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Data obtained through Sentinel are intended to complement other types of evidence such as preclinical studies, clinical trials, postmarket studies, and adverse event reports, all of which are used by FDA to inform regulatory decisions regarding medical product safety. The information contained in this report is provided as part of FDA's commitment to place knowledge acquired from Sentinel in the public domain as soon as possible. Any public health actions taken by FDA regarding products involved in Sentinel queries will continue to be communicated through existing channels.

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The following report contains a description of the request, request specifications, and results from the modular program run(s).

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Overview for Request cdrh_mpl2r_wp001_nsdp_v01

Request ID: cdrh_mpl2r_wp001_nsdp_v01

Request Description: This request estimated hazard ratios for gynecologic surgery among women who experienced hysteroscopic sterilizations versus laparoscopic tubal ligations.

Sentinel Modular Program Tool Used: Cohort Identification and Descriptive Analysis (CIDA) Tool, version 5.1.2

Data Source: Data from January 1, 2008 to September 30, 2015 from 17 Data Partners contributing to the Sentinel Distributed Database (SDD) were included in this request. See Appendix A for a list of dates of available data for each Data Partner. The request package was sent to Data Partners on March 6, 2018.

Study Design: This request utilized a retrospective new-user cohort design.

Exposure and Comparator: The exposure of interest was a hysteroscopic sterilization, with a comparator of laparoscopic tubal ligation. The exposure and comparator procedures were allowed to occur in any care setting and were defined using Current Procedural Terminology-4 (CPT-4), Healthcare Common Procedure Coding System (HCPCS) Level II, and International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) procedure codes. For a list of codes, please see Appendix B.

Cohort Eligibility Criteria: Those included in the cohort were required to be continuously enrolled in plans with medical coverage for at least 183 days prior to their index procedure date, during which gaps in coverage of up to 45 days were allowed. Members were excluded if they had the exposure, comparator, or outcome of interest in their medical history prior to the index date. Members with outcomes on the day of their index exposure were additionally excluded. The following age groups were included in the cohort: 21-30, 31-40, 41-50 years. Only the first qualifying incident procedure that occurred between January 1, 2008 and September 30, 2015 was included.

Follow-up: Follow-up began on the day of the index procedure and continued until the first occurrence of any of the following: 1) disenrollment; 2) disenrollment due to death; 3) end of query period (September 30, 2015); 4) end of Data Partner data availability; 5) occurrence of an outcome; or 6) occurrence of a non-outcome hysterectomy in the analyses of a hysterectomy outcome. Censoring for non-outcome hysterectomy was defined using ICD-9-CM and CPT-4 procedure codes. Please see Appendix C for a list of specific codes.

Outcome of Interest: The two outcomes of interest were hysterectomy and salpingectomy. These outcomes were investigated separately, and together, in any care setting. Any outcomes that occurred on the day of exposure initiation were excluded from the analysis. For a list of CPT-4, HCPCS, and ICD-9-CM procedures codes used to define the outcomes, please see Appendix D.

Propensity Score Estimation: The following characteristics were assessed during the baseline period and were included in the propensity score: age, Charlson/Elixhauser combined comorbidity score¹, health service utilization, pelvic pain, uterine fibroids, and live born deliveries. Covariates were defined using CPT-4, and ICD-9-CM procedure and diagnosis codes. For a list of codes used to defined covariates, please see Appendix E. Occurrences of these covariates were evaluated in the 183 days prior to the exposure. The Propensity Score Analysis (PSA) tool was used to calculate the propensity scores and identify matched cohorts based on propensity scores. Propensity score estimation and matching was performed separately within each Data Partner site.

Matching: The matching ratio for the propensity score was 1:1. Patients in the exposed and comparator cohorts were nearest neighbor matched without replacement, meaning that each comparator patient was matched one time, at most, to an exposed patient. The matching caliper was 0.050.

Effect Estimates: For each comparison, Cox proportional hazards regression models were used to estimate hazard ratios and corresponding 95% confidence intervals for the unmatched analyses and the 1:1 unconditional matched analyses.

Limitations: Algorithms to define exposures, outcomes, and covariates are imperfect and may be misclassified. Therefore, data should be interpreted with this limitation in mind.

Please see Appendix F for the specifications of parameters used in the analyses for this request.

Notes: Please contact the Sentinel Operations Center Query Fulfillment Team (qf@sentinelssystem.org) for questions and to provide comments/suggestions for future enhancements to this document.

¹Gagne, J. J., Glynn, R. J., Avorn, J., Levin, R., Schneeweiss, S. (2011). "A combined comorbidity score predicted mortality in elderly patients better than existing scores." J Clin Epidemiol 64(7):749-759.

Table of Contents

<u>CIDA Glossary</u>	List of terms and their definitions found in this report pertaining to Sentinel's Cohort Identification and Descriptive Analysis (CIDA) Tool
<u>PSA Glossary</u>	List of terms and their definitions found in this report pertaining to Sentinel's Propensity Score Analysis (PSA) Tool
<u>Table 1a</u>	Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Unmatched, Aggregated), Ratio: 1:1, Caliper: 0.05, Hysterectomy Outcome
<u>Table 1b</u>	Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Matched, Aggregated), Ratio: 1:1, Caliper: 0.05, Hysterectomy Outcome
<u>Table 1c</u>	Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Unmatched, Aggregated), Ratio: 1:1, Caliper: 0.05, Salpingectomy Outcome
<u>Table 1d</u>	Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Matched, Aggregated), Ratio: 1:1, Caliper: 0.05, Salpingectomy Outcome
<u>Table 1e</u>	Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Unmatched, Aggregated), Ratio: 1:1, Caliper: 0.05, Hysterectomy or Salpingectomy Outcome
<u>Table 1f</u>	Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Matched, Aggregated), Ratio: 1:1, Caliper: 0.05, Hysterectomy or Salpingectomy Outcome
<u>Table 2</u>	Effect Estimates for Outcome of Hysterectomy, by Analysis Type
<u>Table 3</u>	Effect Estimates for Outcome of Salpingectomy, by Analysis Type
<u>Table 4</u>	Effect Estimates for Outcome of Hysterectomy or Salpingectomy, by Analysis Type
<u>Figure 1a</u>	Histogram of Propensity Score Distributions Before and After Matching, Outcome of Hysteroscopic Sterilization, Aggregated
<u>Figure 1b</u>	Histogram of Propensity Score Distributions Before and After Matching, Outcome of Hysteroscopic Sterilization, 1:1 Aggregated Matched Cohort, Matched Caliper = 0.05
<u>Figure 2a</u>	Histogram of Propensity Score Distributions Before and After Matching, Outcome of Laparoscopic Tubal Ligation, Aggregated
<u>Figure 2b</u>	Histogram of Propensity Score Distributions Before and After Matching, Outcome of Laparoscopic Tubal Ligation, 1:1 Aggregated Matched Cohort, Matched Caliper = 0.05
<u>Figure 3a</u>	Histogram of Propensity Score Distributions Before and After Matching, Outcome of Hysteroscopic Sterilization or Laparoscopic Tubal Ligation, Aggregated
<u>Figure 3b</u>	Histogram of Propensity Score Distributions Before and After Matching, Outcome of Hysteroscopic Sterilization or Laparoscopic Tubal Ligation, 1:1 Aggregated Matched Cohort, Matched Caliper = 0.05
<u>Figure 4</u>	Kaplan Meier Survival Curves Depicting Time to Event or Time to Censor for First Treatment Episode per Patient in the Matched Population for Hysterectomy
<u>Figure 5</u>	Kaplan Meier Survival Curves Depicting Time to Event or Time to Censor for First Treatment Episode per Patient in the Matched Population for Salpingectomy
<u>Figure 6</u>	Kaplan Meier Survival Curves Depicting Time to Event or Time to Censor for First Treatment Episode per Patient in the Matched Population for Hysterectomy or Salpingectomy
<u>Appendix A</u>	Dates of Available Data in the Sentinel Distributed Database (SDD) as of Request End Date (September 30, 2015)
<u>Appendix B</u>	List of Current Procedural Terminology, Fourth Revision (CPT-4), Healthcare Common Procedure Coding System (HCPCS), and International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) Procedure Codes Used to Define Exposures in this Request
<u>Appendix C</u>	List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Procedure Codes Used to Define Censoring by Non-Outcome Hysterectomies in this Request
<u>Appendix D</u>	List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM), Current Procedural Terminology, Fourth Revision (CPT-4), and Healthcare Common Procedure Coding System (HCPCS) Procedure Codes Used to Define Outcomes in this Request
<u>Appendix E</u>	List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request
<u>Appendix F</u>	Specifications for Request cdrh_mpl2r_wp001

**Glossary of Terms for Analyses Using
Cohort Identification and Descriptive Analysis (CIDA) Tool***

Amount Supplied - number of units (pills, tablets, vials) dispensed. Net amount per NDC per dispensing.

Blackout Period - number of days at the beginning of a treatment episode that events are to be ignored. If an event occurs during the blackout period, the episode is excluded.

Care Setting - type of medical encounter or facility where the exposure, event, or condition code was recorded. Possible care settings include: Inpatient Hospital Stay (IP), Non-Acute Institutional Stay (IS), Emergency Department (ED), Ambulatory Visit (AV), and Other Ambulatory Visit (OA). For laboratory results, possible care settings include: Emergency Department (E), Home (H), Inpatient (I), Outpatient (O), or Unknown or Missing (U). The Care Setting, along with the Principal Diagnosis Indicator (PDX), forms the Care Setting/PDX parameter.

Ambulatory Visit (AV) - includes visits at outpatient clinics, same-day surgeries, urgent care visits, and other same-day ambulatory hospital encounters, but excludes emergency department encounters.

Emergency Department (ED) - includes ED encounters that become inpatient stays (in which case inpatient stays would be a separate encounter). Excludes urgent care visits.

Inpatient Hospital Stay (IP) - includes all inpatient stays, same-day hospital discharges, hospital transfers, and acute hospital care where the discharge is after the admission date.

Non-Acute Institutional Stay (IS) - includes hospice, skilled nursing facility (SNF), rehab center, nursing home, residential, overnight non-hospital dialysis and other non-hospital stays.

Other Ambulatory Visit (OA) - includes other non overnight AV encounters such as hospice visits, home health visits, skilled nursing facility visits, other non-hospital visits, as well as telemedicine, telephone and email consultations.

Charlson/Elixhauser Combined Comorbidity Score - calculated based on comorbidities observed during a requester-defined window around the exposure episode start date (e.g., in the 183 days prior to index).

Cohort Definition (drug/exposure) - indicates how the cohort will be defined: 01: Cohort includes only the first valid treatment episode during the query period; 02: Cohort includes all valid treatment episodes during the query period; 03: Cohort includes all valid treatment episodes

Days Supplied - number of days supplied for all dispensings in qualifying treatment episodes.

Eligible Members - number of members eligible for an incident treatment episode (defined by the drug/exposure and event washout periods) with drug and medical coverage during the query period.

Enrollment Gap - number of days allowed between two consecutive enrollment periods without breaking a "continuously enrolled" sequence.

Episodes - treatment episodes; length of episode is determined by days supplied in one dispensing or consecutive dispensings bridged by the episode gap.

Episode Gap - number of days allowed between two (or more) consecutive exposures (dispensings/procedures) to be considered the same treatment episode.

Event Deduplication - specifies how events are counted by the Modular Program (MP) algorithm: 0: Counts all occurrences of a health outcome of interest (HOI) during an exposure episode; 1: de-duplicates occurrences of the same HOI code and code type on the same day; 2: de-duplicates occurrences of the same HOI group on the same day (e.g., de-duplicates at the group level).

Exposure Episode Length - number of days after exposure initiation that is considered "exposed time."

Exposure Extension Period - number of days post treatment period in which the outcomes/events are counted for a treatment episode. Extensions are added after any episode gaps have been bridged.

Lookback Period - number of days wherein a member is required to have evidence of pre-existing condition (diagnosis/procedure/drug dispensing).

Maximum Episode Duration - truncates exposure episodes after a requester-specified number of exposed days. Applied after any gaps are bridged and extension days added to the length of the exposure episode.

Member-Years - sum of all days of enrollment with medical and drug coverage in the query period preceded by an exposure washout period all divided by 365.25.

Minimum Days Supplied - specifies a minimum number of days in length of the days supplied for the episode to be considered.

Minimum Episode Duration - specifies a minimum number of days in length of the episode for it to be considered. Applied after any gaps are bridged and extension days added to the length of the exposure episode.

Monitoring Period - used to define time periods of interest for both sequential analysis and simple cohort characterization requests.

Principal Diagnosis (PDX) - diagnosis or condition established to be chiefly responsible for admission of the patient to the hospital. 'P' = principal diagnosis, 'S' = secondary diagnosis, 'X' = unspecified diagnosis, '.' = blank. Along with the Care Setting values, forms the Caresetting/PDX parameter.

Query Period - period in which the modular program looks for exposures and outcomes of interest.

Treatment Episode Truncation Indicator - indicates whether the exposure episode will be truncated at the occurrence of a requester-specified code.

Washout Period (drug/exposure) - number of days a user is required to have no evidence of prior exposure (drug dispensing/procedure) and continuous drug and medical coverage prior to an incident treatment episode.

Washout Period (event/outcome) - number of days a user is required to have no evidence of a prior event (procedure/diagnosis) and continuous drug and medical coverage prior to an incident treatment episode.

Years at Risk - number of days supplied plus any episode gaps and exposure extension periods all divided by 365.25.

*all terms may not be used in this report

Glossary of Terms for Analyses Using Propensity Score Analysis (PSA) Tool*

Covariate - requester defined binary variable to include in the propensity score estimation model (e.g., diabetes, heart failure, etc.) during requester-defined lookback period. Requester may also choose to add any of the following categorical, continuous, or count metrics to the propensity score estimation model:

1. Age (continuous)
2. Sex
3. Time period (i.e., monitoring period for sequential analyses)
4. Year of exposure
5. Comorbidity score
6. Medical utilization – number of inpatient stays
7. Medical utilization – number of institutional stays
8. Medical utilization – number of emergency department visits
9. Medical utilization – number of outpatient visits
10. Health care utilization – number of other ambulatory encounters (e.g., telemedicine, email consults)
11. Drug utilization – number of dispensings
12. Drug utilization – number of unique generics dispensed
13. Drug Utilization – number of unique drug classes dispensed

Covariate Evaluation Window - specified number of days relative to index date to evaluate the occurrence of covariates of interest. Note: members are required to have continuous enrollment during the covariate evaluation window, regardless of the value included in the "Continuous enrollment before exposure" field.

Individual Level Data Return - program may return individual-level, de-identified datasets to the Sentinel Operations Center (SOC). While the datasets contain a single row per patient for each specified analysis, patient identifiers such as a patient ID are not included in the output. Individual-level datasets are returned to the SOC, aggregated, and used to calculate effect estimates via Cox (proportional hazards) regression.

Mahalanobis Distance - provides a measure of balance across all variables while accounting for their correlation.

Matching Caliper - maximum allowed difference in propensity scores between treatment and control patients. Requester may select any caliper (e.g., 0.01, 0.025, and 0.05).

Matching Ratio - patients in exposed and comparator groups are nearest neighbor matched by a 1:1 or 1:n (up to 10) matching ratio.

Matched Conditional and Unconditional Analysis - in a conditional matched analysis, a Cox model, stratified by Data Partner site and matched set, is run on the matched population. This can be done for both the both 1:1 and 1:n matched cohorts. In an unconditional analysis, a Cox model, stratified by Data Partner site only, is run on the matched population. This can be done for the 1:1 matched cohort only.

Propensity Score Stratification - option to stratify propensity scores based on requester-defined percentiles in the unmatched population. In a stratified analysis, a Cox model, stratified by Data Partner site, is run on the stratified population. Note that all patients identified in exposure and comparator cohorts are used in the analysis.

PSM Tool - performs effect estimation by comparing exposure propensity-score matched parallel new user cohorts. Propensity score estimation and matching are conducted within each Sentinel Data Partner site via distributed programming code; data are returned to the SOC, aggregated, and used to calculate effect estimates.

Risk-set Level Data Return - alternative to the patient-level data return approach. In this approach, the PSM tool will produce de-identified, risk-set level datasets instead of or in addition to individual-level output. Whereas each observation in the patient-level datasets represents one patient in the cohort, each observation in the risk set dataset represents one event. Risk sets are created at the Data Partner site, returned to the SOC, aggregated, and used to calculate effect estimates via case-centered logistic regression.

Subgroup Analysis - may be conducted using any requester-defined covariates. Subgroup analyses may be performed in the unmatched and the matched population.

Zero Cell Correction - indicator for whether to screen variables with a zero correction added to each cell in the confounder/outcome 2x2 table. Recommended when the number of exposed outcomes is fewer than 150.

*all terms may not be used in this report

Table 1a. Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Unmatched, Aggregated), Ratio: 1:1, Caliper: 0.05, Hysterectomy Outcome

Characteristic	Medical Product				Covariate Balance	
	Hysteroscopic Sterilization		Laparoscopic Tubal Ligation		Absolute Difference	Standardized Difference
	Number of Patients	%	Number of Patients	%		
Patients	105,718	100.0%	459,752	100.0%	-	-
Demographics	Mean	Standard Deviation	Mean	Standard Deviation		
Mean age (years)	37.1	5.7	34.4	5.5	2.701	0.484
	Number of Patients	%	Number of Patients	%		
Age (years)						
21-30	17,001	16.1%	130,908	28.5%	-12.392	-0.301
31-40	59,752	56.5%	269,123	58.5%	-2.016	-0.041
41-50	28,965	27.4%	59,721	13.0%	14.409	0.365
Gender: Female	105,718	100.0%	459,752	100.0%	0.000	-
Year						
2008	8,020	7.6%	50,951	11.1%	-3.823	-0.129
2009	15,006	14.2%	64,540	14.0%	-0.090	-0.003
2010	16,619	15.7%	62,468	13.6%	2.137	0.060
2011	16,968	16.1%	61,244	13.3%	2.739	0.077
2012	16,272	15.4%	59,485	12.9%	2.453	0.070
2013	15,821	15.0%	62,194	13.5%	1.438	0.041
2014	10,900	10.3%	58,208	12.7%	-2.350	-0.074
2015	6,112	5.8%	40,662	8.8%	-3.062	-0.118
Recorded history of during Baseline Period:	Mean	Standard Deviation	Mean	Standard Deviation		
Charlson/Elixhauser combined comorbidity score ¹	0.2	0.7	0.2	0.6	-0.029	-0.045
	Number of Patients	%	Number of Patients	%		
Pelvic Pain	9,428	8.9%	51,898	11.3%	-2.370	-0.079
Uterine Fibroids	4,696	4.4%	22,537	4.9%	-0.460	-0.022
Pregnancy - Prior 6 Months	25,606	24.2%	325,946	70.9%	-46.675	-1.057
Health Service Utilization Intensity:	Mean	Standard Deviation	Mean	Standard Deviation		
Mean number of ambulatory encounters (AV)	8.3	6.4	10.4	7.1	-2.101	-0.311
Mean number of emergency room encounters (ED)	0.2	0.7	0.4	1	-0.171	-0.199
Mean number of inpatient hospital encounters (IP)	0.3	0.5	0.8	0.7	-0.533	-0.850
Mean number of non-acute institutional encounters (IS)	0	0.1	0	0.1	-0.004	-0.039
Mean number of other ambulatory encounters (OA)	1.7	2.7	2.5	3.6	-0.809	-0.256

¹ The Charlson/Elixhauser combined comorbidity score is calculated based on comorbidities observed during a requester-defined window around the exposure episode start date (index date).

Table 1b. Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Matched, Aggregated), Ratio: 1:1, Caliper: 0.05, Hysterectomy Outcome

Characteristic	Medical Product				Covariate Balance	
	Hysteroscopic Sterilization		Laparoscopic Tubal Ligation		Absolute Difference	Standardized Difference
	Number of Patients	%	Number of Patients	%		
Patients	104,212	98.6%	104,212	22.7%	-	-
Demographics	Mean	Standard Deviation	Mean	Standard Deviation		
Mean age (years)	37.1	5.7	37.1	5.7	-0.043	-0.008
	Number of Patients	%	Number of Patients	%		
Age (years)						
21-30	16,934	16.2%	16,646	16.0%	0.276	0.008
31-40	59,018	56.6%	59,133	56.7%	-0.110	-0.002
41-50	28,260	27.1%	28,433	27.3%	-0.166	-0.004
Gender: Female	104,212	100.0%	104,212	100.0%	0.000	-
Year						
2008	7,876	7.6%	12,226	11.7%	-4.329	-0.145
2009	14,776	14.2%	15,829	15.2%	-1.048	-0.029
2010	16,335	15.7%	14,755	14.2%	1.530	0.043
2011	16,738	16.1%	13,619	13.1%	3.019	0.085
2012	16,076	15.4%	12,919	12.4%	3.029	0.088
2013	15,623	15.0%	14,000	13.4%	1.557	0.045
2014	10,773	10.3%	12,614	12.1%	-1.767	-0.056
2015	6,015	5.8%	8,250	7.9%	-2.148	-0.085
Recorded history of during Baseline Period:	Mean	Standard Deviation	Mean	Standard Deviation		
Charlson/Elixhauser combined comorbidity score ¹	0.2	0.7	0.2	0.6	-0.010	-0.015
	Number of Patients	%	Number of Patients	%		
Pelvic Pain	9,425	9.0%	9,449	9.1%	-0.023	-0.001
Uterine Fibroids	4,693	4.5%	4,638	4.5%	0.053	0.003
Pregnancy - Prior 6 Months	25,606	24.6%	25,607	24.6%	-0.001	0.000
Health Service Utilization Intensity:	Mean	Standard Deviation	Mean	Standard Deviation		
Mean number of ambulatory encounters (AV)	8.3	6.4	8.4	6.1	-0.012	-0.002
Mean number of emergency room encounters (ED)	0.2	0.7	0.2	0.7	-0.007	-0.011
Mean number of inpatient hospital encounters (IP)	0.3	0.5	0.3	0.5	-0.005	-0.009
Mean number of non-acute institutional encounters (IS)	0	0.1	0	0.1	0.000	-0.003
Mean number of other ambulatory encounters (OA)	1.7	2.6	1.7	2.5	-0.001	0.000

¹ The Charlson/Elixhauser combined comorbidity score is calculated based on comorbidities observed during a requester-defined window around the exposure episode start date (index date).

Table 1c. Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Unmatched, Aggregated), Ratio: 1:1, Caliper: 0.05, Salpingectomy Outcome

Characteristic	Medical Product				Covariate Balance	
	Hysteroscopic Sterilization		Laparoscopic Tubal Ligation		Absolute Difference	Standardized Difference
	Number of Patients	%	Number of Patients	%		
Patients	105,668	100.0%	448,237	100.0%	-	-
Demographics	Mean	Standard Deviation	Mean	Standard Deviation		
Mean age (years)	37.1	5.7	34.4	5.4	2.764	0.496
	Number of Patients	%	Number of Patients	%		
Age (years)						
21-30	16,995	16.1%	128,846	28.7%	-12.662	-0.307
31-40	59,719	56.5%	262,674	58.6%	-2.086	-0.042
41-50	28,954	27.4%	56,717	12.7%	14.748	0.375
Gender: Female	105668	100.0%	448,237	100.0%	0.000	-
Year						
2008	8,017	7.6%	50,029	11.2%	-3.910	-0.132
2009	15,005	14.2%	63,304	14.1%	-0.179	-0.005
2010	16,614	15.7%	61,233	13.7%	2.066	0.058
2011	16,964	16.1%	60,051	13.4%	2.666	0.075
2012	16,262	15.4%	58,288	13.0%	2.386	0.068
2013	15,811	15.0%	60,774	13.6%	1.404	0.040
2014	10,889	10.3%	56,312	12.6%	-2.258	-0.071
2015	6,106	5.8%	38,246	8.5%	-2.753	-0.107
Recorded history of during Baseline Period:	Mean	Standard Deviation	Mean	Standard Deviation		
Charlson/Elixhauser combined comorbidity score ¹	0.2	0.7	0.2	0.6	-0.029	-0.044
	Number of Patients	%	Number of Patients	%		
Pelvic Pain	9,408	8.9%	48,342	10.8%	-1.882	-0.063
Uterine Fibroids	4,696	4.4%	21,523	4.8%	-0.358	-0.017
Pregnancy - Prior 6 Months	25,598	24.2%	322,025	71.8%	-47.618	-1.084
Health Service Utilization Intensity:	Mean	Standard Deviation	Mean	Standard Deviation		
Mean number of ambulatory encounters (AV)	8.3	6.4	10.4	7.1	-2.114	-0.313
Mean number of emergency room encounters (ED)	0.2	0.7	0.4	1	-0.170	-0.200
Mean number of inpatient hospital encounters (IP)	0.3	0.5	0.8	0.7	-0.543	-0.866
Mean number of non-acute institutional encounters (IS)	0	0.1	0	0.1	-0.004	-0.039
Mean number of other ambulatory encounters (OA)	1.7	2.7	2.5	3.6	-0.809	-0.256

¹ The Charlson/Elixhauser combined comorbidity score is calculated based on comorbidities observed during a requester-defined window around the exposure episode start date (index date).

Table 1d. Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Matched, Aggregated), Ratio: 1:1, Caliper: 0.05, Salpingectomy Outcome

Characteristic	Medical Product				Covariate Balance	
	Hysteroscopic Sterilization		Laparoscopic Tubal Ligation		Absolute Difference	Standardized Difference
	Number of Patients	%	Number of Patients	%		
Patients	103,724	98.2%	103,724	23.1%	-	-
Demographics	Mean	Standard Deviation	Mean	Standard Deviation		
Mean age (years)	37.1	5.7	37.1	5.7	-0.024	-0.004
	Number of Patients	%	Number of Patients	%		
Age (years)						
21-30	16,930	16.3%	16,657	16.1%	0.263	0.007
31-40	58,825	56.7%	59,068	56.9%	-0.234	-0.005
41-50	27,969	27.0%	27,999	27.0%	-0.029	-0.001
Gender: Female	103,724	100.0%	103,724	100.0%	0.000	-
Year						
2008	7,837	7.6%	12,299	11.9%	-4.462	-0.149
2009	14,717	14.2%	15,924	15.4%	-1.207	-0.034
2010	16,276	15.7%	14,872	14.3%	1.366	0.038
2011	16,648	16.1%	13,710	13.2%	2.858	0.081
2012	15,975	15.4%	13,029	12.6%	2.840	0.082
2013	15,566	15.0%	13,993	13.5%	1.517	0.043
2014	10,709	10.3%	12,130	11.7%	-1.370	-0.044
2015	5,996	5.8%	7,767	7.5%	-1.710	-0.069
Recorded history of during Baseline Period:	Mean	Standard Deviation	Mean	Standard Deviation		
Charlson/Elixhauser combined comorbidity score ¹	0.2	0.7	0.2	0.6	-0.008	-0.012
	Number of Patients	%	Number of Patients	%		
Pelvic Pain	9,398	9.1%	9,370	9.0%	0.027	0.001
Uterine Fibroids	4,696	4.5%	4,671	4.5%	0.024	0.001
Pregnancy - Prior 6 Months	25,598	24.7%	25,597	24.7%	0.001	0.000
Health Service Utilization Intensity:	Mean	Standard Deviation	Mean	Standard Deviation		
Mean number of ambulatory encounters (AV)	8.3	6.4	8.4	6.1	-0.016	-0.003
Mean number of emergency room encounters (ED)	0.2	0.7	0.2	0.7	-0.004	-0.006
Mean number of inpatient hospital encounters (IP)	0.3	0.5	0.3	0.5	-0.005	-0.010
Mean number of non-acute institutional encounters (IS)	0	0.1	0	0.1	0.000	-0.002
Mean number of other ambulatory encounters (OA)	1.7	2.6	1.7	2.6	-0.016	-0.006

¹ The Charlson/Elixhauser combined comorbidity score is calculated based on comorbidities observed during a requester-defined window around the exposure episode start date (index date).

Table 1e. Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Unmatched, Aggregated), Ratio: 1:1, Caliper: 0.05, Hysterectomy or Salpingectomy Outcome

Characteristic	Medical Product				Covariate Balance	
	Hysteroscopic Sterilization		Laparoscopic Tubal Ligation		Absolute Difference	Standardized Difference
	Number of Patients	%	Number of Patients	%		
Patients	105,640	100.0%	447,388	100.0%	-	-
Demographics	Mean	Standard Deviation	Mean	Standard Deviation		
Mean age (years)	37.1	5.7	34.4	5.4	2.770	0.497
	Number of Patients	%	Number of Patients	%		
Age (years)						
21-30	16,991	16.1%	128,739	28.8%	-12.692	-0.308
31-40	59,708	56.5%	262,203	58.6%	-2.087	-0.042
41-50	28,941	27.4%	56,446	12.6%	14.779	0.376
Gender: Female	105,640	100.0%	447,388	100.0%	0.000	-
Year						
2008	8,017	7.6%	49,957	11.2%	-3.914	-0.132
2009	15,000	14.2%	63,201	14.1%	-0.185	-0.005
2010	16,610	15.7%	61,121	13.7%	2.065	0.058
2011	16,959	16.1%	59,919	13.4%	2.670	0.075
2012	16,259	15.4%	58,174	13.0%	2.388	0.068
2013	15,807	15.0%	60,656	13.6%	1.405	0.040
2014	10,885	10.3%	56,203	12.6%	-2.259	-0.071
2015	6,103	5.8%	38,157	8.5%	-2.751	-0.107
Recorded history of during Baseline Period:	Mean	Standard Deviation	Mean	Standard Deviation		
Charlson/Elixhauser combined comorbidity score ¹	0.2	0.7	0.2	0.6	-0.028	-0.044
	Number of Patients	%	Number of Patients	%		
Pelvic Pain	9,400	8.9%	48,126	10.8%	-1.859	-0.062
Uterine Fibroids	4,685	4.4%	21,244	4.7%	-0.314	-0.015
Pregnancy - Prior 6 Months	25,595	24.2%	321,616	71.9%	-47.659	-1.085
Health Service Utilization Intensity:	Mean	Standard Deviation	Mean	Standard Deviation		
Mean number of ambulatory encounters (AV)	8.3	6.4	10.4	7.1	-2.113	-0.313
Mean number of emergency room encounters (ED)	0.2	0.7	0.4	1	-0.170	-0.200
Mean number of inpatient hospital encounters (IP)	0.3	0.5	0.8	0.7	-0.543	-0.866
Mean number of non-acute institutional encounters (IS)	0	0.1	0	0.1	-0.004	-0.039
Mean number of other ambulatory encounters (OA)	1.7	2.7	2.5	3.6	-0.809	-0.256

¹ The Charlson/Elixhauser combined comorbidity score is calculated based on comorbidities observed during a requester-defined window around the exposure episode start date (index date).

Table 1f. Baseline Characteristics of New Initiators of Hysteroscopic Sterilization and Laparoscopic Tubal Ligation, (Matched, Aggregated), Ratio: 1:1, Caliper: 0.05, Hysterectomy or Salpingectomy Outcome

Characteristic	Medical Product				Covariate Balance	
	Hysteroscopic Sterilization		Laparoscopic Tubal Ligation		Absolute Difference	Standardized Difference
	Number of Patients	%	Number of Patients	%		
Patients (N)	103,690	98.2%	103,690	23.2%	-	-
Demographics	Mean	Standard Deviation	Mean	Standard Deviation		
Mean age (years)	37.1	5.7	37.1	5.7	-0.004	-0.001
	Number of Patients	%	Number of Patients	%		
Age (years)						
21-30	16,928	16.3%	16,672	16.1%	0.247	0.007
31-40	58,793	56.7%	59,244	57.1%	-0.435	-0.009
41-50	27,969	27.0%	27,774	26.8%	0.188	0.004
Gender: Female	103,690	100.0%	103,690	100.0%	0.000	-
Year						
2008	7,856	7.6%	12,175	11.7%	-4.321	-0.144
2009	14,704	14.2%	15,961	15.4%	-1.257	-0.035
2010	16,238	15.7%	14,895	14.4%	1.307	0.036
2011	16,658	16.1%	13,781	13.3%	2.799	0.079
2012	15,990	15.4%	12,934	12.5%	2.947	0.085
2013	15,564	15.0%	14,024	13.5%	1.485	0.042
2014	10,697	10.3%	12,181	11.7%	-1.431	-0.046
2015	5,983	5.8%	7,739	7.5%	-1.696	-0.068
Recorded history of during Baseline Period:	Mean	Standard Deviation	Mean	Standard Deviation		
Charlson/Elixhauser combined comorbidity score ¹	0.2	0.7	0.2	0.6	-0.008	-0.013
	Number of Patients	%	Number of Patients	%		
Pelvic Pain	9,391	9.1%	9,345	9.0%	0.044	0.002
Uterine Fibroids	4,684	4.5%	4,599	4.4%	0.082	0.004
Pregnancy - Prior 6 Months	25,595	24.7%	25,598	24.7%	-0.003	0.000
Health Service Utilization Intensity:	Mean	Standard Deviation	Mean	Standard Deviation		
Mean number of ambulatory encounters (AV)	8.3	6.4	8.4	6.1	-0.009	-0.001
Mean number of emergency room encounters (ED)	0.2	0.7	0.2	0.7	-0.005	-0.007
Mean number of inpatient hospital encounters (IP)	0.3	0.5	0.3	0.5	-0.004	-0.008
Mean number of non-acute institutional encounters (IS)	0	0.1	0	0.1	0.000	-0.004
Mean number of other ambulatory encounters (OA)	1.7	2.6	1.7	2.5	-0.011	-0.004

¹ The Charlson/Elixhauser combined comorbidity score is calculated based on comorbidities observed during a requester-defined window around the exposure episode start date (index date).

Table 2. Effect Estimates for Outcome of Hysterectomy, by Analysis Type

Medical Product	Number of New Users	Person-Years at Risk	Average Person-Days at Risk	Average Person-Years at Risk	Number of Events	Incidence Rate per 1,000 Person-Years	Risk per 1,000 New Users	Incidence Rate Difference per 1,000 Person-Years	Difference in Risk per 1,000 New Users	Hazard Ratio (95% CI)	Wald P-Value
Unmatched Analysis (Site-adjusted only)											
Hysteroscopic Sterilization	105,718	234,624.64	810.62	2.22	4,419	18.83	41.80	0.15	2.65	1.01 (0.98, 1.04)	0.5784
Laparoscopic Tubal Ligation	459,752	963,034.57	765.08	2.09	17,998	18.69	39.15				
1:1 Matched Unconditional Predefined Analysis; Caliper=0.05											
Hysteroscopic Sterilization	104,212	230,349.43	807.35	2.21	4,356	18.91	41.80	-4.09	-7.98	0.82 (0.79, 0.85)	<.0001
Laparoscopic Tubal Ligation	104,212	225,567.60	790.59	2.16	5,188	23.00	49.78				

Table 3. Effect Estimates for Outcome of Salpingectomy, by Analysis Type

Medical Product	Number of New Users	Person-Years at Risk	Average Person-Days at Risk	Average Person-Years at Risk	Number of Events	Incidence Rate per 1,000 Person-Years	Risk per 1,000 New Users	Incidence Rate Difference per 1,000 Person-Years	Difference in Risk per 1,000 New Users	Hazard Ratio (95% CI)	Wald P-Value
Unmatched Analysis (Site-adjusted only)											
Hysteroscopic Sterilization	105,668	239,624.41	828.28	2.27	1,738	7.25	16.45	2.66	6.53	1.65 (1.56, 1.74)	<.0001
Laparoscopic Tubal Ligation	448,237	968,433.24	789.14	2.16	4,446	4.59	9.92				
1:1 Matched Unconditional Predefined Analysis; Caliper=0.05											
Hysteroscopic Sterilization	103,724	234,175.64	824.62	2.26	1,699	7.26	16.38	1.98	4.46	1.39 (1.29, 1.49)	<.0001
Laparoscopic Tubal Ligation	103,724	234,362.97	825.28	2.26	1,236	5.27	11.92				

Table 4. Effect Estimates for Outcome of Hysterectomy or Salpingectomy, by Analysis Type

Medical Product	Number of New Users	Person-Years at Risk	Average Person-Days at Risk	Average Person-Years at Risk	Number of Events	Incidence Rate per 1,000 Person-Years	Risk per 1,000 New Users	Incidence Rate Difference per 1,000 Person-Years	Difference in Risk per 1,000 New Users	Hazard Ratio (95% CI)	Wald P-Value
Unmatched Analysis (Site-adjusted only)											
Hysteroscopic Sterilization	105,640	232,705.03	804.58	2.20	5,517	23.71	52.22	2.83	8.51	1.14 (1.11, 1.18)	<.0001
Laparoscopic Tubal Ligation	447,388	936,836.46	764.84	2.09	19,558	20.88	43.72				
1:1 Matched Unconditional Predefined Analysis; Caliper=0.05											
Hysteroscopic Sterilization	103,690	227,419.25	801.09	2.19	5,432	23.89	52.39	-2.54	-4.92	0.90 (0.87, 0.93)	<.0001
Laparoscopic Tubal Ligation	103,690	224,882.86	792.15	2.17	5,942	26.42	57.31				

Figure 1a. Histogram of Propensity Score Distributions Before and After Matching, Outcome of Hysteroscopic Sterilization, Aggregated

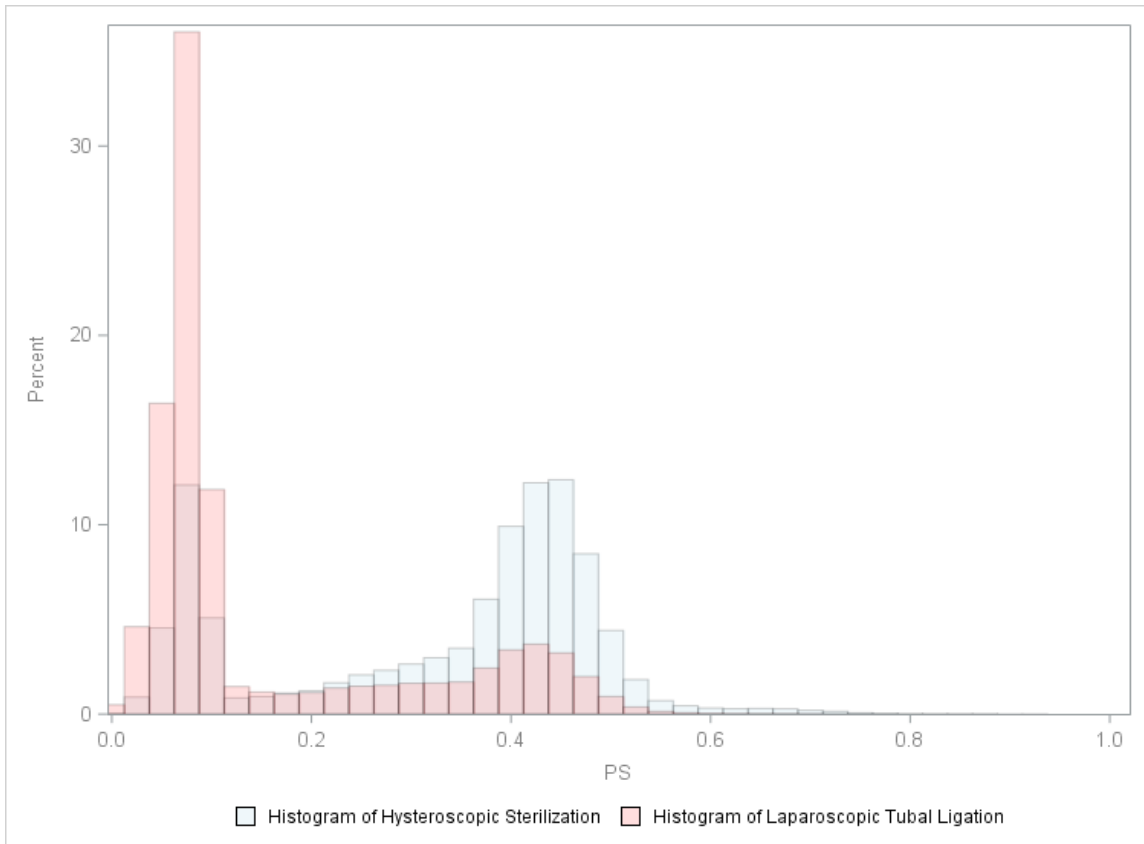


Figure 1b. Histogram of Propensity Score Distributions Before and After Matching, Outcome of Hysteroscopic Sterilization, 1:1 Aggregated Matched Cohort, Matched Caliper = 0.05

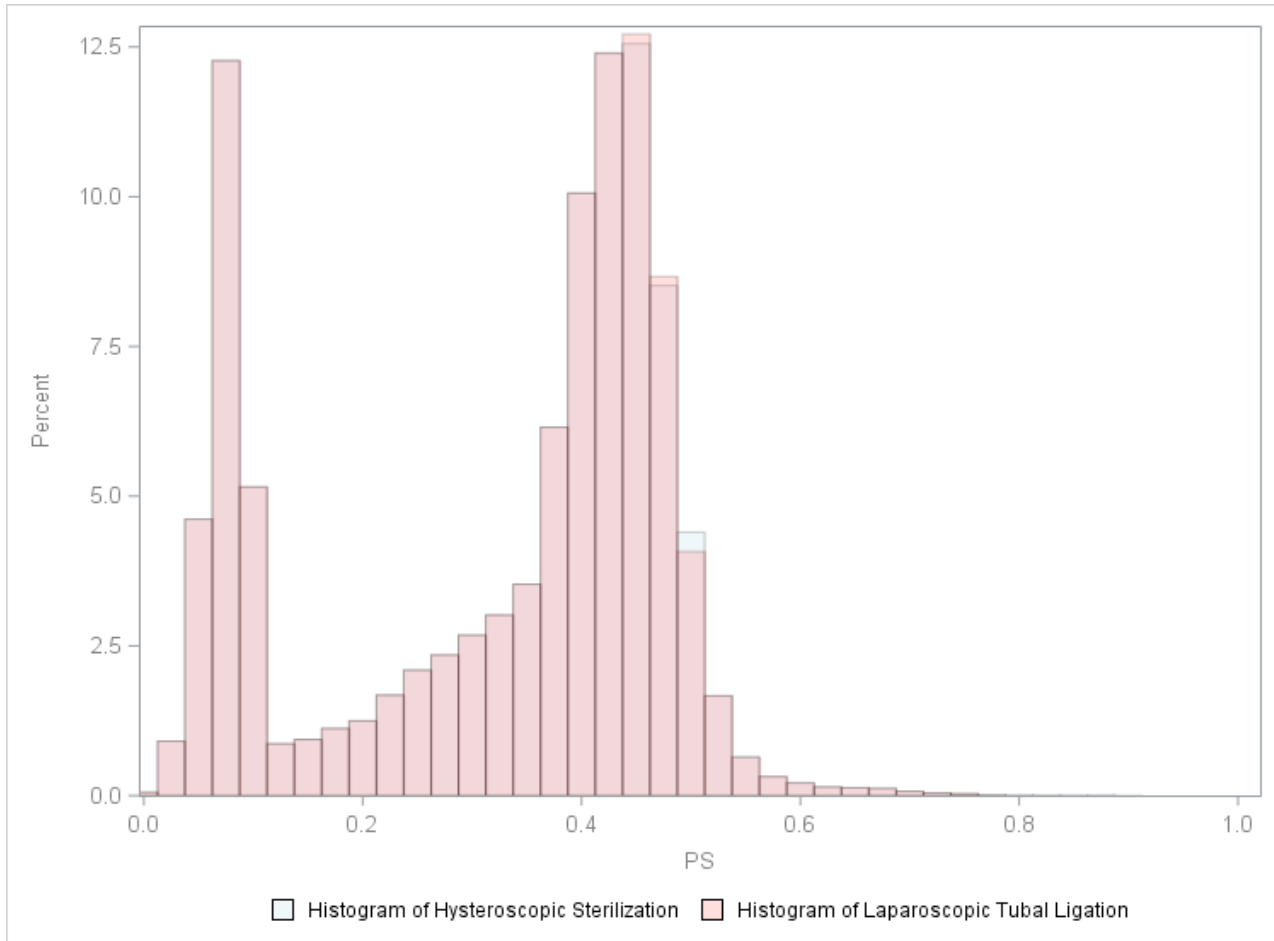


Figure 2a. Histogram of Propensity Score Distributions Before and After Matching, Outcome of Laparoscopic Tubal Ligation, Aggregated

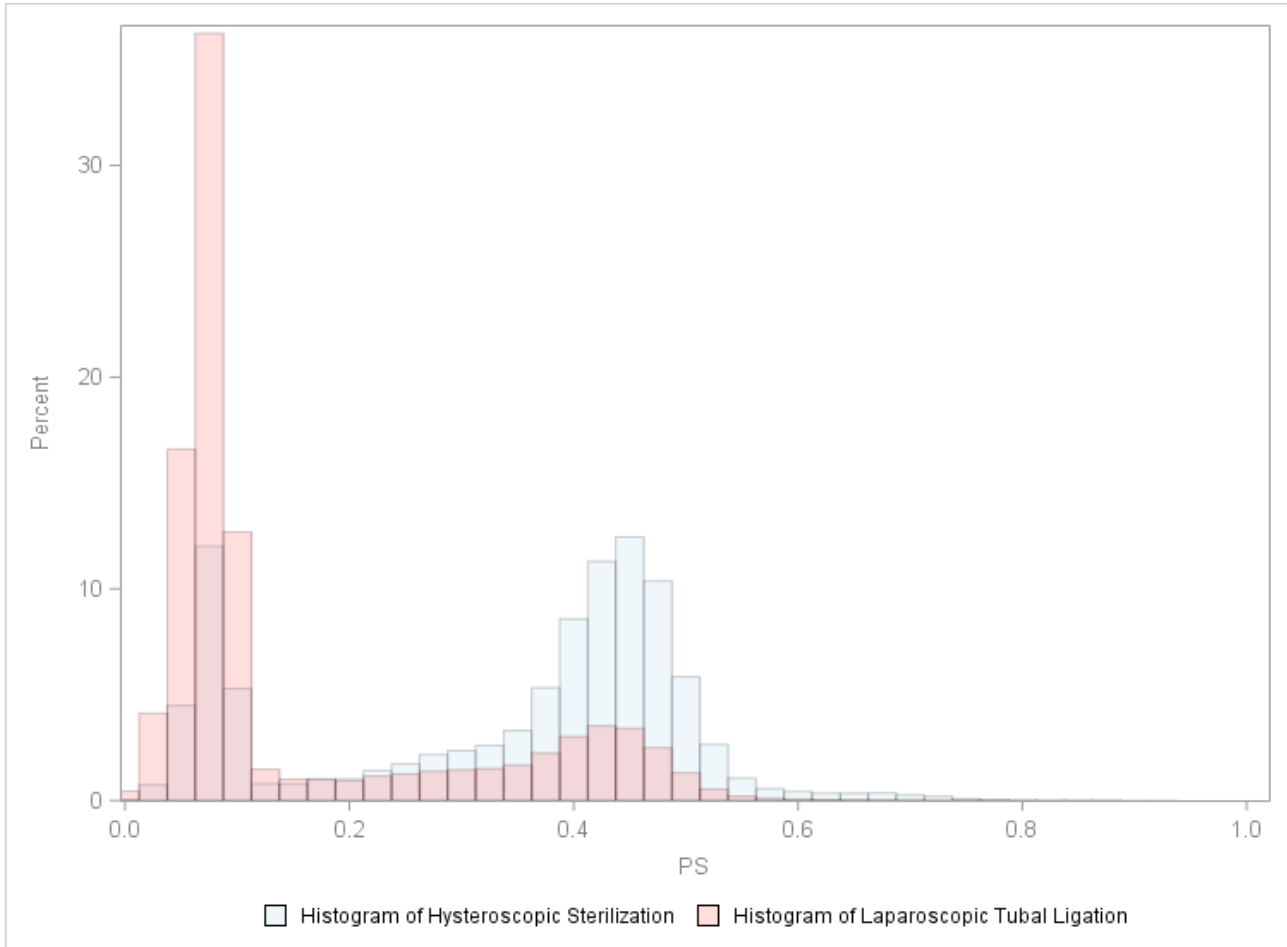


Figure 2b. Histogram of Propensity Score Distributions Before and After Matching, Outcome of Laparoscopic Tubal Ligation, 1:1 Aggregated Matched Cohort, Matched Caliper = 0.05

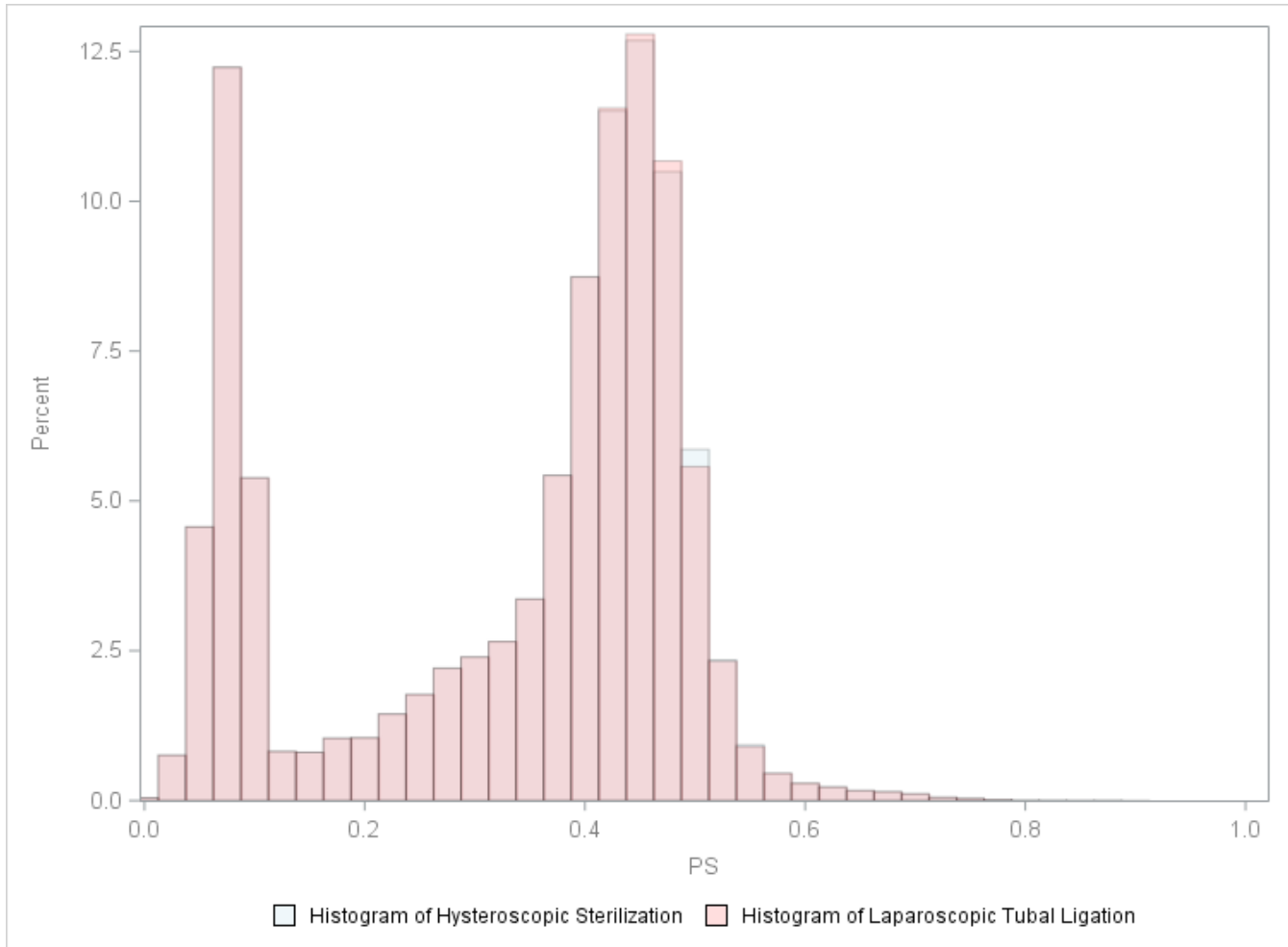


Figure 3a. Histogram of Propensity Score Distributions Before and After Matching, Outcome of Hysteroscopic Sterilization or Laparoscopic Tubal Ligation, Aggregated

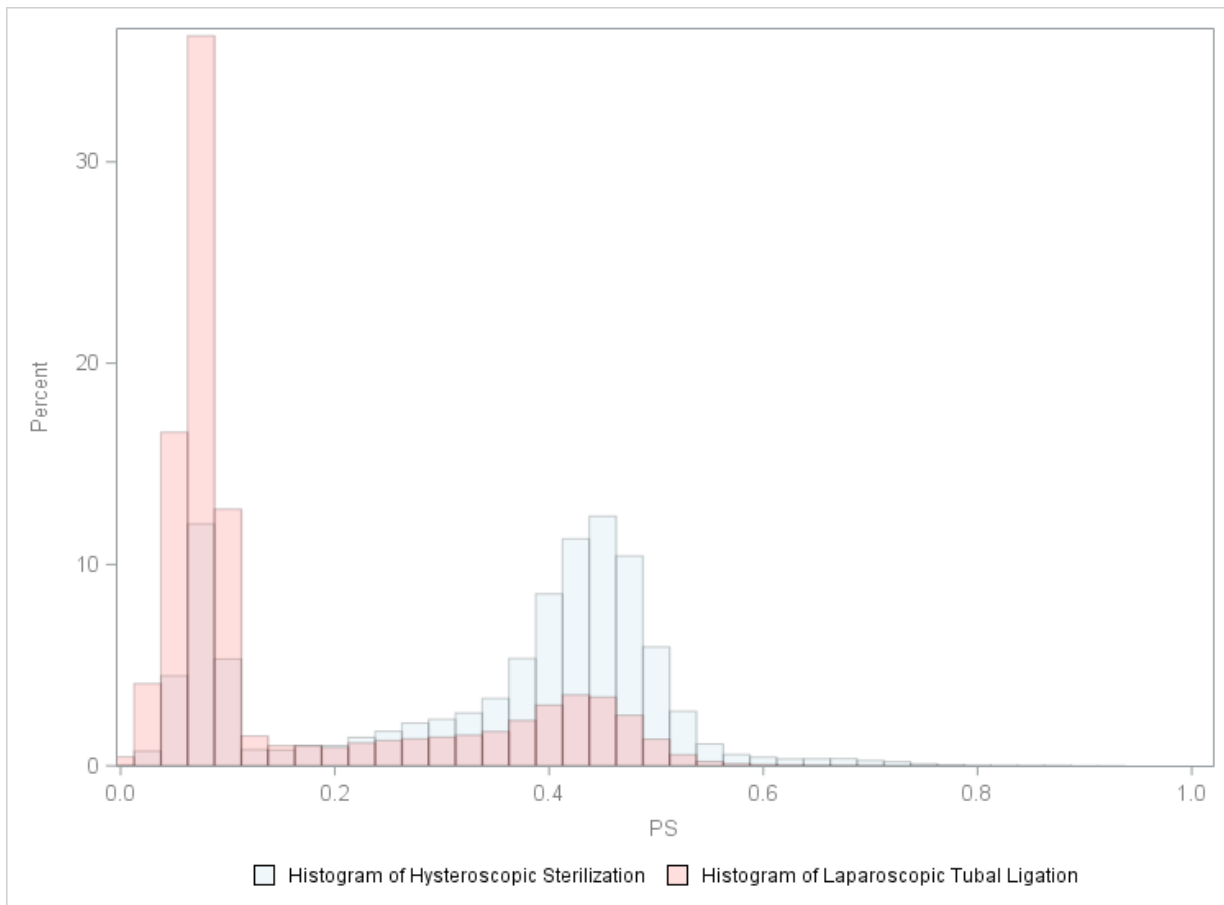


Figure 3b. Histogram of Propensity Score Distributions Before and After Matching, Outcome of Hysteroscopic Sterilization or Laparoscopic Tubal Ligation, 1:1 Aggregated Matched Cohort, Matched Caliper = 0.05

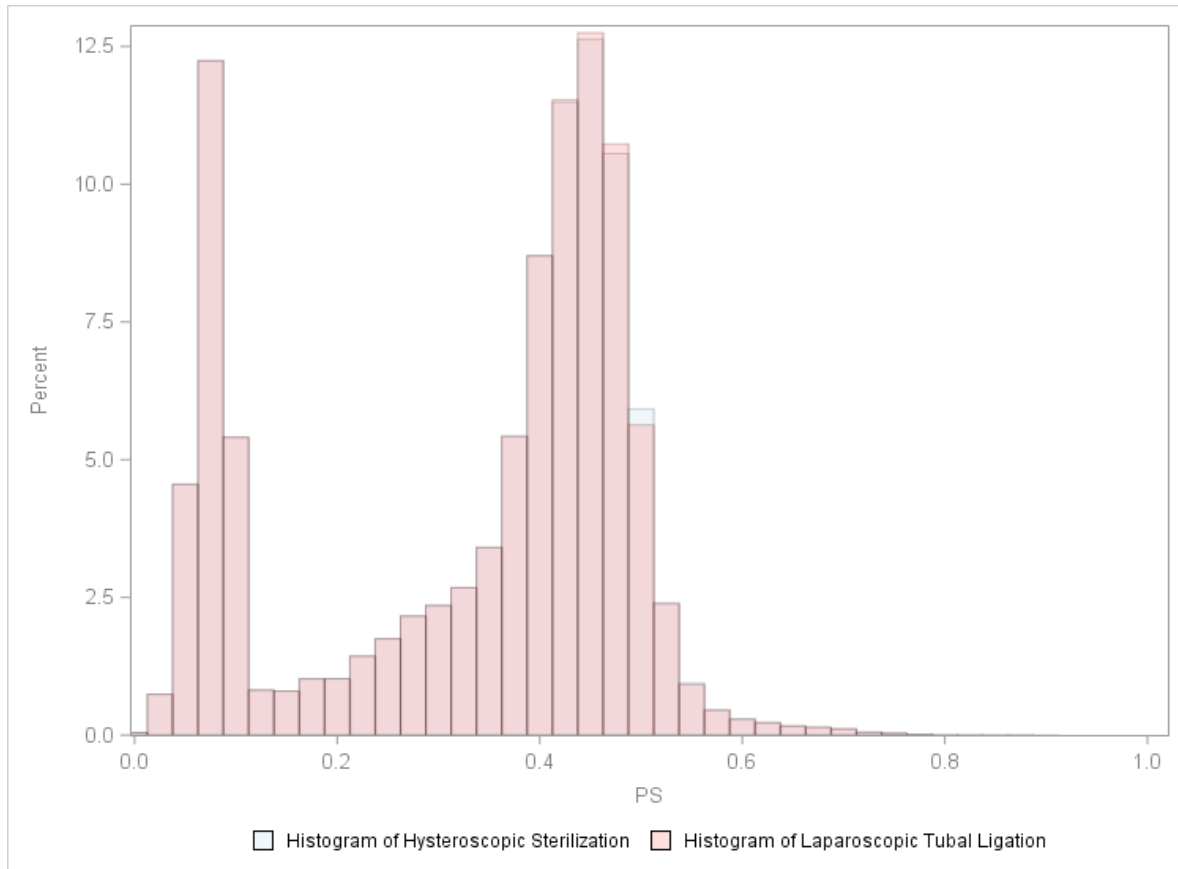
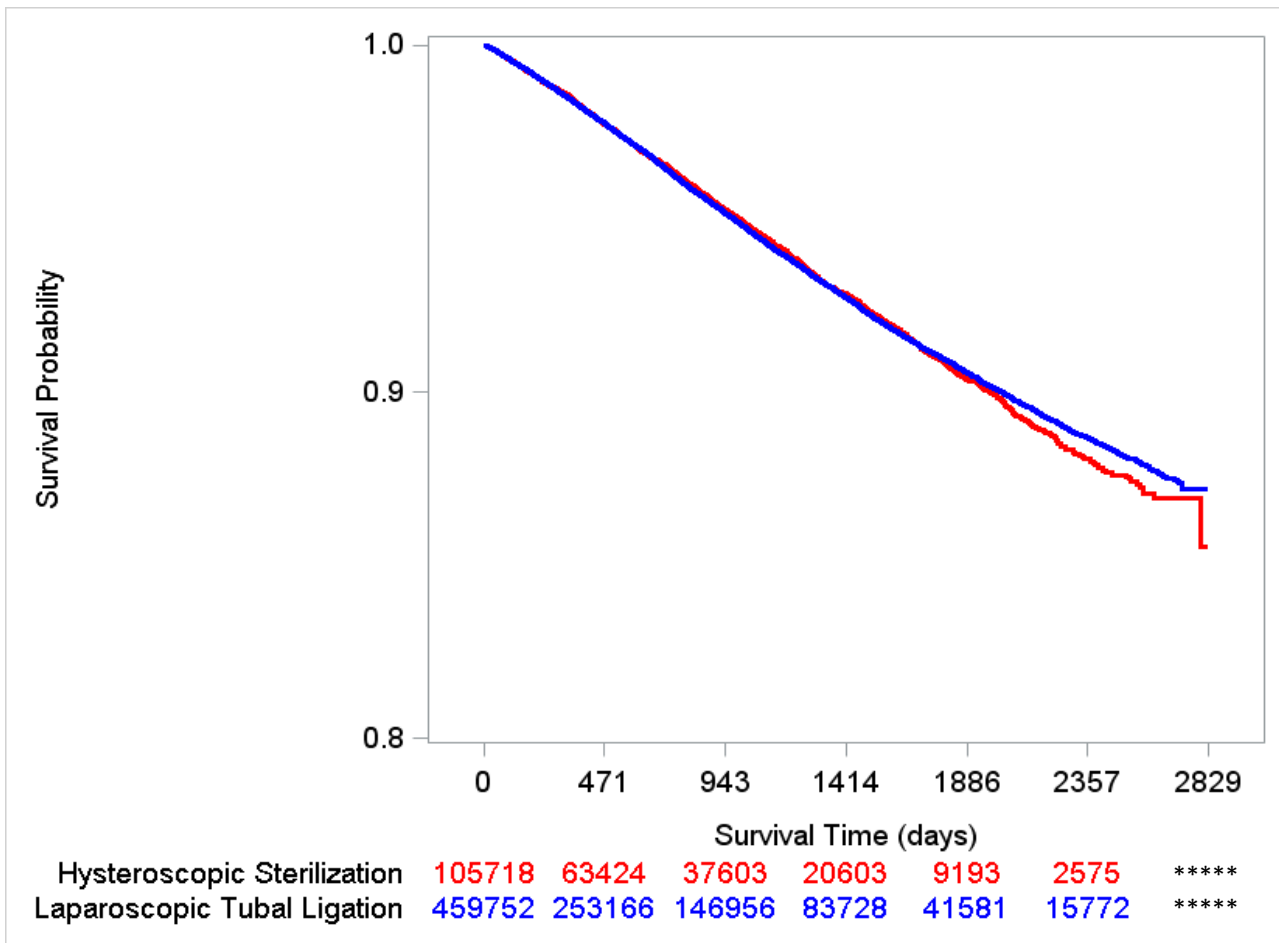
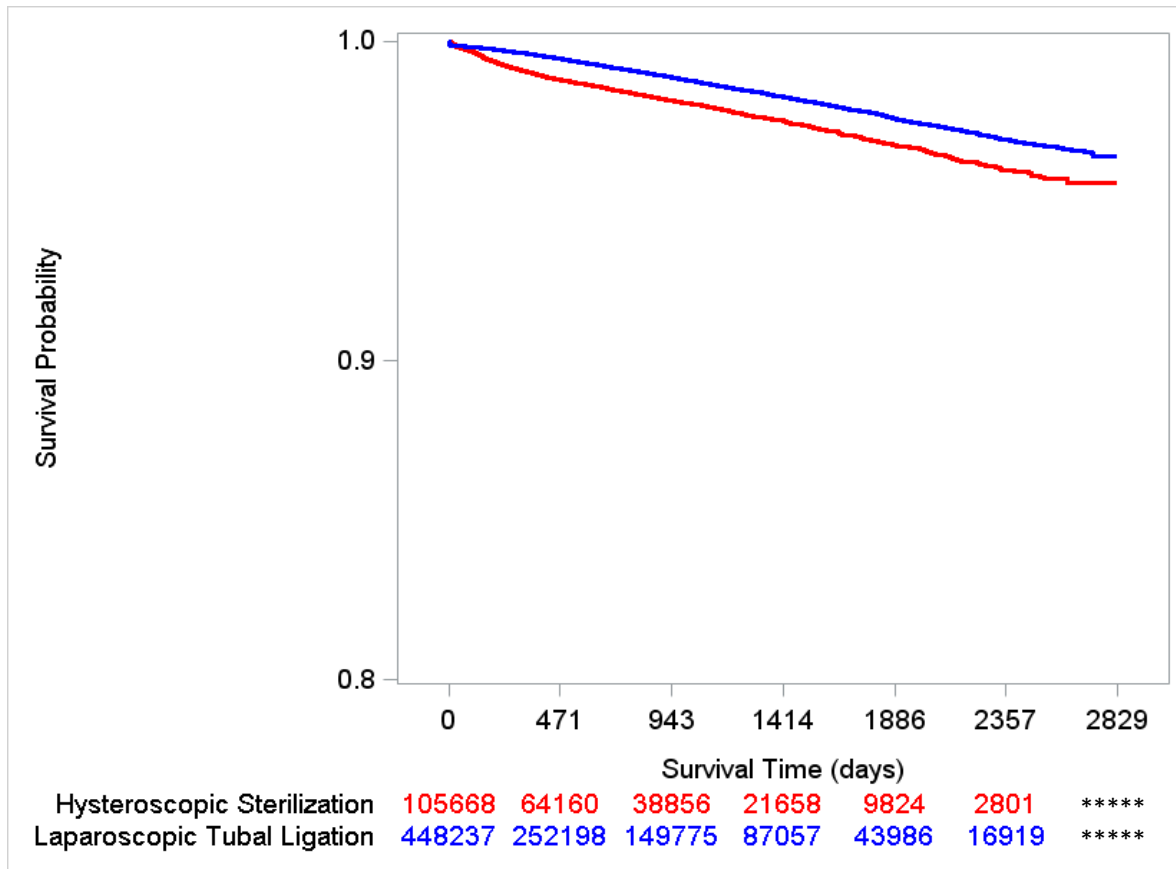


Figure 4. Kaplan Meier Survival Curves Depicting Time to Event or Time to Censor for First Treatment Episode per Patient in the Matched Population for Hysterectomy



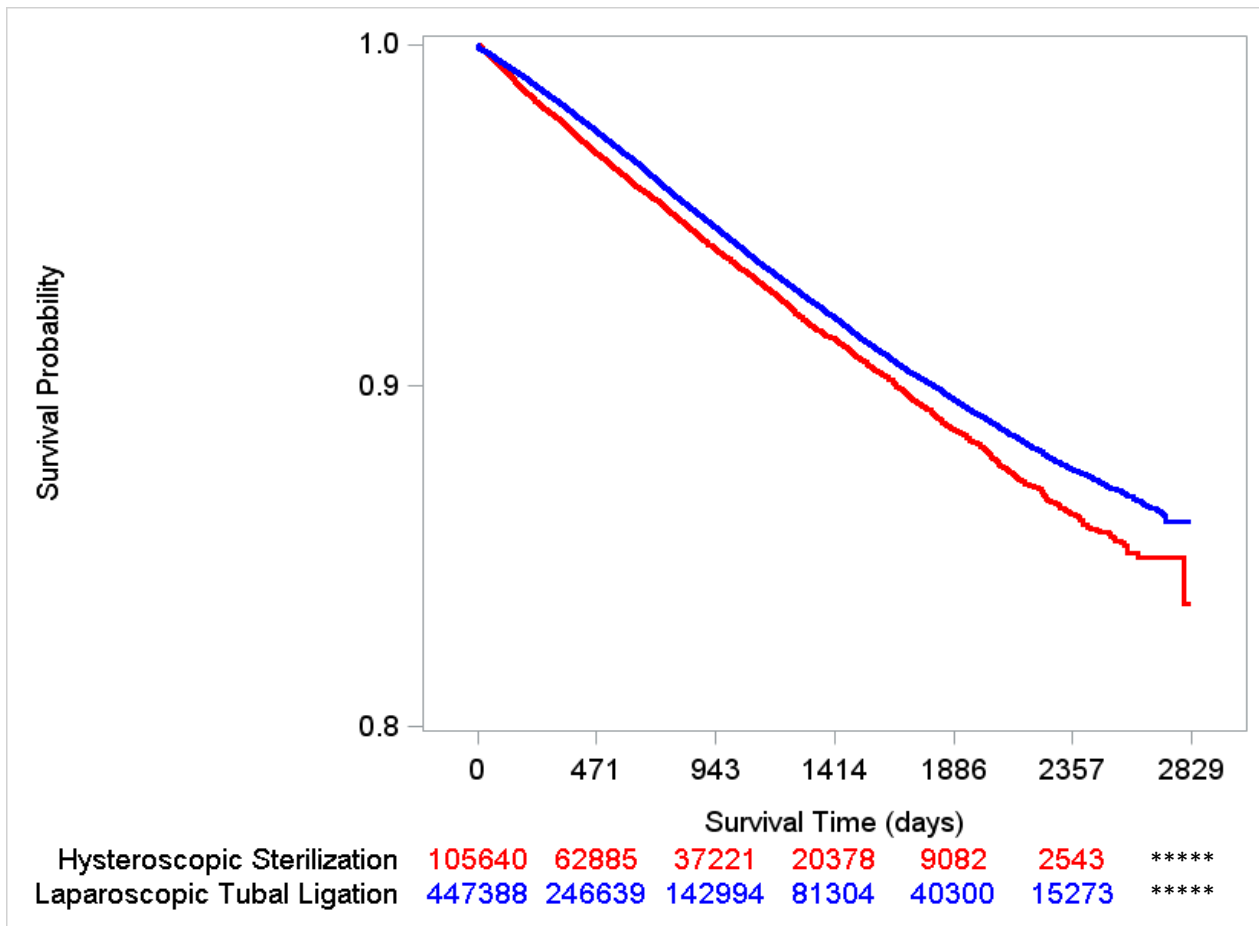
*****Data are not presented in these cells due to a small sample size or to assure a small cell cannot be recalculated through the cells presented.

Figure 5. Kaplan Meier Survival Curves Depicting Time to Event or Time to Censor for First Treatment Episode per Patient in the Matched Population for Salpingectomy



*****Data are not presented in these cells due to a small sample size or to assure a small cell cannot be recalculated through the cells presented.

Figure 6. Kaplan Meier Survival Curves Depicting Time to Event or Time to Censor for First Treatment Episode per Patient in the Matched Population for Hysterectomy or Salpingectomy



*****Data are not presented in these cells due to a small sample size or to assure a small cell cannot be recalculated through the cells presented.

Appendix A. Dates of Available Data in the Sentinel Distributed Database (SDD) as of Request End Date (September 30, 2015)

DPID	DP Start Date	DP End Date
DP01	06/01/2007	09/30/2015
DP02	01/01/2000	09/30/2015
DP03	01/01/2000	09/30/2015
DP04	01/01/2008	09/30/2015
DP05	01/01/2006	09/30/2015
DP06	01/01/2000	09/30/2015
DP07	01/01/2008	09/30/2015
DP08	01/01/2010	09/30/2015
DP09	01/01/2005	09/30/2015
DP10	01/01/2000	10/31/2014
DP11	01/01/2000	05/31/2015
DP12	01/01/2000	09/30/2015
DP13	01/01/2000	09/30/2015
DP14	01/01/2000	09/30/2015
DP15	01/01/2004	09/30/2015
DP16	01/01/2000	09/30/2015
DP17	01/01/2012	09/30/2015

Appendix B. List of Current Procedural Terminology, Fourth Revision (CPT-4), Healthcare Common Procedure Coding System (HCPCS), and International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) Procedure Codes Used to Define Exposures in this Request

Description	Code	Code Type
Hysteroscopic Sterilization		
Hysteroscopy, surgical; with bilateral fallopian tube cannulation to induce occlusion by placement of permanent implants	58565	CPT-4
Permanent implantable contraceptive intratubal occlusion device(s) and delivery system	A4264	HCPCS
Laparoscopic Tubal Ligation		
Bilateral endoscopic destruction or occlusion of fallopian tubes	66.2	ICD-9-CM
Bilateral endoscopic ligation and crushing of fallopian tubes	66.21	ICD-9-CM
Bilateral endoscopic ligation and division of fallopian tubes	66.22	ICD-9-CM
Other bilateral endoscopic destruction or occlusion of fallopian tubes	66.29	ICD-9-CM
Other bilateral destruction or occlusion of fallopian tubes	66.3	ICD-9-CM
Other bilateral destruction or occlusion of fallopian tubes	66.39	ICD-9-CM
Other bilateral ligation and division of fallopian tubes	66.32	ICD-9-CM
Other bilateral ligation and crushing of fallopian tubes	66.31	ICD-9-CM
Unilateral destruction or occlusion of fallopian tube	66.92	ICD-9-CM
Laparoscopy, surgical; with fulguration of oviducts (with or without transection)	58670	CPT-4
Laparoscopy, surgical; with occlusion of oviducts by device (eg, band, clip, or Falope ring)	58671	CPT-4
Ligation or transection of fallopian tube(s), abdominal or vaginal approach, unilateral or bilateral	58600	CPT-4
Ligation or transection of fallopian tube(s), abdominal or vaginal approach, postpartum, unilateral or bilateral, during same hospitalization (separate procedure)	58605	CPT-4
Ligation or transection of fallopian tube(s) when done at the time of cesarean delivery or intra-abdominal surgery (not a separate procedure) (List separately in addition to code for primary procedure)	58611	CPT-4
Occlusion of fallopian tube(s) by device (eg, band, clip, Falope ring) vaginal or suprapubic approach	58615	CPT-4

Appendix C. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Procedure Codes Used to Define Censoring by Non-Outcome Hysterectomies in this Request

Description	Code Code Type
Radical abdominal hysterectomy	68.6 ICD-9-CM
Laparoscopic radical abdominal hysterectomy	68.61 ICD-9-CM
Other and unspecified radical abdominal hysterectomy	68.69 ICD-9-CM
Radical vaginal hysterectomy	68.7 ICD-9-CM
Laparoscopic radical vaginal hysterectomy [LRVH]	68.71 ICD-9-CM
Other and unspecified radical vaginal hysterectomy	68.79 ICD-9-CM
Total abdominal hysterectomy (corpus and cervix), with or without removal of tube(s), with or without removal of ovary(s); with colpo-urethrocystopexy (eg, Marshall-Marchetti-Krantz, Burch)	58152 CPT-4
Total abdominal hysterectomy, including partial vaginectomy, with para-aortic and pelvic lymph node sampling, with or without removal of tube(s), with or without removal of ovary(s)	58200 CPT-4
Radical abdominal hysterectomy, with bilateral total pelvic lymphadenectomy and para-aortic lymph node sampling (biopsy), with or without removal of tube(s), with or without removal of ovary(s)	58210 CPT-4
Pelvic exenteration for gynecologic malignancy, with total abdominal hysterectomy or cervicectomy, with or without removal of tube(s), with or without removal of ovary(s), with removal of bladder and ureteral transplantations, and/or abdominoperineal resection of rectum and colon and colostomy, or any combination thereof	58240 CPT-4
Vaginal hysterectomy, for uterus 250 g or less; with removal of tube(s), and/or ovary(s), with repair of enterocele	58263 CPT-4
Vaginal hysterectomy, for uterus 250 g or less; with colpo-urethrocystopexy (Marshall-Marchetti-Krantz type, Pereyra type) with or without endoscopic control	58267 CPT-4
Vaginal hysterectomy, for uterus 250 g or less; with repair of enterocele	58270 CPT-4
Vaginal hysterectomy, with total or partial vaginectomy;	58275 CPT-4
Vaginal hysterectomy, with total or partial vaginectomy; with repair of enterocele	58280 CPT-4
Vaginal hysterectomy, radical (Schauta type operation)	58285 CPT-4
Vaginal hysterectomy, for uterus greater than 250 g; with removal of tube(s) and/or ovary(s), with repair of enterocele	58292 CPT-4
Vaginal hysterectomy, for uterus greater than 250 g; with colpo-urethrocystopexy (Marshall-Marchetti-Krantz type, Pereyra type) with or without endoscopic control	58293 CPT-4
Vaginal hysterectomy, for uterus greater than 250 g; with repair of enterocele	58294 CPT-4
Laparoscopy, surgical, with radical hysterectomy, with bilateral total pelvic lymphadenectomy and para-aortic lymph node sampling (biopsy), with removal of tube(s) and ovary(s), if performed	58548 CPT-4
Resection (initial) of ovarian, tubal or primary peritoneal malignancy with bilateral salpingo-oophorectomy and omentectomy; with total abdominal hysterectomy, pelvic and limited para-aortic lymphadenectomy	58951 CPT-4
Bilateral salpingo-oophorectomy with omentectomy, total abdominal hysterectomy and radical dissection for debulking;	58953 CPT-4
Bilateral salpingo-oophorectomy with omentectomy, total abdominal hysterectomy and radical dissection for debulking; with pelvic lymphadenectomy and limited para-aortic lymphadenectomy	58954 CPT-4
Bilateral salpingo-oophorectomy with total omentectomy, total abdominal hysterectomy for malignancy	58956 CPT-4

Appendix D. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM), Current Procedural Terminology, Fourth Revision (CPT-4), and Healthcare Common Procedure Coding System (HCPCS) Procedure Codes Used to Define Outcomes in this Request

Description	Code	Code Type
Hysterectomy		
Laparoscopic supracervical hysterectomy [LSH]	68.31	ICD-9-CM
Other and unspecified subtotal abdominal hysterectomy	68.39	ICD-9-CM
Laparoscopic total abdominal hysterectomy	68.41	ICD-9-CM
Other and unspecified total abdominal hysterectomy	68.49	ICD-9-CM
Laparoscopically assisted vaginal hysterectomy (LAVH)	68.51	ICD-9-CM
Other and unspecified vaginal hysterectomy	68.59	ICD-9-CM
Other and unspecified hysterectomy	68.9	ICD-9-CM
Total abdominal hysterectomy (corpus and cervix), with or without removal of tube(s), with or without removal of ovary(s);	58150	CPT-4
Supracervical abdominal hysterectomy (subtotal hysterectomy), with or without removal of tube(s), with or without removal of ovary(s)	58180	CPT-4
Vaginal hysterectomy, for uterus 250 g or less;	58260	CPT-4
Vaginal hysterectomy, for uterus 250 g or less; with removal of tube(s), and/or ovary(s)	58262	CPT-4
Vaginal hysterectomy, for uterus greater than 250 g;	58290	CPT-4
Vaginal hysterectomy, for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)	58291	CPT-4
Laparoscopy, surgical, supracervical hysterectomy, for uterus 250 g or less;	58541	CPT-4
Laparoscopy, surgical, supracervical hysterectomy, for uterus 250 g or less; with removal of tube(s) and/or ovary(s)	58542	CPT-4
Laparoscopy, surgical, supracervical hysterectomy, for uterus greater than 250 g;	58543	CPT-4
Laparoscopy, surgical, supracervical hysterectomy, for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)	58544	CPT-4
Laparoscopy, surgical, with vaginal hysterectomy, for uterus 250 g or less;	58550	CPT-4
Laparoscopy, surgical, with vaginal hysterectomy, for uterus 250 g or less; with removal of tube(s) and/or ovary(s)	58552	CPT-4
Laparoscopy, surgical, with vaginal hysterectomy, for uterus greater than 250 g;	58553	CPT-4
Laparoscopy, surgical, with vaginal hysterectomy, for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)	58554	CPT-4
Laparoscopy, surgical, with total hysterectomy, for uterus 250 g or less;	58570	CPT-4
Laparoscopy, surgical, with total hysterectomy, for uterus 250 g or less; with removal of tube(s) and/or ovary(s)	58571	CPT-4
Laparoscopy, surgical, with total hysterectomy, for uterus greater than 250 g;	58572	CPT-4
Laparoscopy, surgical, with total hysterectomy, for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)	58573	CPT-4
Laparoscopic supracervical hysterectomy (subtotal hysterectomy), with or without removal of tube(s), with or without removal of ovary(s)	S2078	HCPCS
Salpingectomy		
Total unilateral salpingectomy	66.4	ICD-9-CM
Removal of both fallopian tubes at same operative episode	66.51	ICD-9-CM
Removal of remaining fallopian tube	66.52	ICD-9-CM
Other salpingectomy	66.6	ICD-9-CM
Bilateral partial salpingectomy, not otherwise specified	66.63	ICD-9-CM
Other partial salpingectomy	66.69	ICD-9-CM
Salpingotomy	66.01	ICD-9-CM
Salpingostomy	66.02	ICD-9-CM
Salpingo-salpingostomy	66.73	ICD-9-CM
Salpingo-uterostomy	66.74	ICD-9-CM
Laparoscopy, surgical; with removal of adnexal structures (partial or total oophorectomy and/or salpingectomy)	58661	CPT-4
Salpingectomy, complete or partial, unilateral or bilateral (separate procedure)	58700	CPT-4
Laparoscopy, Surgical; With Removal Of Adnexal Structures (partial Or Total Oophorectomy And/or Salpingectomy)	58988	CPT-4

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Pelvic Pain			
Other specified symptom associated with female genital organs	625.8	Diagnosis	ICD-9-CM
Unspecified symptom associated with female genital organs	625.9	Diagnosis	ICD-9-CM
Pain in joint, pelvic region and thigh	719.5	Diagnosis	ICD-9-CM
Uterine Fibroids			
Submucous leiomyoma of uterus	218.0	Diagnosis	ICD-9-CM
Intramural leiomyoma of uterus	218.1	Diagnosis	ICD-9-CM
Subserous leiomyoma of uterus	218.2	Diagnosis	ICD-9-CM
Leiomyoma of uterus, unspecified	218.9	Diagnosis	ICD-9-CM
Live Born Delivery			
Routine obstetric care including antepartum care, vaginal delivery (with or without episiotomy, and/or forceps) and postpartum care	59400	Procedure	CPT-4
Vaginal delivery only (with or without episiotomy and/or forceps);	59409	Procedure	CPT-4
Vaginal delivery only (with or without episiotomy and/or forceps); including postpartum care	59410	Procedure	CPT-4
Routine obstetric care including antepartum care, cesarean delivery, and postpartum care	59510	Procedure	CPT-4
Cesarean delivery only;	59514	Procedure	CPT-4
Cesarean delivery only; including postpartum care	59515	Procedure	CPT-4
Routine obstetric care including antepartum care, vaginal delivery (with or without episiotomy, and/or forceps) and postpartum care, after previous cesarean delivery	59610	Procedure	CPT-4
Vaginal delivery only, after previous cesarean delivery (with or without episiotomy and/or forceps);	59612	Procedure	CPT-4
Vaginal delivery only, after previous cesarean delivery (with or without episiotomy and/or forceps); including postpartum care	59614	Procedure	CPT-4
Routine obstetric care including antepartum care, cesarean delivery, and postpartum care, following attempted vaginal delivery after previous cesarean delivery	59618	Procedure	CPT-4
Cesarean delivery only, following attempted vaginal delivery after previous cesarean delivery;	59620	Procedure	CPT-4
Cesarean delivery only, following attempted vaginal delivery after previous cesarean delivery; including postpartum care	59622	Procedure	CPT-4
Normal delivery	650	Diagnosis	ICD-9-CM
Fetus or newborn affected by breech delivery and extraction	763.0	Diagnosis	ICD-9-CM
Fetus or newborn affected by forceps delivery	763.2	Diagnosis	ICD-9-CM
Fetus or newborn affected by delivery by vacuum extractor	763.3	Diagnosis	ICD-9-CM
Fetus or newborn affected by cesarean delivery	763.4	Diagnosis	ICD-9-CM
Fetus or newborn affected by precipitate delivery	763.6	Diagnosis	ICD-9-CM
Fetal death from asphyxia or anoxia before onset of labor or at unspecified time	768.0	Diagnosis	ICD-9-CM
Fetal death from asphyxia or anoxia during labor	768.1	Diagnosis	ICD-9-CM
Placenta previa without hemorrhage, with delivery	641.01	Diagnosis	ICD-9-CM
Hemorrhage from placenta previa, with delivery	641.11	Diagnosis	ICD-9-CM
Premature separation of placenta, with delivery	641.21	Diagnosis	ICD-9-CM
Antepartum hemorrhage associated with coagulation defects, with delivery	641.31	Diagnosis	ICD-9-CM
Other antepartum hemorrhage, with delivery	641.81	Diagnosis	ICD-9-CM
Unspecified antepartum hemorrhage, with delivery	641.91	Diagnosis	ICD-9-CM
Benign essential hypertension with delivery	642.01	Diagnosis	ICD-9-CM
Benign essential hypertension, with delivery, with current postpartum complication	642.02	Diagnosis	ICD-9-CM
Hypertension secondary to renal disease, with delivery	642.11	Diagnosis	ICD-9-CM
Hypertension secondary to renal disease, with delivery, with current postpartum complication	642.12	Diagnosis	ICD-9-CM
Other pre-existing hypertension, with delivery	642.21	Diagnosis	ICD-9-CM
Other pre-existing hypertension, with delivery, with current postpartum complication	642.22	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Transient hypertension of pregnancy, with delivery	642.31	Diagnosis	ICD-9-CM
Transient hypertension of pregnancy, with delivery, with current postpartum complication	642.32	Diagnosis	ICD-9-CM
Mild or unspecified pre-eclampsia, with delivery	642.41	Diagnosis	ICD-9-CM
Mild or unspecified pre-eclampsia, with delivery, with current postpartum complication	642.42	Diagnosis	ICD-9-CM
Severe pre-eclampsia, with delivery	642.51	Diagnosis	ICD-9-CM
Severe pre-eclampsia, with delivery, with current postpartum complication	642.52	Diagnosis	ICD-9-CM
Eclampsia, with delivery	642.61	Diagnosis	ICD-9-CM
Eclampsia, with delivery, with current postpartum complication	642.62	Diagnosis	ICD-9-CM
Pre-eclampsia or eclampsia superimposed on pre-existing hypertension, with delivery	642.71	Diagnosis	ICD-9-CM
Pre-eclampsia or eclampsia superimposed on pre-existing hypertension, with delivery, with current postpartum complication	642.72	Diagnosis	ICD-9-CM
Unspecified hypertension, with delivery	642.91	Diagnosis	ICD-9-CM
Unspecified hypertension, with delivery, with current postpartum complication	642.92	Diagnosis	ICD-9-CM
Mild hyperemesis gravidarum, delivered	643.01	Diagnosis	ICD-9-CM
Hyperemesis gravidarum with metabolic disturbance, delivered	643.11	Diagnosis	ICD-9-CM
Late vomiting of pregnancy, delivered	643.21	Diagnosis	ICD-9-CM
Other vomiting complicating pregnancy, delivered	643.81	Diagnosis	ICD-9-CM
Unspecified vomiting of pregnancy, delivered	643.91	Diagnosis	ICD-9-CM
Early onset of delivery, delivered, with or without mention of antepartum condition	644.21	Diagnosis	ICD-9-CM
Prolonged pregnancy, with delivery	645.01	Diagnosis	ICD-9-CM
Post term pregnancy, delivered, with or without mention of antepartum condition	645.11	Diagnosis	ICD-9-CM
Prolonged pregnancy, delivered, with or without mention of antepartum condition	645.21	Diagnosis	ICD-9-CM
	645.22	Diagnosis	ICD-9-CM
Papyraceous fetus, delivered, with or without mention of antepartum condition	646.01	Diagnosis	ICD-9-CM
Edema or excessive weight gain in pregnancy, with delivery, with or without mention of antepartum complication	646.11	Diagnosis	ICD-9-CM
Edema or excessive weight gain in pregnancy, with delivery, with current postpartum complication	646.12	Diagnosis	ICD-9-CM
Unspecified renal disease in pregnancy, with delivery	646.21	Diagnosis	ICD-9-CM
Unspecified renal disease in pregnancy, with delivery, with current postpartum complication	646.22	Diagnosis	ICD-9-CM
Pregnancy complication, recurrent pregnancy loss, with or without mention of antepartum condition	646.31	Diagnosis	ICD-9-CM
Peripheral neuritis in pregnancy, with delivery	646.41	Diagnosis	ICD-9-CM
Peripheral neuritis in pregnancy, with delivery, with current postpartum complication	646.42	Diagnosis	ICD-9-CM
Asymptomatic bacteriuria in pregnancy, with delivery	646.51	Diagnosis	ICD-9-CM
Asymptomatic bacteriuria in pregnancy, with delivery, with current postpartum complication	646.52	Diagnosis	ICD-9-CM
Infections of genitourinary tract in pregnancy, with delivery	646.61	Diagnosis	ICD-9-CM
Infections of genitourinary tract in pregnancy, with delivery, with current postpartum complication	646.62	Diagnosis	ICD-9-CM
Liver and biliary tract disorders in pregnancy, delivered, with or without mention of antepartum condition	646.71	Diagnosis	ICD-9-CM
Other specified complication of pregnancy, with delivery	646.81	Diagnosis	ICD-9-CM
Other specified complications of pregnancy, with delivery, with current postpartum complication	646.82	Diagnosis	ICD-9-CM
Unspecified complication of pregnancy, with delivery	646.91	Diagnosis	ICD-9-CM
Maternal syphilis, complicating pregnancy, with delivery	647.01	Diagnosis	ICD-9-CM
Maternal syphilis, complicating pregnancy, with delivery, with current postpartum complication	647.02	Diagnosis	ICD-9-CM
Maternal gonorrhoea with delivery	647.11	Diagnosis	ICD-9-CM
Maternal gonorrhoea, with delivery, with current postpartum complication	647.12	Diagnosis	ICD-9-CM
Other maternal venereal diseases with delivery	647.21	Diagnosis	ICD-9-CM
Other maternal venereal diseases with delivery, with current postpartum complication	647.22	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Maternal tuberculosis with delivery	647.31	Diagnosis	ICD-9-CM
Maternal tuberculosis with delivery, with current postpartum complication	647.32	Diagnosis	ICD-9-CM
Maternal malaria with delivery	647.41	Diagnosis	ICD-9-CM
Maternal malaria with delivery, with current postpartum complication	647.42	Diagnosis	ICD-9-CM
Maternal rubella with delivery	647.51	Diagnosis	ICD-9-CM
Maternal rubella with delivery, with current postpartum complication	647.52	Diagnosis	ICD-9-CM
Other maternal viral disease with delivery	647.61	Diagnosis	ICD-9-CM
Other maternal viral disease with delivery, with current postpartum complication	647.62	Diagnosis	ICD-9-CM
Other specified maternal infectious and parasitic disease with delivery	647.81	Diagnosis	ICD-9-CM
Other specified maternal infectious and parasitic disease with delivery, with current postpartum complication	647.82	Diagnosis	ICD-9-CM
Unspecified maternal infection or infestation with delivery	647.91	Diagnosis	ICD-9-CM
Unspecified maternal infection or infestation with delivery, with current postpartum complication	647.92	Diagnosis	ICD-9-CM
Maternal diabetes mellitus with delivery	648.01	Diagnosis	ICD-9-CM
Maternal diabetes mellitus with delivery, with current postpartum complication	648.02	Diagnosis	ICD-9-CM
Maternal thyroid dysfunction with delivery, with or without mention of antepartum condition	648.11	Diagnosis	ICD-9-CM
Maternal thyroid dysfunction with delivery, with current postpartum complication	648.12	Diagnosis	ICD-9-CM
Maternal anemia, with delivery	648.21	Diagnosis	ICD-9-CM
Maternal anemia with delivery, with current postpartum complication	648.22	Diagnosis	ICD-9-CM
Maternal drug dependence, with delivery	648.31	Diagnosis	ICD-9-CM
Maternal drug dependence, with delivery, with current postpartum complication	648.32	Diagnosis	ICD-9-CM
Maternal mental disorders, with delivery	648.41	Diagnosis	ICD-9-CM
Maternal mental disorders, with delivery, with current postpartum complication	648.42	Diagnosis	ICD-9-CM
Maternal congenital cardiovascular disorders, with delivery	648.51	Diagnosis	ICD-9-CM
Maternal congenital cardiovascular disorders, with delivery, with current postpartum complication	648.52	Diagnosis	ICD-9-CM
Other maternal cardiovascular diseases, with delivery	648.61	Diagnosis	ICD-9-CM
Other maternal cardiovascular diseases, with delivery, with current postpartum complication	648.62	Diagnosis	ICD-9-CM
Bone and joint disorders of maternal back, pelvis, and lower limbs, with delivery	648.71	Diagnosis	ICD-9-CM
Bone and joint disorders of maternal back, pelvis, and lower limbs, with delivery, with current postpartum complication	648.72	Diagnosis	ICD-9-CM
Abnormal maternal glucose tolerance, with delivery	648.81	Diagnosis	ICD-9-CM
Abnormal maternal glucose tolerance, with delivery, with current postpartum complication	648.82	Diagnosis	ICD-9-CM
Other current maternal conditions classifiable elsewhere, with delivery	648.91	Diagnosis	ICD-9-CM
Other current maternal conditions classifiable elsewhere, with delivery, with current postpartum complication	648.92	Diagnosis	ICD-9-CM
Tobacco use disorder complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition	649.01	Diagnosis	ICD-9-CM
Tobacco use disorder complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication	649.02	Diagnosis	ICD-9-CM
Obesity complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition	649.11	Diagnosis	ICD-9-CM
Obesity complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication	649.12	Diagnosis	ICD-9-CM
Bariatric surgery status complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition	649.21	Diagnosis	ICD-9-CM
Bariatric surgery status complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication	649.22	Diagnosis	ICD-9-CM
Coagulation defects complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition	649.31	Diagnosis	ICD-9-CM
Coagulation defects complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication	649.32	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Epilepsy complicating pregnancy, childbirth, or the puerperium, delivered, with or without mention of antepartum condition	649.41	Diagnosis	ICD-9-CM
Epilepsy complicating pregnancy, childbirth, or the puerperium, delivered, with mention of postpartum complication	649.42	Diagnosis	ICD-9-CM
Spotting complicating pregnancy, delivered, with or without mention of antepartum condition	649.51	Diagnosis	ICD-9-CM
Uterine size date discrepancy, delivered, with or without mention of antepartum condition	649.61	Diagnosis	ICD-9-CM
Uterine size date discrepancy, delivered, with mention of postpartum complication	649.62	Diagnosis	ICD-9-CM
Cervical shortening, delivered, with or without mention of antepartum condition	649.71	Diagnosis	ICD-9-CM
Onset (spontaneous) of labor after 37 completed weeks of gestation but before 39 completed weeks gestation, with delivery by (planned) cesarean section, delivered, with or without mention of antepartum condition	649.81	Diagnosis	ICD-9-CM
Onset (spontaneous) of labor after 37 completed weeks of gestation but before 39 completed weeks gestation, with delivery by (planned) cesarean section, delivered, with mention of postpartum complication	649.82	Diagnosis	ICD-9-CM
Twin pregnancy, delivered	651.01	Diagnosis	ICD-9-CM
Triplet pregnancy, delivered	651.11	Diagnosis	ICD-9-CM
Quadruplet pregnancy, delivered	651.21	Diagnosis	ICD-9-CM
Twin pregnancy with fetal loss and retention of one fetus, delivered	651.31	Diagnosis	ICD-9-CM
Triplet pregnancy with fetal loss and retention of one or more, delivered	651.41	Diagnosis	ICD-9-CM
Quadruplet pregnancy with fetal loss and retention of one or more, delivered	651.51	Diagnosis	ICD-9-CM
Other multiple pregnancy with fetal loss and retention of one or more fetus(es), delivered	651.61	Diagnosis	ICD-9-CM
Multiple gestation following (elective) fetal reduction, delivered, with or without mention of antepartum condition	651.71	Diagnosis	ICD-9-CM
Other specified multiple gestation, delivered	651.81	Diagnosis	ICD-9-CM
Unspecified multiple gestation, delivered	651.91	Diagnosis	ICD-9-CM
Unstable lie of fetus, delivered	652.01	Diagnosis	ICD-9-CM
Breech or other malpresentation successfully converted to cephalic presentation, delivered	652.11	Diagnosis	ICD-9-CM
Breech presentation without mention of version, delivered	652.21	Diagnosis	ICD-9-CM
Transverse or oblique fetal presentation, delivered	652.31	Diagnosis	ICD-9-CM
Fetal face or brow presentation, delivered	652.41	Diagnosis	ICD-9-CM
High fetal head at term, delivered	652.51	Diagnosis	ICD-9-CM
Multiple gestation with malpresentation of one fetus or more, delivered	652.61	Diagnosis	ICD-9-CM
Prolapsed arm of fetus, delivered	652.71	Diagnosis	ICD-9-CM
Other specified malposition or malpresentation of fetus, delivered	652.81	Diagnosis	ICD-9-CM
Unspecified malposition or malpresentation of fetus, delivered	652.91	Diagnosis	ICD-9-CM
Major abnormality of bony pelvis, not further specified, delivered	653.01	Diagnosis	ICD-9-CM
Generally contracted pelvis in pregnancy, delivered	653.11	Diagnosis	ICD-9-CM
Inlet contraction of pelvis in pregnancy, delivered	653.21	Diagnosis	ICD-9-CM
Outlet contraction of pelvis in pregnancy, delivered	653.31	Diagnosis	ICD-9-CM
Fetopelvic disproportion, delivered	653.41	Diagnosis	ICD-9-CM
Unusually large fetus causing disproportion, delivered	653.51	Diagnosis	ICD-9-CM
Hydrocephalic fetus causing disproportion, delivered	653.61	Diagnosis	ICD-9-CM
Other fetal abnormality causing disproportion, delivered	653.71	Diagnosis	ICD-9-CM
Fetal disproportion of other origin, delivered	653.81	Diagnosis	ICD-9-CM
Unspecified fetal disproportion, delivered	653.91	Diagnosis	ICD-9-CM
Congenital abnormalities of pregnant uterus, delivered	654.01	Diagnosis	ICD-9-CM
Congenital abnormalities of pregnant uterus, delivered, with mention of postpartum complication	654.02	Diagnosis	ICD-9-CM
Tumors of body of uterus, delivered	654.11	Diagnosis	ICD-9-CM
Tumors of body of uterus, delivered, with mention of postpartum complication	654.12	Diagnosis	ICD-9-CM
Previous cesarean delivery, delivered, with or without mention of antepartum condition	654.21	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Retroverted and incarcerated gravid uterus, delivered	654.31	Diagnosis	ICD-9-CM
Retroverted and incarcerated gravid uterus, delivered, with mention of postpartum complication	654.32	Diagnosis	ICD-9-CM
Other abnormalities in shape or position of gravid uterus and of neighboring structures, delivered	654.41	Diagnosis	ICD-9-CM
Other abnormalities in shape or position of gravid uterus and of neighboring structures, delivered, with mention of postpartum complication	654.42	Diagnosis	ICD-9-CM
Cervical incompetence, delivered	654.51	Diagnosis	ICD-9-CM
Cervical incompetence, delivered, with mention of postpartum complication	654.52	Diagnosis	ICD-9-CM
Other congenital or acquired abnormality of cervix, with delivery	654.61	Diagnosis	ICD-9-CM
Other congenital or acquired abnormality of cervix, delivered, with mention of postpartum complication	654.62	Diagnosis	ICD-9-CM
Congenital or acquired abnormality of vagina, with delivery	654.71	Diagnosis	ICD-9-CM
Congenital or acquired abnormality of vagina, delivered, with mention of postpartum complication	654.72	Diagnosis	ICD-9-CM
Congenital or acquired abnormality of vulva, with delivery	654.81	Diagnosis	ICD-9-CM
Congenital or acquired abnormality of vulva, delivered, with mention of postpartum complication	654.82	Diagnosis	ICD-9-CM
Other and unspecified abnormality of organs and soft tissues of pelvis, with delivery	654.91	Diagnosis	ICD-9-CM
Other and unspecified abnormality of organs and soft tissues of pelvis, delivered, with mention of postpartum complication	654.92	Diagnosis	ICD-9-CM
Central nervous system malformation in fetus, with delivery	655.01	Diagnosis	ICD-9-CM
Chromosomal abnormality in fetus, affecting management of mother, with delivery	655.11	Diagnosis	ICD-9-CM
Hereditary disease in family possibly affecting fetus, affecting management of mother, with delivery	655.21	Diagnosis	ICD-9-CM
Suspected damage to fetus from viral disease in mother, affecting management of mother, with delivery	655.31	Diagnosis	ICD-9-CM
Suspected damage to fetus from other disease in mother, affecting management of mother, with delivery	655.41	Diagnosis	ICD-9-CM
Suspected damage to fetus from drugs, affecting management of mother, delivered	655.51	Diagnosis	ICD-9-CM
Suspected damage to fetus from radiation, affecting management of mother, delivered	655.61	Diagnosis	ICD-9-CM
Decreased fetal movements, affecting management of mother, delivered	655.71	Diagnosis	ICD-9-CM
Other known or suspected fetal abnormality, not elsewhere classified, affecting management of mother, delivery	655.81	Diagnosis	ICD-9-CM
Unspecified fetal abnormality affecting management of mother, delivery	655.91	Diagnosis	ICD-9-CM
Fetal-maternal hemorrhage, with delivery	656.01	Diagnosis	ICD-9-CM
Rhesus isoimmunization affecting management of mother, delivered	656.11	Diagnosis	ICD-9-CM
Isoimmunization from other and unspecified blood-group incompatibility, affecting management of mother, delivered	656.21	Diagnosis	ICD-9-CM
Fetal distress affecting management of mother, delivered	656.31	Diagnosis	ICD-9-CM
Intrauterine death affecting management of mother, delivered	656.41	Diagnosis	ICD-9-CM
Poor fetal growth, affecting management of mother, delivered	656.51	Diagnosis	ICD-9-CM
Excessive fetal growth affecting management of mother, delivered	656.61	Diagnosis	ICD-9-CM
Other placental conditions affecting management of mother, delivered	656.71	Diagnosis	ICD-9-CM
Other specified fetal and placental problems affecting management of mother, delivered	656.81	Diagnosis	ICD-9-CM
Unspecified fetal and placental problem affecting management of mother, delivered	656.91	Diagnosis	ICD-9-CM
Polyhydramnios, with delivery	657.01	Diagnosis	ICD-9-CM
Oligohydramnios, delivered	65801	Diagnosis	ICD-9-CM
Premature rupture of membranes in pregnancy, delivered	658.11	Diagnosis	ICD-9-CM
Delayed delivery after spontaneous or unspecified rupture of membranes, delivered	658.21	Diagnosis	ICD-9-CM
Delayed delivery after artificial rupture of membranes, delivered	658.31	Diagnosis	ICD-9-CM
Infection of amniotic cavity, delivered	658.41	Diagnosis	ICD-9-CM
Other problem associated with amniotic cavity and membranes, delivered	658.81	Diagnosis	ICD-9-CM
Unspecified problem associated with amniotic cavity and membranes, delivered	658.91	Diagnosis	ICD-9-CM
Failed mechanical induction of labor, delivered	65901	Diagnosis	ICD-9-CM
Failed medical or unspecified induction of labor, delivered	659.11	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Unspecified maternal pyrexia during labor, delivered	659.21	Diagnosis	ICD-9-CM
Generalized infection during labor, delivered	659.31	Diagnosis	ICD-9-CM
Grand multiparity, delivered, with or without mention of antepartum condition	659.41	Diagnosis	ICD-9-CM
Elderly primigravida, delivered	659.51	Diagnosis	ICD-9-CM
Elderly multigravida, delivered, with mention of antepartum condition	659.61	Diagnosis	ICD-9-CM
Abnormality in fetal heart rate or rhythm, delivered, with or without mention of antepartum condition	659.71	Diagnosis	ICD-9-CM
Other specified indication for care or intervention related to labor and delivery, delivered	659.81	Diagnosis	ICD-9-CM
Unspecified indication for care or intervention related to labor and delivery, delivered	659.91	Diagnosis	ICD-9-CM
Obstruction caused by malposition of fetus at onset of labor, delivered	660.01	Diagnosis	ICD-9-CM
Obstruction by bony pelvis during labor and delivery, delivered	660.11	Diagnosis	ICD-9-CM
Obstruction by abnormal pelvic soft tissues during labor and delivery, delivered	660.21	Diagnosis	ICD-9-CM
Deep transverse arrest and persistent occipitoposterior position during labor and deliver, delivered	660.31	Diagnosis	ICD-9-CM
Shoulder (girdle) dystocia during labor and deliver, delivered	660.41	Diagnosis	ICD-9-CM
Locked twins, delivered	660.51	Diagnosis	ICD-9-CM
Unspecified failed trial of labor, delivered	660.61	Diagnosis	ICD-9-CM
Unspecified failed forceps or vacuum extractor, delivered	660.71	Diagnosis	ICD-9-CM
Other causes of obstructed labor, delivered	660.81	Diagnosis	ICD-9-CM
Unspecified obstructed labor, with delivery	660.91	Diagnosis	ICD-9-CM
Primary uterine inertia, with delivery	661.01	Diagnosis	ICD-9-CM
Secondary uterine inertia, with delivery	661.11	Diagnosis	ICD-9-CM
Other and unspecified uterine inertia, with delivery	661.21	Diagnosis	ICD-9-CM
Precipitate labor, with delivery	661.31	Diagnosis	ICD-9-CM
Hypertonic, incoordinate, or prolonged uterine contractions, with delivery	661.41	Diagnosis	ICD-9-CM
Unspecified abnormality of labor, with delivery	661.91	Diagnosis	ICD-9-CM
Prolonged first stage of labor, delivered	662.01	Diagnosis	ICD-9-CM
Unspecified prolonged labor, delivered	662.11	Diagnosis	ICD-9-CM
Prolonged second stage of labor, delivered	662.21	Diagnosis	ICD-9-CM
Delayed delivery of second twin, triplet, etc., delivered	662.31	Diagnosis	ICD-9-CM
Prolapse of cord, complicating labor and delivery, delivered	663.01	Diagnosis	ICD-9-CM
Cord around neck, with compression, complicating labor and delivery, delivered	663.11	Diagnosis	ICD-9-CM
Other and unspecified cord entanglement, with compression, complicating labor and delivery, delivered	663.21	Diagnosis	ICD-9-CM
Other and unspecified cord entanglement, without mention of compression, complicating labor and delivery, delivered	663.31	Diagnosis	ICD-9-CM
Short cord complicating labor and delivery, delivered	663.41	Diagnosis	ICD-9-CM
Vasa previa complicating labor and delivery, delivered	663.51	Diagnosis	ICD-9-CM
Vascular lesions of cord complicating labor and delivery, delivered	663.61	Diagnosis	ICD-9-CM
Other umbilical cord complications during labor and delivery, delivered	663.81	Diagnosis	ICD-9-CM
Unspecified umbilical cord complication during labor and delivery, delivered	663.91	Diagnosis	ICD-9-CM
First-degree perineal laceration, with delivery	664.01	Diagnosis	ICD-9-CM
Second-degree perineal laceration, with delivery	664.11	Diagnosis	ICD-9-CM
Third-degree perineal laceration, with delivery	664.21	Diagnosis	ICD-9-CM
Fourth-degree perineal laceration, with delivery	664.31	Diagnosis	ICD-9-CM
Unspecified perineal laceration, with delivery	664.41	Diagnosis	ICD-9-CM
Vulvar and perineal hematoma, with delivery	664.51	Diagnosis	ICD-9-CM
Anal sphincter tear complicating delivery, not associated with third-degree perineal laceration, delivered, with or without mention of antepartum condition	664.61	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Other specified trauma to perineum and vulva, with delivery	664.81	Diagnosis	ICD-9-CM
Unspecified trauma to perineum and vulva, with delivery	664.91	Diagnosis	ICD-9-CM
Rupture of uterus before onset of labor, with delivery	665.01	Diagnosis	ICD-9-CM
Rupture of uterus during labor, with delivery	665.11	Diagnosis	ICD-9-CM
Inversion of uterus, delivered with postpartum complication	665.22	Diagnosis	ICD-9-CM
Laceration of cervix, with delivery	665.31	Diagnosis	ICD-9-CM
High vaginal laceration, with delivery	665.41	Diagnosis	ICD-9-CM
Other injury to pelvic organs, with delivery	665.51	Diagnosis	ICD-9-CM
Damage to pelvic joints and ligaments, with delivery	665.61	Diagnosis	ICD-9-CM
Pelvic hematoma, with delivery	665.71	Diagnosis	ICD-9-CM
Pelvic hematoma, delivered with postpartum complication	665.72	Diagnosis	ICD-9-CM
Other specified obstetrical trauma, with delivery	665.81	Diagnosis	ICD-9-CM
Other specified obstetrical trauma, delivered, with postpartum	665.82	Diagnosis	ICD-9-CM
Unspecified obstetrical trauma, with delivery	665.91	Diagnosis	ICD-9-CM
Unspecified obstetrical trauma, delivered, with postpartum complication	665.92	Diagnosis	ICD-9-CM
Third-stage postpartum hemorrhage, with delivery	666.02	Diagnosis	ICD-9-CM
Other immediate postpartum hemorrhage, with delivery	666.12	Diagnosis	ICD-9-CM
Delayed and secondary postpartum hemorrhage, with delivery	666.22	Diagnosis	ICD-9-CM
Postpartum coagulation defects, with delivery	666.32	Diagnosis	ICD-9-CM
Retained placenta without hemorrhage, with delivery, with mention of postpartum complication	667.02	Diagnosis	ICD-9-CM
Retained portions of placenta or membranes, without hemorrhage, delivered, with mention of postpartum complication	667.12	Diagnosis	ICD-9-CM
Pulmonary complications of the administration of anesthesia or other sedation in labor and delivery, delivered	668.01	Diagnosis	ICD-9-CM
Pulmonary complications of the administration of anesthesia or other sedation in labor and delivery, delivered, with mention of postpartum complication	668.02	Diagnosis	ICD-9-CM
Cardiac complications of the administration of anesthesia or other sedation in labor and delivery, delivered	668.11	Diagnosis	ICD-9-CM
Cardiac complications of the administration of anesthesia or other sedation in labor and delivery, delivered, with mention of postpartum complication	668.12	Diagnosis	ICD-9-CM
Central nervous system complications of the administration of anesthesia or other sedation in labor and delivery, delivered	668.21	Diagnosis	ICD-9-CM
Central nervous system complications of the administration of anesthesia or other sedation in labor and delivery, delivered, with mention of postpartum complication	668.22	Diagnosis	ICD-9-CM
Other complications of the administration of anesthesia or other sedation in labor and delivery, delivered	668.81	Diagnosis	ICD-9-CM
Other complications of the administration of anesthesia or other sedation in labor and delivery, delivered, with mention of postpartum complication	668.82	Diagnosis	ICD-9-CM
Unspecified complication of the administration of anesthesia or other sedation in labor and delivery, delivered	668.91	Diagnosis	ICD-9-CM
Unspecified complication of the administration of anesthesia or other sedation in labor and delivery, delivered, with mention of postpartum complication	668.92	Diagnosis	ICD-9-CM
Maternal distress, with delivery, with or without mention of antepartum condition	669.01	Diagnosis	ICD-9-CM
Maternal distress, with delivery, with mention of postpartum complication	669.02	Diagnosis	ICD-9-CM
Shock during or following labor and delivery, with delivery, with or without mention of antepartum condition	669.11	Diagnosis	ICD-9-CM
Shock during or following labor and delivery, with delivery, with mention of postpartum complication	669.12	Diagnosis	ICD-9-CM
Maternal hypotension syndrome, with delivery, with or without mention of antepartum condition	669.21	Diagnosis	ICD-9-CM
Maternal hypotension syndrome, with delivery, with mention of postpartum complication	669.22	Diagnosis	ICD-9-CM
Acute kidney failure following labor and delivery, delivered, with mention of postpartum complication	669.32	Diagnosis	ICD-9-CM
Other complications of obstetrical surgery and procedures, with delivery, with or without mention of antepartum condition	669.41	Diagnosis	ICD-9-CM
Other complications of obstetrical surgery and procedures, with delivery, with mention of postpartum complication	669.42	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Forceps or vacuum extractor delivery without mention of indication, delivered, with or without mention of antepartum condition	669.51	Diagnosis	ICD-9-CM
Breech extraction, without mention of indication, delivered, with or without mention of antepartum condition	669.61	Diagnosis	ICD-9-CM
Cesarean delivery, without mention of indication, delivered, with or without mention of antepartum condition	669.71	Diagnosis	ICD-9-CM
Other complication of labor and delivery, delivered, with or without mention of antepartum condition	669.81	Diagnosis	ICD-9-CM
Other complication of labor and delivery, delivered, with mention of postpartum complication	669.82	Diagnosis	ICD-9-CM
Unspecified complication of labor and delivery, with delivery, with or without mention of antepartum condition	669.91	Diagnosis	ICD-9-CM
Unspecified complication of labor and delivery, with delivery, with mention of postpartum complication	669.92	Diagnosis	ICD-9-CM
Major puerperal infection, unspecified, delivered, with mention of postpartum complication	670.02	Diagnosis	ICD-9-CM
Puerperal endometritis, delivered, with mention of postpartum complication	670.12	Diagnosis	ICD-9-CM
Puerperal sepsis, delivered, with mention of postpartum complication	670.22	Diagnosis	ICD-9-CM
Puerperal septic thrombophlebitis, delivered, with mention of postpartum complication	670.32	Diagnosis	ICD-9-CM
Other major puerperal infection, delivered, with mention of postpartum complication	670.82	Diagnosis	ICD-9-CM
Varicose veins of legs, with delivery, with or without mention of antepartum condition	671.01	Diagnosis	ICD-9-CM
Varicose veins of legs, with delivery, with mention of postpartum complication	671.02	Diagnosis	ICD-9-CM
Varicose veins of vulva and perineum, with delivery, with or without mention of antepartum condition	671.11	Diagnosis	ICD-9-CM
Varicose veins of vulva and perineum, with delivery, with mention of postpartum complication	671.12	Diagnosis	ICD-9-CM
Superficial thrombophlebitis with delivery, with or without mention of antepartum condition	671.21	Diagnosis	ICD-9-CM
Superficial thrombophlebitis with delivery, with mention of postpartum complication	671.22	Diagnosis	ICD-9-CM
Deep phlebothrombosis, antepartum, with delivery	671.31	Diagnosis	ICD-9-CM
Deep phlebothrombosis, postpartum, with delivery	671.42	Diagnosis	ICD-9-CM
Other phlebitis and thrombosis with delivery, with or without mention of antepartum condition	671.51	Diagnosis	ICD-9-CM
Other phlebitis and thrombosis with delivery, with mention of postpartum complication	671.52	Diagnosis	ICD-9-CM
Other venous complication, with delivery, with or without mention of antepartum condition	671.81	Diagnosis	ICD-9-CM
Other venous complication, with delivery, with mention of postpartum complication	671.82	Diagnosis	ICD-9-CM
Unspecified venous complication, with delivery, with or without mention of antepartum condition	671.91	Diagnosis	ICD-9-CM
Unspecified venous complication, with delivery, with mention of postpartum complication	671.92	Diagnosis	ICD-9-CM
Puerperal pyrexia of unknown origin, delivered, with mention of postpartum complication	672.02	Diagnosis	ICD-9-CM
Obstetrical air embolism, with delivery, with or without mention of antepartum condition	673.01	Diagnosis	ICD-9-CM
Obstetrical air embolism, with delivery, with mention of postpartum complication	673.02	Diagnosis	ICD-9-CM
Amniotic fluid embolism, with delivery, with or without mention of antepartum condition	673.11	Diagnosis	ICD-9-CM
Amniotic fluid embolism, with delivery, with mention of postpartum complication	673.12	Diagnosis	ICD-9-CM
Obstetrical blood-clot embolism, with delivery, with or without mention of antepartum condition	673.21	Diagnosis	ICD-9-CM
Obstetrical blood-clot embolism, with mention of postpartum complication	673.22	Diagnosis	ICD-9-CM
Obstetrical pyemic and septic embolism, with delivery, with or without mention of antepartum condition	673.31	Diagnosis	ICD-9-CM
Obstetrical pyemic and septic embolism, with delivery, with mention of postpartum complication	673.32	Diagnosis	ICD-9-CM
Other obstetrical pulmonary embolism, with delivery, with or without mention of antepartum condition	673.81	Diagnosis	ICD-9-CM
Other obstetrical pulmonary embolism, with delivery, with mention of postpartum complication	673.82	Diagnosis	ICD-9-CM
Cerebrovascular disorder, with delivery, with or without mention of antepartum condition	674.01	Diagnosis	ICD-9-CM
Cerebrovascular disorder, with delivery, with mention of postpartum complication	674.02	Diagnosis	ICD-9-CM
Disruption of cesarean wound, with delivery, with mention of postpartum complication	674.12	Diagnosis	ICD-9-CM
Disruption of perineal wound, with delivery, with mention of postpartum complication	674.22	Diagnosis	ICD-9-CM
Other complication of obstetrical surgical wounds, with delivery, with mention of postpartum complication	674.32	Diagnosis	ICD-9-CM
Placental polyp, with delivery, with mention of postpartum complication	674.42	Diagnosis	ICD-9-CM
Peripartum cardiomyopathy, delivered, with or without mention of antepartum condition	674.51	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Peripartum cardiomyopathy, delivered, with mention of postpartum condition	674.52	Diagnosis	ICD-9-CM
Other complication of puerperium, with delivery, with mention of postpartum complication	674.82	Diagnosis	ICD-9-CM
Unspecified complications of puerperium, with delivery, with mention of postpartum complication	674.92	Diagnosis	ICD-9-CM
Infection of nipple associated with childbirth, delivered, with or without mention of antepartum condition	675.01	Diagnosis	ICD-9-CM
Infection of nipple associated with childbirth, delivered with mention of postpartum complication	675.02	Diagnosis	ICD-9-CM
Abscess of breast associated with childbirth, delivered, with or without mention of antepartum condition	675.11	Diagnosis	ICD-9-CM
Abscess of breast associated with childbirth, delivered, with mention of postpartum complication	675.12	Diagnosis	ICD-9-CM
Nonpurulent mastitis, delivered, with or without mention of antepartum condition	675.21	Diagnosis	ICD-9-CM
Nonpurulent mastitis, delivered, with mention of postpartum complication	675.22	Diagnosis	ICD-9-CM
Other specified infection of the breast and nipple associated with childbirth, delivered, with or without mention of antepartum condition	675.81	Diagnosis	ICD-9-CM
Other specified infection of the breast and nipple associated with childbirth, delivered, with mention of postpartum complication	675.82	Diagnosis	ICD-9-CM
Unspecified infection of the breast and nipple, delivered, with or without mention of antepartum condition	675.91	Diagnosis	ICD-9-CM
Unspecified infection of the breast and nipple, delivered, with mention of postpartum complication	675.92	Diagnosis	ICD-9-CM
Retracted nipple, delivered, with or without mention of antepartum condition	676.01	Diagnosis	ICD-9-CM
Retracted nipple, delivered, with mention of postpartum complication	676.02	Diagnosis	ICD-9-CM
Cracked nipple, delivered, with or without mention of antepartum condition	676.11	Diagnosis	ICD-9-CM
Cracked nipple, delivered, with mention of postpartum complication	676.12	Diagnosis	ICD-9-CM
Engorgement of breasts, delivered, with or without mention of antepartum condition	676.21	Diagnosis	ICD-9-CM
Engorgement of breasts, delivered, with mention of postpartum complication	676.22	Diagnosis	ICD-9-CM
Other and unspecified disorder of breast associated with childbirth, delivered, with or without mention of antepartum condition	676.31	Diagnosis	ICD-9-CM
Other and unspecified disorder of breast associated with childbirth, delivered, with mention of postpartum complication	676.32	Diagnosis	ICD-9-CM
Failure of lactation, with delivery, with or without mention of antepartum condition	676.41	Diagnosis	ICD-9-CM
Failure of lactation, with delivery, with mention of postpartum complication	676.42	Diagnosis	ICD-9-CM
Suppressed lactation, with delivery, with or without mention of antepartum condition	676.51	Diagnosis	ICD-9-CM
Suppressed lactation, with delivery, with mention of postpartum complication	676.52	Diagnosis	ICD-9-CM
Galactorrhea, with delivery, with or without mention of antepartum condition	676.61	Diagnosis	ICD-9-CM
Galactorrhea, with delivery, with mention of postpartum complication	676.62	Diagnosis	ICD-9-CM
Other disorder of lactation, with delivery, with or without mention of antepartum condition	676.81	Diagnosis	ICD-9-CM
Other disorder of lactation, with delivery, with mention of postpartum complication	676.82	Diagnosis	ICD-9-CM
Unspecified disorder of lactation, with delivery, with or without mention of antepartum condition	676.91	Diagnosis	ICD-9-CM
Forceps, vacuum, and breech delivery	72	Procedure	ICD-9-CM
Other procedures inducing or assisting delivery	73	Procedure	ICD-9-CM
Low forceps operation	720	Procedure	ICD-9-CM
Low forceps operation with episiotomy	721	Procedure	ICD-9-CM
Mid forceps operation	722	Procedure	ICD-9-CM
High forceps operation	723	Procedure	ICD-9-CM
Forceps rotation of fetal head	724	Procedure	ICD-9-CM
Breech extraction	725	Procedure	ICD-9-CM
Forceps application to aftercoming head	726	Procedure	ICD-9-CM
Vacuum extraction	727	Procedure	ICD-9-CM
Other specified instrumental delivery	728	Procedure	ICD-9-CM
Unspecified instrumental delivery	729	Procedure	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Artificial rupture of membranes	730	Procedure	ICD-9-CM
Other surgical induction of labor	731	Procedure	ICD-9-CM
Internal and combined version and extraction	732	Procedure	ICD-9-CM
Failed forceps	733	Procedure	ICD-9-CM
Medical induction of labor	734	Procedure	ICD-9-CM
Manually assisted delivery	735	Procedure	ICD-9-CM
Episiotomy	736	Procedure	ICD-9-CM
Operations on fetus to facilitate delivery	738	Procedure	ICD-9-CM
Other operations assisting delivery	739	Procedure	ICD-9-CM
Classical cesarean section	740	Procedure	ICD-9-CM
Low cervical cesarean section	741	Procedure	ICD-9-CM
Extraperitoneal cesarean section	742	Procedure	ICD-9-CM
Cesarean section of other specified type	744	Procedure	ICD-9-CM
Cesarean section of unspecified type	749	Procedure	ICD-9-CM
Mid forceps operation with episiotomy	722.1	Procedure	ICD-9-CM
Other mid forceps operation	722.9	Procedure	ICD-9-CM
High forceps operation with episiotomy	723.1	Procedure	ICD-9-CM
Other high forceps operation	723.9	Procedure	ICD-9-CM
Partial breech extraction with forceps to aftercoming head	725.1	Procedure	ICD-9-CM
Other partial breech extraction	725.2	Procedure	ICD-9-CM
Total breech extraction with forceps to aftercoming head	725.3	Procedure	ICD-9-CM
Other total breech extraction	725.4	Procedure	ICD-9-CM
Vacuum extraction with episiotomy	727.1	Procedure	ICD-9-CM
Other vacuum extraction	727.9	Procedure	ICD-9-CM
Induction of labor by artificial rupture of membranes	730.1	Procedure	ICD-9-CM
Other artificial rupture of membranes	730.9	Procedure	ICD-9-CM
Internal and combined version without extraction	732.1	Procedure	ICD-9-CM
Internal and combined version with extraction	732.2	Procedure	ICD-9-CM
Manual rotation of fetal head	735.1	Procedure	ICD-9-CM
Other manually assisted delivery	735.9	Procedure	ICD-9-CM
External version to assist delivery	739.1	Procedure	ICD-9-CM
Replacement of prolapsed umbilical cord	739.2	Procedure	ICD-9-CM
Incision of cervix to assist delivery	739.3	Procedure	ICD-9-CM
Pubiotomy to assist delivery	739.4	Procedure	ICD-9-CM
Other operations to assist delivery	739.9	Procedure	ICD-9-CM
Other cesarean section of unspecified type	749.9	Procedure	ICD-9-CM
Unspecified disorder of lactation, with delivery, with mention of postpartum complication	676.92	Diagnosis	ICD-9-CM
Fetal hematologic conditions, delivered, with or without mention of antepartum condition	678.01	Diagnosis	ICD-9-CM
Fetal conjoined twins, delivered, with or without mention of antepartum condition	678.11	Diagnosis	ICD-9-CM
Maternal complications from in utero procedure, delivered, with or without mention of antepartum condition	679.01	Diagnosis	ICD-9-CM
Maternal complications from in utero procedure, delivered, with mention of postpartum complication	679.02	Diagnosis	ICD-9-CM
Fetal complications from in utero procedure, delivered, with or without mention of antepartum condition	679.11	Diagnosis	ICD-9-CM
Fetal complications from in utero procedure, delivered, with mention of postpartum complication	679.12	Diagnosis	ICD-9-CM
Outcome of delivery	V27	Diagnosis	ICD-9-CM
Outcome of delivery, single liveborn	V27.0	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Outcome of delivery, single stillborn	V27.1	Diagnosis	ICD-9-CM
Outcome of delivery, twins, both liveborn	V27.2	Diagnosis	ICD-9-CM
Outcome of delivery, twins, one liveborn and one stillborn	V27.3	Diagnosis	ICD-9-CM
Outcome of delivery, twins, both stillborn	V27.4	Diagnosis	ICD-9-CM
Outcome of delivery, other multiple birth, all liveborn	V27.5	Diagnosis	ICD-9-CM
Outcome of delivery, other multiple birth, some liveborn	V27.6	Diagnosis	ICD-9-CM
Outcome of delivery, other multiple birth, all stillborn	V27.7	Diagnosis	ICD-9-CM
Outcome of delivery, unspecified	V27.9	Diagnosis	ICD-9-CM
Single liveborn	V30	Diagnosis	ICD-9-CM
Single liveborn, born in hospital	V30.0	Diagnosis	ICD-9-CM
Single liveborn, born in hospital, delivered without mention of cesarean delivery	V30.00	Diagnosis	ICD-9-CM
Single liveborn, born in hospital, delivered by cesarean delivery	V30.01	Diagnosis	ICD-9-CM
Single liveborn, born before admission to hospital	V30.1	Diagnosis	ICD-9-CM
Single liveborn, born outside hospital and not hospitalized	V30.2	Diagnosis	ICD-9-CM
Twin birth, mate liveborn	V31	Diagnosis	ICD-9-CM
Twin, mate liveborn, born in hospital	V31.0	Diagnosis	ICD-9-CM
Twin, mate liveborn, born in hospital, delivered without mention of cesarean delivery	V31.00	Diagnosis	ICD-9-CM
Twin, mate liveborn, born in hospital, delivered by cesarean delivery	V31.01	Diagnosis	ICD-9-CM
Twin birth, mate liveborn, born before admission to hospital	V31.1	Diagnosis	ICD-9-CM
Twin birth, mate liveborn, born outside hospital and not hospitalized	V31.2	Diagnosis	ICD-9-CM
Twin birth, mate stillborn	V32	Diagnosis	ICD-9-CM
Twin, mate stillborn, born in hospital	V32.0	Diagnosis	ICD-9-CM
Twin, mate stillborn, born in hospital, delivered without mention of cesarean delivery	V32.00	Diagnosis	ICD-9-CM
Twin, mate stillborn, born in hospital, delivered by cesarean delivery	V32.01	Diagnosis	ICD-9-CM
Twin birth, mate stillborn, born before admission to hospital	V32.1	Diagnosis	ICD-9-CM
Twin birth, mate stillborn, born outside hospital and not hospitalized	V32.2	Diagnosis	ICD-9-CM
Twin birth, unspecified whether mate liveborn or stillborn	V33	Diagnosis	ICD-9-CM
Twin, unspecified, born in hospital	V33.0	Diagnosis	ICD-9-CM
Twin, unspecified whether mate stillborn or liveborn, born in hospital, delivered without mention of cesarean delivery	V33.00	Diagnosis	ICD-9-CM
Twin, unspecified whether mate stillborn or liveborn, born in hospital, delivered by cesarean delivery	V33.01	Diagnosis	ICD-9-CM
Twin birth, unspecified whether mate liveborn or stillborn, born before admission to hospital	V33.1	Diagnosis	ICD-9-CM
Twin birth, unspecified whether mate liveborn or stillborn, born outside hospital and not hospitalized	V33.2	Diagnosis	ICD-9-CM
Other multiple birth (three or more), mates all liveborn	V34	Diagnosis	ICD-9-CM
Other multiple, mates all liveborn, born in hospital	V34.0	Diagnosis	ICD-9-CM
Other multiple, mates all liveborn, born in hospital, delivered without mention of cesarean delivery	V34.00	Diagnosis	ICD-9-CM
Other multiple, mates all liveborn, born in hospital, delivered by cesarean delivery	V34.01	Diagnosis	ICD-9-CM
Other multiple birth (three or more), mates all liveborn, born before admission to hospital	V34.1	Diagnosis	ICD-9-CM
Other multiple birth (three or more), mates all liveborn, born outside hospital and not hospitalized	V34.2	Diagnosis	ICD-9-CM
Other multiple birth (three or more), mates all stillborn	V35	Diagnosis	ICD-9-CM
Other multiple, mates all stillborn, born in hospital	V35.0	Diagnosis	ICD-9-CM
Other multiple, mates all stillborn, born in hospital, delivered without mention of cesarean delivery	V35.00	Diagnosis	ICD-9-CM
Other multiple, mates all stillborn, born in hospital, delivered by cesarean delivery	V35.01	Diagnosis	ICD-9-CM
Other multiple birth (three or more), mates all stillborn, born before admission to hospital	V35.1	Diagnosis	ICD-9-CM
Other multiple birth (three or more), mates all stillborn, born outside of hospital and not hospitalized	V35.2	Diagnosis	ICD-9-CM
Other multiple birth (three or more), mates liveborn and stillborn	V36	Diagnosis	ICD-9-CM

Appendix E. List of International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) and Current Procedural Terminology, Fourth Revision (CPT-4) Diagnosis and Procedure Codes Used to Define Covariates in this Request

Description	Code	Code Category	Code Type
Other multiple, mates liveborn and stillborn, born in hospital	V36.0	Diagnosis	ICD-9-CM
Other multiple, mates liveborn and stillborn, born in hospital, delivered without mention of cesarean delivery	V36.00	Diagnosis	ICD-9-CM
Other multiple, mates liveborn and stillborn, born in hospital, delivered by cesarean delivery	V36.01	Diagnosis	ICD-9-CM
Other multiple birth (three or more), mates liveborn and stillborn, born before admission to hospital	V36.1	Diagnosis	ICD-9-CM
Other multiple birth (three or more), mates liveborn and stillborn, born outside hospital and not hospitalized	V36.2	Diagnosis	ICD-9-CM
Other multiple birth (three or more), unspecified whether mates liveborn or stillborn	V37	Diagnosis	ICD-9-CM
Other multiple, unspecified whether mates stillborn or liveborn, born in hospital	V37.0	Diagnosis	ICD-9-CM
Other multiple, unspecified whether mates stillborn or liveborn, born in hospital, delivered without mention of cesarean delivery	V37.00	Diagnosis	ICD-9-CM
Other multiple, unspecified whether mates stillborn or liveborn, born in hospital, delivered by cesarean delivery	V37.01	Diagnosis	ICD-9-CM
Other multiple birth (three or more), unspecified whether mates liveborn or stillborn, born before admission to hospital	V37.1	Diagnosis	ICD-9-CM
Other multiple birth (three or more), unspecified whether mates liveborn or stillborn, born outside of hospital	V37.2	Diagnosis	ICD-9-CM
Liveborn, unspecified whether single, twin, or multiple	V39	Diagnosis	ICD-9-CM
Other liveborn, unspecified whether single, twin, or multiple, born in hospital	V39.0	Diagnosis	ICD-9-CM
Liveborn infant, unspecified whether single, twin, or multiple, born in hospital, delivered without mention of cesarean delivery	V39.00	Diagnosis	ICD-9-CM
Liveborn infant, unspecified whether single, twin, or multiple, born in hospital, delivered by cesarean	V39.01	Diagnosis	ICD-9-CM
Liveborn, unspecified whether single, twin or multiple, born before admission to hospital	V39.1	Diagnosis	ICD-9-CM
Liveborn, unspecified whether single, twin or multiple, born outside hospital and not hospitalized	V39.2	Diagnosis	ICD-9-CM

Appendix F. Specifications for Request cdrh_mpl2r_wp001

This request utilized the Cohort Identification and Descriptive Analysis (CIDA) tool, version 5.2.1, to investigate whether women who receive hysteroscopic sterilization are at higher risk for future gynecologic surgery compared to women who receive laparoscopic tubal ligation.

Query Period: January 1, 2008 - September 30, 2015
Coverage Requirement: Medical Coverage
Enrollment Requirement: 183 days
Enrollment Gap: 45 days
Sex: Female
Age Groups: 21-30, 31-40, 41-50 years

	Comparison 1		Comparison 2		Comparison 3	
Drug/Exposure						
Incident Exposure/Comparator	Hysteroscopic sterilization	Laparoscopic tubal ligation	Hysteroscopic sterilization	Laparoscopic tubal ligation	Hysteroscopic sterilization	Laparoscopic tubal ligation
Care Setting	Any	Any	Any	Any	Any	Any
Incident w/ Respect to:	Hysteroscopic Sterilization, Laparoscopic Tubal Ligation, Any Hysterectomy, or Salpingectomy	Hysteroscopic Sterilization, Laparoscopic Tubal Ligation, Any Hysterectomy, or Salpingectomy	Hysteroscopic Sterilization, Laparoscopic Tubal Ligation, Any Hysterectomy, or Salpingectomy	Hysteroscopic Sterilization, Laparoscopic Tubal Ligation, Any Hysterectomy, or Salpingectomy	Hysteroscopic Sterilization, Laparoscopic Tubal Ligation, Any Hysterectomy, or Salpingectomy	Hysteroscopic Sterilization, Laparoscopic Tubal Ligation, Any Hysterectomy, or Salpingectomy
Incidence Criteria Care Setting	Any	Any	Any	Any	Any	Any
Washout	(Entire History, -1)	(Entire History, -1)	(Entire History, -1)	(Entire History, -1)	(Entire History, -1)	(Entire History, -1)
Cohort Definition	First valid incident treatment episode during the query period	First valid incident treatment episode during the query period	First valid incident treatment episode during the query period	First valid incident treatment episode during the query period	First valid incident treatment episode during the query period	First valid incident treatment episode during the query period
IIT Days -- Episode Length (Days)	5,000	5,000	5,000	5,000	5,000	5,000
Episode Truncation at Death	Yes	Yes	Yes	Yes	Yes	Yes
Episode Truncation for Exposure	Non-outcome hysterectomy, DP End Date, Query End Date, Disenrollment, Outcome of Interest	Non-outcome hysterectomy, DP End Date, Query End Date, Disenrollment, Outcome of Interest	DP End Date, Query End Date, Disenrollment, Outcome of Interest	DP End Date, Query End Date, Disenrollment, Outcome of Interest	Non-outcome hysterectomy, DP End Date, Query End Date, Disenrollment, Outcome of Interest	Non-outcome hysterectomy, DP End Date, Query End Date, Disenrollment, Outcome of Interest

	Comparison 1		Comparison 2		Comparison 3	
Event/Outcome						
Event/Outcome	Hysterectomy (not done to remove malignancy)	Hysterectomy (not done to remove malignancy)	Salpingectomy	Salpingectomy	Hysterectomy (not done to remove malignancy) OR Salpingectomy	Hysterectomy (not done to remove malignancy) OR Salpingectomy
Care Setting/PDX	Any	Any	Any	Any	Any	Any
Blackout Period	1 (no same day exposure outcome)	1 (no same day exposure outcome)	1 (no same day exposure outcome)	1 (no same day exposure outcome)	1 (no same day exposure outcome)	1 (no same day exposure outcome)
Propensity Score Matching						
Covariates	Age, healthcare utilization, prior combined comorbidity raw score, recorded history of pelvic pain, recorded history of uterine fibroids, prior pregnancy in last six months	Age, healthcare utilization, prior combined comorbidity raw score, recorded history of pelvic pain, recorded history of uterine fibroids, prior pregnancy in last six months	Age, healthcare utilization, prior combined comorbidity raw score, recorded history of pelvic pain, recorded history of uterine fibroids, prior pregnancy in last six months	Age, healthcare utilization, prior combined comorbidity raw score, recorded history of pelvic pain, recorded history of uterine fibroids, prior pregnancy in last six months	Age, healthcare utilization, prior combined comorbidity raw score, recorded history of pelvic pain, recorded history of uterine fibroids, prior pregnancy in last six months	Age, healthcare utilization, prior combined comorbidity raw score, recorded history of pelvic pain, recorded history of uterine fibroids, prior pregnancy in last six months
Covariate Evaluation Window	-183, 0	-183, 0	-183, 0	-183, 0	-183, 0	-183, 0
Matching Ratio	1:1	1:1	1:1	1:1	1:1	1:1
Matching Caliper Settings	0.050	0.050	0.050	0.050	0.050	0.050
Analysis Type	Unconditional	Unconditional	Unconditional	Unconditional	Unconditional	Unconditional
Additional Covariates to Adjust for in Cox Model	----	----	----	----	----	----
Subgroup Analysis	----	----	----	----	----	----
Effect Estimation	Risk set level data return	Risk set level data return	Risk set level data return	Risk set level data return	Risk set level data return	Risk set level data return
Kaplan Meier Plot	Yes	Yes	Yes	Yes	Yes	Yes

International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM), Healthcare Common Procedure Coding System (HCPCS), and Current Procedural Terminology, Fourth Revision (CPT-4) codes are provided by Optum360. National Drug Codes (NDCs) are checked against First Data Bank's "National Drug Data File (NDDF®) Plus."