.0001
Surgeon years in practice	1.00	1.00 – 1.00	0.33
Specialty			
General surgery	Reference	-	-
Neurosurgery	1.90	1.75 – 2.08	<0.0001
Orthopedic surgery	1.25	1.21 – 1.30	<0.0001
Plastic surgery	1.08	1.02 – 1.14	0.01
Cardiothoracic surgery	1.27	1.18 – 1.37	<0.0001
Gynecology	0.84	0.80 – 0.87	<0.0001
Ophthalmology	1.84	1.74 – 1.95	<0.0001
Otolaryngology	1.22	1.16 – 1.29	<0.0001
Urology	0.98	0.93 – 1.04	0.52
Hospital type			
Teaching	Reference	-	-
Non-teaching	1.08	1.05 – 1.10	<0.0001
Patient age[†]	1.00	1.00 – 1.00	0.23
Proportion of patients with ADG ≥10	0.87	0.79 – 0.97	0.01
Proportion of patients with ASA ≥III	1.68	1.54 – 1.83	<0.0001
Proportion of patients with BMI >40	1.36	1.11 – 1.65	0.002
Marginalization[†]	0.97	0.92 – 1.01	0.14

ADG = aggregated diagnosis group; BMI = body mass index; ASA = American Society of Anesthesiologists
[†]Modelled as average values for each surgeon based on all operations performed across the study period

eTable 5. Multivariable analysis of the association between the proportion of female patients and earnings per hour. A surgery-level model was constructed using the 25 most commonly performed procedures among each specialty.

	Adjusted RR (95%CI)	***p-value***
Proportion of female patients	1.06 (0.87-1.29)	0.58
Average patient age	1.01 (1.00-1.02)	0.003
Proportion of patients with ADG ≥10	0.44 (0.23-0.82)	0.01
Proportion of patients with ASA ≥III	1.27 (0.96-1.68)	0.10
Proportion of patients with BMI >40	1.49 (0.73-3.02)	0.27
Average marginalization	1.75 (0.91-3.37)	0.09
Proportion of procedures performed at teaching hospitals	2.30 (1.80-2.93)	<0.0001
Average surgeon years in practice	0.99 (0.98-1.01)	0.24

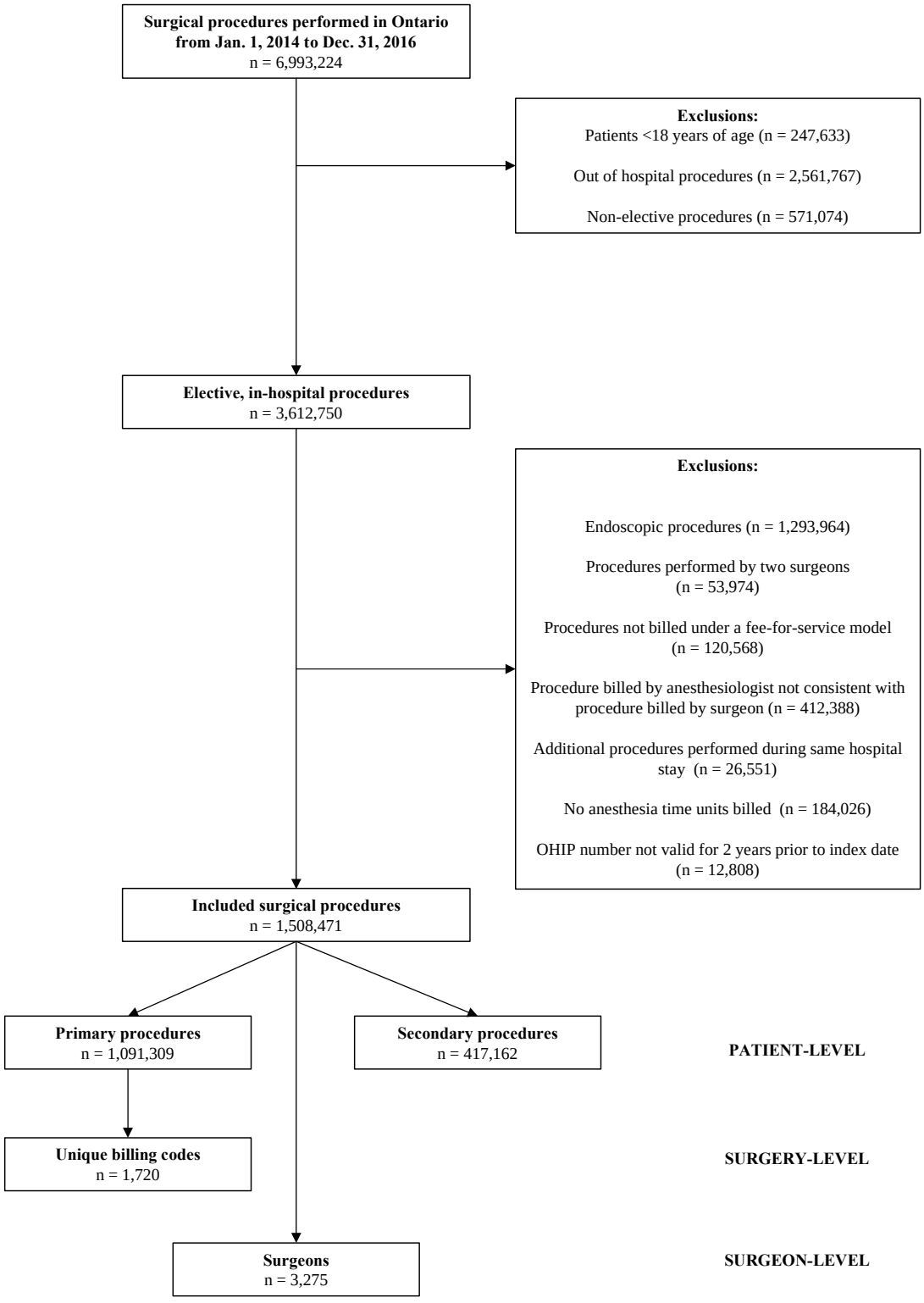
RR = rate ratio; CI = confidence interval; ADG = aggregated diagnosis group; BMI = body mass index (kg/m^2); ASA = American Society of Anesthesiologists

eTable 6. Multivariable analysis of the association between surgeon sex and procedure duration. Separate models were fit for each specialty to model the number of 15-minute time units billed for the 25 most common procedures performed by each specialty.

Specialty	Duration of procedure, *RR* (95% CI)	p-value
General surgery	1.02 (0.96-1.07)	0.55
Neurosurgery	0.93 (0.79-1.08)	0.32
Orthopedic surgery	1.04 (0.97-1.11)	0.30
Plastic surgery	1.07 (1.02-1.13)	0.008
Cardiothoracic surgery	0.98 (0.91-1.05)	0.53
Gynecology	1.03 (0.98-1.07)	0.30
Ophthalmology	1.08 (0.97-1.21)	0.15
Otolaryngology	0.99 (0.92-1.06)	0.70
Urology	0.90 (0.80-1.00)	0.06

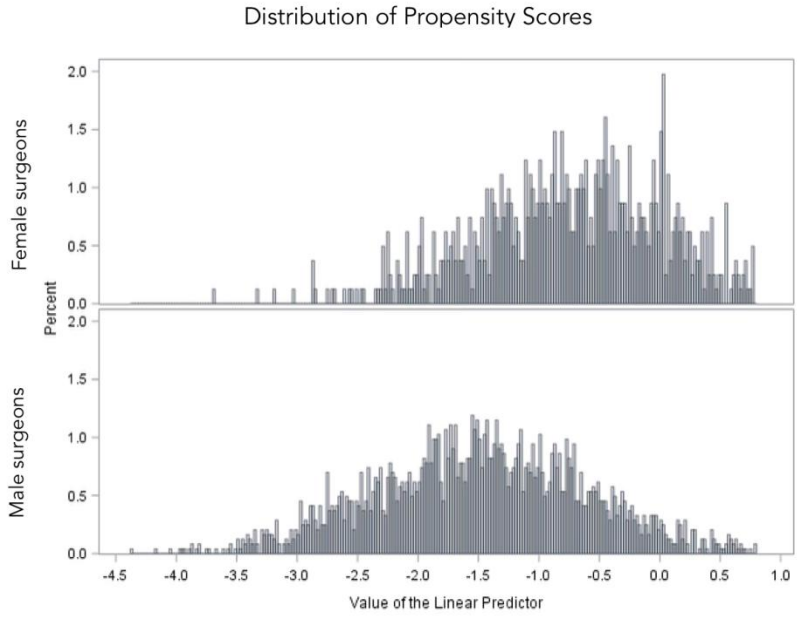
RR: rate ratio; CI: confidence interval
All models adjusted for hospital type (teaching vs. non-teaching), surgeon age, patient age, patient sex, obesity (BMI >40), ADG (≥10), ASA category (≥III), and marginalization score; clustering by procedure performed

eFigure 1. Diagram of cohort creation



eFigure 2. Histograms demonstrating distribution of propensity scores between male and female surgeons a) prior to propensity score matching; b) after propensity score matching. Similar distributions in propensity scores among male and female surgeons after matching confirmed appropriately balanced matched groups.

a) Prior to matching



b) After matching