Impact of Hospital Location and Teaching Status on Outcomes of Hysterectomy for Malignant Gynecologic Disease

Analysis for RCOP NIS Sep Surgery3

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## Preamble:

* **Reference Papers:**
  + [Dolmatova et al. 2016](https://doi.org/10.1016/j.amjcard.2016.05.062)
  + [Sohail et al. 2025](https://www.jacc.org/doi/abs/10.1016/S0735-1097%2825%2902161-8)
  + [Salman et al. 2025](https://doi.org/10.1097/MCA.0000000000001479)
* **Study Objective**: To evaluate the association between hospital location and teaching status (urban teaching, urban non-teaching, rural) and clinical and utilization outcomes among women undergoing hysterectomy for malignant gynecologic disease.
* **Data Source**: Cross-sectional analysis using the National Inpatient Sample (NIS) database from 2018 to 2020, a representative sample of all-payer inpatient hospitalizations in the U.S.
* **Patient Selection**: Included female patients aged ≥18 years with a diagnosis of malignant gynecologic cancer (ICD-10-CM codes C51–C58) who underwent hysterectomy (ICD-10-PCS codes) during the same admission. Excluded patients with missing hospital location/teaching status.
* **Outcomes of Interest**:
  + In-hospital Mortality
  + Length of Stay (LOS) in days
  + Inflation-adjusted Total Charges (converted to 2020 U.S. dollars using Consumer Price Index data)
  + Any Major Complication — defined as the presence of at least one of the following:
    - Postoperative infection
    - Wound complication
    - Postoperative bleeding
    - Acute kidney injury
    - Postoperative ileus
    - Venous thromboembolism
* **Statistical Analysis**: Univariable and multivariable analyses were conducted to assess the association between hospital location/teaching status and the outcomes of interest:
  + **Univariable Analysis:**
    - Continuous variables: Design-based Kruskal-Wallis test.
    - Categorical variables: Pearson’s X² test with Rao & Scott adjustment to account for survey design.
  + **Multivariable Analysis:**
    - Logistic regression for binary outcomes (e.g., mortality, complications).
    - Linear regression for continuous outcomes (e.g., length of stay, total charges).
  + **Adjustments:** Models controlled for the following covariates:
    - **Demographics and Socioeconomic Factors**: Age, Race, Residential income, Expected primary payer.
    - **Clinical Factors:** A summary measure of comorbidity (Elixhauser comorbidity index), Type of gynecologic cancer, Surgical approach to hysterectomy.
    - **Hospital-Level Factors:** Hospital region and Hospital bedsize.
* **Software:** All statistical analyses were performed using R Statistical Language (Version 4.5.0; R Foundation for Statistical Computing, Vienna, Austria), incorporating survey-weighted procedures via the *survey* package to account for the complex sampling design of NIS.

## Baseline Table:

| **Characteristic** | **Overall** N = 88,510*1* | **Urban, teaching** N = 80,755*1* | **Rural** N = 1,125*1* | **Urban, non-teaching** N = 6,630*1* | **p-value***2* |
| --- | --- | --- | --- | --- | --- |
| Age, y | 61 (13) | 61 (13) | 61 (14) | 62 (13) | 0.006 |
| Race |  |  |  |  | <0.001 |
| White | 58,440 (68%) | 52,970 (67%) | 950 (88%) | 4,520 (69%) |  |
| Asian or Pacific Islander | 4,345 (5.0%) | 3,960 (5.0%) | 0 (0%) | 385 (5.9%) |  |
| Black | 10,745 (12%) | 10,085 (13%) | 80 (7.4%) | 580 (8.8%) |  |
| Hispanic | 9,585 (11%) | 8,730 (11%) | 40 (3.7%) | 815 (12%) |  |
| Other | 3,310 (3.8%) | 3,030 (3.8%) | 15 (1.4%) | 265 (4.0%) |  |
| Median ZIP Code Income Quartile |  |  |  |  | <0.001 |
| $1 - $51,999 | 21,790 (25%) | 19,915 (25%) | 435 (40%) | 1,440 (22%) |  |
| $52,000 - $65,999 | 21,335 (24%) | 19,110 (24%) | 480 (44%) | 1,745 (27%) |  |
| $66,000 - $87,999 | 22,035 (25%) | 20,240 (25%) | 155 (14%) | 1,640 (25%) |  |
| $88,000 or more | 22,115 (25%) | 20,340 (26%) | 25 (2.3%) | 1,750 (27%) |  |
| Primary Expected Payer |  |  |  |  | 0.002 |
| Private | 35,295 (40%) | 32,470 (40%) | 385 (34%) | 2,440 (37%) |  |
| Medicaid | 10,615 (12%) | 9,800 (12%) | 130 (12%) | 685 (10%) |  |
| Medicare | 37,780 (43%) | 34,025 (42%) | 555 (49%) | 3,200 (48%) |  |
| Other | 4,710 (5.3%) | 4,355 (5.4%) | 55 (4.9%) | 300 (4.5%) |  |
| Elective Admission |  |  |  |  | 0.10 |
| Elective | 74,930 (85%) | 68,540 (85%) | 970 (86%) | 5,420 (82%) |  |
| Non-elective | 13,180 (15%) | 11,825 (15%) | 155 (14%) | 1,200 (18%) |  |
| Elixhauser Comorbidity Index | 3.83 (1.96) | 3.83 (1.96) | 3.74 (1.81) | 3.75 (1.99) | 0.5 |
| Hospital Region |  |  |  |  | <0.001 |
| Midwest | 18,240 (21%) | 16,830 (21%) | 445 (40%) | 965 (15%) |  |
| Northeast | 17,910 (20%) | 17,250 (21%) | 220 (20%) | 440 (6.6%) |  |
| South | 31,030 (35%) | 28,005 (35%) | 330 (29%) | 2,695 (41%) |  |
| West | 21,330 (24%) | 18,670 (23%) | 130 (12%) | 2,530 (38%) |  |
| Hospital Bed Size |  |  |  |  | 0.023 |
| Large | 60,080 (68%) | 54,295 (67%) | 915 (81%) | 4,870 (73%) |  |
| Medium | 19,920 (23%) | 18,525 (23%) | 130 (12%) | 1,265 (19%) |  |
| Small | 8,510 (9.6%) | 7,935 (9.8%) | 80 (7.1%) | 495 (7.5%) |  |
| Hysterectomy Surgical Approach |  |  |  |  | <0.001 |
| Abdominal | 61,170 (69%) | 56,270 (70%) | 875 (78%) | 4,025 (61%) |  |
| Laparoscopic | 6,515 (7.4%) | 5,970 (7.4%) | 60 (5.3%) | 485 (7.3%) |  |
| Robotic | 20,485 (23%) | 18,220 (23%) | 180 (16%) | 2,085 (31%) |  |
| Vaginal | 340 (0.4%) | 295 (0.4%) | 10 (0.9%) | 35 (0.5%) |  |
| Type of Gynecologic Cancer |  |  |  |  | 0.025 |
| Uterine | 7,660 (8.7%) | 6,810 (8.4%) | 125 (11%) | 725 (11%) |  |
| Endometrial | 37,145 (42%) | 33,740 (42%) | 535 (48%) | 2,870 (43%) |  |
| Ovarian | 32,160 (36%) | 29,600 (37%) | 345 (31%) | 2,215 (33%) |  |
| Cervical | 8,635 (9.8%) | 7,875 (9.8%) | 95 (8.4%) | 665 (10%) |  |
| Fallopian Tube | 1,945 (2.2%) | 1,830 (2.3%) | 5 (0.4%) | 110 (1.7%) |  |
| Vaginal | 150 (0.2%) | 130 (0.2%) | 5 (0.4%) | 15 (0.2%) |  |
| Vulvar | 125 (0.1%) | 115 (0.1%) | 0 (0%) | 10 (0.2%) |  |
| Other Female Reproductive | 690 (0.8%) | 655 (0.8%) | 15 (1.3%) | 20 (0.3%) |  |
| Congestive Heart Failure | 3,770 (4.3%) | 3,465 (4.3%) | 45 (4.0%) | 260 (3.9%) | 0.8 |
| Chronic Pulmonary Disease | 11,385 (13%) | 10,540 (13%) | 155 (14%) | 690 (10%) | 0.020 |
| Diabetes Mellitus | 18,890 (21%) | 17,195 (21%) | 240 (21%) | 1,455 (22%) | 0.9 |
| Renal Failure | 5,315 (6.0%) | 4,915 (6.1%) | 65 (5.8%) | 335 (5.1%) | 0.3 |
| Coagulopathy | 3,150 (3.6%) | 2,905 (3.6%) | 10 (0.9%) | 235 (3.5%) | 0.2 |
| Obesity | 25,725 (29%) | 23,470 (29%) | 380 (34%) | 1,875 (28%) | 0.4 |
| Hypertension | 45,035 (51%) | 41,150 (51%) | 645 (57%) | 3,240 (49%) | 0.12 |
| Metastatic Cancer | 27,770 (31%) | 25,815 (32%) | 185 (16%) | 1,770 (27%) | <0.001 |
| *1*Mean (SD); n (%) | | | | | |
| *2*Design-based KruskalWallis test; Pearson's X^2: Rao & Scott adjustment | | | | | |

## Univariable Analysis:

| **Characteristic** | **Overall** N = 88,510*1* | **Urban, teaching** N = 80,755*1* | **Rural** N = 1,125*1* | **Urban, non-teaching** N = 6,630*1* | **p-value***2* |
| --- | --- | --- | --- | --- | --- |
| In-hospital Mortality | 350 (0.4%) | 300 (0.4%) | 10 (0.9%) | 40 (0.6%) | 0.2 |
| Length of Stay (days) | 3.0 (2.0, 5.0) | 3.0 (2.0, 5.0) | 3.0 (2.0, 4.0) | 3.0 (2.0, 5.0) | 0.014 |
| Inflation-Adjusted Total Charges ($) | 69,191 (46,550, 106,019) | 69,345 (46,721, 104,954) | 41,932 (30,431, 61,397) | 73,325 (48,488, 123,029) | <0.001 |
| Non-Home Discharge | 5,320 (6.0%) | 4,825 (6.0%) | 75 (6.7%) | 420 (6.3%) | 0.8 |
| Any Major Complication | 10,490 (12%) | 9,755 (12%) | 80 (7.1%) | 655 (9.9%) | 0.011 |
| Postoperative Infection | 870 (1.0%) | 780 (1.0%) | 10 (0.9%) | 80 (1.2%) | 0.7 |
| Wound Complication | 510 (0.6%) | 490 (0.6%) | 5 (0.4%) | 15 (0.2%) | 0.2 |
| Postoperative Hemorrhage | 955 (1.1%) | 890 (1.1%) | 10 (0.9%) | 55 (0.8%) | 0.6 |
| Acute Kidney Injury | 6,925 (7.8%) | 6,465 (8.0%) | 60 (5.3%) | 400 (6.0%) | 0.018 |
| Postoperative Ileus | 330 (0.4%) | 305 (0.4%) | 5 (0.4%) | 20 (0.3%) | 0.9 |
| Venous Thromboembolism | 2,705 (3.1%) | 2,475 (3.1%) | 15 (1.3%) | 215 (3.2%) | 0.3 |
| *1*n (%); Median (Q1, Q3) | | | | | |
| *2*Pearson's X^2: Rao & Scott adjustment; Design-based KruskalWallis test | | | | | |

## Multivariable Logistic Regression:

### In-hospital Mortality:

| **Characteristic** | **OR** | **95% CI** | **p-value** |
| --- | --- | --- | --- |
| Hospital Location and Teaching Status |  |  |  |
| Urban, teaching | — | — |  |
| Rural | 2.16 | 0.29, 15.9 | 0.4 |
| Urban, non-teaching | 2.09 | 1.00, 4.34 | 0.048 |
| Age, y | 1.02 | 0.99, 1.05 | 0.3 |
| Race |  |  |  |
| White | — | — |  |
| Asian or Pacific Islander | 0.44 | 0.06, 3.26 | 0.4 |
| Black | 1.83 | 0.86, 3.90 | 0.11 |
| Hispanic | 1.34 | 0.57, 3.12 | 0.5 |
| Other | 0.00 | 0.00, 0.00 | <0.001 |
| Median ZIP Code Income Quartile |  |  |  |
| $1 - $51,999 | — | — |  |
| $52,000 - $65,999 | 0.67 | 0.31, 1.43 | 0.3 |
| $66,000 - $87,999 | 1.17 | 0.58, 2.33 | 0.7 |
| $88,000 or more | 0.99 | 0.46, 2.12 | >0.9 |
| Primary Expected Payer |  |  |  |
| Private | — | — |  |
| Medicaid | 1.00 | 0.35, 2.87 | >0.9 |
| Medicare | 1.59 | 0.74, 3.44 | 0.2 |
| Other | 1.40 | 0.30, 6.46 | 0.7 |
| Hospital Region |  |  |  |
| Midwest | — | — |  |
| Northeast | 1.42 | 0.61, 3.29 | 0.4 |
| South | 0.88 | 0.42, 1.86 | 0.7 |
| West | 1.12 | 0.52, 2.42 | 0.8 |
| Hospital Bed Size |  |  |  |
| Large | — | — |  |
| Medium | 1.56 | 0.89, 2.73 | 0.12 |
| Small | 1.10 | 0.43, 2.81 | 0.8 |
| Elixhauser Comorbidity Index | 1.62 | 1.48, 1.77 | <0.001 |
| Hysterectomy Surgical Approach |  |  |  |
| Abdominal | — | — |  |
| Laparoscopic | 0.84 | 0.28, 2.50 | 0.8 |
| Robotic | 0.63 | 0.32, 1.25 | 0.2 |
| Vaginal | 0.00 | 0.00, 0.00 | <0.001 |
| Type of Gynecologic Cancer |  |  |  |
| Uterine | — | — |  |
| Endometrial | 0.46 | 0.22, 1.00 | 0.049 |
| Ovarian | 0.69 | 0.32, 1.52 | 0.4 |
| Cervical | 0.35 | 0.07, 1.74 | 0.2 |
| Fallopian Tube | 0.36 | 0.04, 2.89 | 0.3 |
| Vaginal | 0.00 | 0.00, 0.00 | <0.001 |
| Vulvar | 0.00 | 0.00, 0.00 | <0.001 |
| Other Female Reproductive | 1.40 | 0.16, 12.1 | 0.8 |
| Abbreviations: CI = Confidence Interval, OR = Odds Ratio | | | |

### Any Major Complication:

| **Characteristic** | **OR** | **95% CI** | **p-value** |
| --- | --- | --- | --- |
| Hospital Location and Teaching Status |  |  |  |
| Urban, teaching | — | — |  |
| Rural | 0.51 | 0.28, 0.93 | 0.029 |
| Urban, non-teaching | 0.92 | 0.74, 1.14 | 0.4 |
| Age, y | 1.01 | 1.00, 1.02 | 0.003 |
| Race |  |  |  |
| White | — | — |  |
| Asian or Pacific Islander | 1.08 | 0.85, 1.38 | 0.5 |
| Black | 1.39 | 1.21, 1.61 | <0.001 |
| Hispanic | 0.95 | 0.80, 1.14 | 0.6 |
| Other | 1.20 | 0.92, 1.56 | 0.2 |
| Median ZIP Code Income Quartile |  |  |  |
| $1 - $51,999 | — | — |  |
| $52,000 - $65,999 | 1.05 | 0.92, 1.21 | 0.5 |
| $66,000 - $87,999 | 0.99 | 0.85, 1.14 | 0.8 |
| $88,000 or more | 1.01 | 0.87, 1.18 | 0.9 |
| Primary Expected Payer |  |  |  |
| Private | — | — |  |
| Medicaid | 1.56 | 1.32, 1.85 | <0.001 |
| Medicare | 1.14 | 0.98, 1.31 | 0.085 |
| Other | 1.28 | 1.0, 1.64 | 0.055 |
| Hospital Region |  |  |  |
| Midwest | — | — |  |
| Northeast | 1.05 | 0.90, 1.22 | 0.6 |
| South | 0.78 | 0.67, 0.90 | <0.001 |
| West | 0.70 | 0.60, 0.82 | <0.001 |
| Hospital Bed Size |  |  |  |
| Large | — | — |  |
| Medium | 0.91 | 0.80, 1.05 | 0.2 |
| Small | 0.79 | 0.66, 0.94 | 0.008 |
| Elixhauser Comorbidity Index | 1.48 | 1.44, 1.52 | <0.001 |
| Hysterectomy Surgical Approach |  |  |  |
| Abdominal | — | — |  |
| Laparoscopic | 0.56 | 0.44, 0.71 | <0.001 |
| Robotic | 0.49 | 0.42, 0.57 | <0.001 |
| Vaginal | 0.58 | 0.22, 1.50 | 0.3 |
| Type of Gynecologic Cancer |  |  |  |
| Uterine | — | — |  |
| Endometrial | 0.74 | 0.62, 0.89 | 0.001 |
| Ovarian | 0.86 | 0.72, 1.02 | 0.083 |
| Cervical | 0.66 | 0.52, 0.85 | 0.001 |
| Fallopian Tube | 0.62 | 0.43, 0.90 | 0.013 |
| Vaginal | 3.29 | 1.29, 8.40 | 0.013 |
| Vulvar | 1.32 | 0.45, 3.85 | 0.6 |
| Other Female Reproductive | 1.09 | 0.65, 1.84 | 0.7 |
| Abbreviations: CI = Confidence Interval, OR = Odds Ratio | | | |

### Non-Home Discharge:

| **Characteristic** | **OR** | **95% CI** | **p-value** |
| --- | --- | --- | --- |
| Hospital Location and Teaching Status |  |  |  |
| Urban, teaching | — | — |  |
| Rural | 0.94 | 0.51, 1.75 | 0.9 |
| Urban, non-teaching | 1.18 | 0.94, 1.50 | 0.2 |
| Age, y | 1.06 | 1.05, 1.07 | <0.001 |
| Race |  |  |  |
| White | — | — |  |
| Asian or Pacific Islander | 0.48 | 0.28, 0.82 | 0.007 |
| Black | 0.91 | 0.72, 1.13 | 0.4 |
| Hispanic | 0.70 | 0.52, 0.95 | 0.022 |
| Other | 0.87 | 0.58, 1.30 | 0.5 |
| Median ZIP Code Income Quartile |  |  |  |
| $1 - $51,999 | — | — |  |
| $52,000 - $65,999 | 0.82 | 0.68, 0.99 | 0.042 |
| $66,000 - $87,999 | 0.80 | 0.66, 0.98 | 0.031 |
| $88,000 or more | 0.79 | 0.64, 0.97 | 0.027 |
| Primary Expected Payer |  |  |  |
| Private | — | — |  |
| Medicaid | 1.83 | 1.37, 2.46 | <0.001 |
| Medicare | 2.04 | 1.61, 2.57 | <0.001 |
| Other | 1.08 | 0.64, 1.81 | 0.8 |
| Hospital Region |  |  |  |
| Midwest | — | — |  |
| Northeast | 1.05 | 0.85, 1.29 | 0.7 |
| South | 0.69 | 0.56, 0.84 | <0.001 |
| West | 0.57 | 0.45, 0.72 | <0.001 |
| Hospital Bed Size |  |  |  |
| Large | — | — |  |
| Medium | 1.16 | 0.98, 1.39 | 0.092 |
| Small | 1.07 | 0.84, 1.37 | 0.6 |
| Elixhauser Comorbidity Index | 1.42 | 1.37, 1.46 | <0.001 |
| Hysterectomy Surgical Approach |  |  |  |
| Abdominal | — | — |  |
| Laparoscopic | 0.56 | 0.42, 0.75 | <0.001 |
| Robotic | 0.50 | 0.42, 0.61 | <0.001 |
| Vaginal | 0.96 | 0.32, 2.85 | >0.9 |
| Type of Gynecologic Cancer |  |  |  |
| Uterine | — | — |  |
| Endometrial | 0.71 | 0.57, 0.89 | 0.003 |
| Ovarian | 0.66 | 0.52, 0.83 | <0.001 |
| Cervical | 0.80 | 0.55, 1.17 | 0.3 |
| Fallopian Tube | 0.38 | 0.22, 0.65 | <0.001 |
| Vaginal | 3.17 | 1.06, 9.47 | 0.038 |
| Vulvar | 1.86 | 0.61, 5.69 | 0.3 |
| Other Female Reproductive | 1.17 | 0.64, 2.13 | 0.6 |
| Abbreviations: CI = Confidence Interval, OR = Odds Ratio | | | |

## Multivariable Linear Regression:

### Length of Stay:

| **Characteristic** | **Beta** | **95% CI** | **p-value** |
| --- | --- | --- | --- |
| Hospital Location and Teaching Status |  |  |  |
| Urban, teaching | — | — |  |
| Rural | -1.0 | -1.4, -0.69 | <0.001 |
| Urban, non-teaching | 0.31 | -0.01, 0.63 | 0.054 |
| Age, y | 0.00 | -0.01, 0.01 | 0.4 |
| Race |  |  |  |
| White | — | — |  |
| Asian or Pacific Islander | 0.42 | -0.38, 1.2 | 0.3 |
| Black | 0.35 | 0.08, 0.61 | 0.012 |
| Hispanic | -0.09 | -0.37, 0.18 | 0.5 |
| Other | 0.20 | -0.12, 0.52 | 0.2 |
| Median ZIP Code Income Quartile |  |  |  |
| $1 - $51,999 | — | — |  |
| $52,000 - $65,999 | 0.04 | -0.16, 0.25 | 0.7 |
| $66,000 - $87,999 | 0.19 | -0.08, 0.46 | 0.2 |
| $88,000 or more | 0.15 | -0.08, 0.39 | 0.2 |
| Primary Expected Payer |  |  |  |
| Private | — | — |  |
| Medicaid | 1.2 | 0.77, 1.7 | <0.001 |
| Medicare | 0.00 | -0.23, 0.22 | >0.9 |
| Other | 0.54 | 0.22, 0.86 | <0.001 |
| Hospital Region |  |  |  |
| Midwest | — | — |  |
| Northeast | 0.28 | 0.03, 0.53 | 0.030 |
| South | -0.17 | -0.41, 0.07 | 0.2 |
| West | -0.11 | -0.38, 0.16 | 0.4 |
| Hospital Bed Size |  |  |  |
| Large | — | — |  |
| Medium | -0.13 | -0.34, 0.08 | 0.2 |
| Small | -0.23 | -0.52, 0.07 | 0.13 |
| Elixhauser Comorbidity Index | 0.75 | 0.68, 0.81 | <0.001 |
| Hysterectomy Surgical Approach |  |  |  |
| Abdominal | — | — |  |
| Laparoscopic | -2.4 | -2.6, -2.1 | <0.001 |
| Robotic | -2.5 | -2.7, -2.3 | <0.001 |
| Vaginal | -1.9 | -2.6, -1.2 | <0.001 |
| Type of Gynecologic Cancer |  |  |  |
| Uterine | — | — |  |
| Endometrial | -1.0 | -1.3, -0.64 | <0.001 |
| Ovarian | 0.00 | -0.35, 0.34 | >0.9 |
| Cervical | -0.36 | -0.83, 0.11 | 0.14 |
| Fallopian Tube | 0.06 | -0.57, 0.69 | 0.9 |
| Vaginal | 6.3 | 3.0, 9.7 | <0.001 |
| Vulvar | 8.0 | 1.6, 14 | 0.014 |
| Other Female Reproductive | 0.08 | -0.68, 0.84 | 0.8 |
| Abbreviation: CI = Confidence Interval | | | |

### Inflation-adjusted Total Charge:

| **Characteristic** | **Beta** | **95% CI** | **p-value** |
| --- | --- | --- | --- |
| Hospital Location and Teaching Status |  |  |  |
| Urban, teaching | — | — |  |
| Rural | -30,527 | -36,577, -24,478 | <0.001 |
| Urban, non-teaching | 10,040 | 726, 19,354 | 0.035 |
| Age, y | -129 | -319, 60 | 0.2 |
| Race |  |  |  |
| White | — | — |  |
| Asian or Pacific Islander | 6,624 | 95, 13,153 | 0.047 |
| Black | 6,339 | 1,851, 10,826 | 0.006 |
| Hispanic | 5,976 | 537, 11,414 | 0.031 |
| Other | 7,698 | 583, 14,814 | 0.034 |
| Median ZIP Code Income Quartile |  |  |  |
| $1 - $51,999 | — | — |  |
| $52,000 - $65,999 | 1,706 | -1,749, 5,162 | 0.3 |
| $66,000 - $87,999 | 1,777 | -1,961, 5,515 | 0.4 |
| $88,000 or more | 7,236 | 2,519, 11,953 | 0.003 |
| Primary Expected Payer |  |  |  |
| Private | — | — |  |
| Medicaid | 5,240 | 149, 10,330 | 0.044 |
| Medicare | -3,491 | -8,113, 1,132 | 0.14 |
| Other | -119 | -5,239, 5,001 | >0.9 |
| Hospital Region |  |  |  |
| Midwest | — | — |  |
| Northeast | 12,843 | 7,300, 18,386 | <0.001 |
| South | 1,335 | -3,719, 6,390 | 0.6 |
| West | 38,055 | 29,998, 46,112 | <0.001 |
| Hospital Bed Size |  |  |  |
| Large | — | — |  |
| Medium | -4,940 | -10,118, 238 | 0.062 |
| Small | -17,386 | -23,385, -11,386 | <0.001 |
| Elixhauser Comorbidity Index | 11,386 | 10,145, 12,627 | <0.001 |
| Hysterectomy Surgical Approach |  |  |  |
| Abdominal | — | — |  |
| Laparoscopic | -16,517 | -21,836, -11,198 | <0.001 |
| Robotic | -3,496 | -6,822, -170 | 0.039 |
| Vaginal | -16,775 | -29,597, -3,952 | 0.010 |
| Type of Gynecologic Cancer |  |  |  |
| Uterine | — | — |  |
| Endometrial | -16,777 | -22,154, -11,401 | <0.001 |
| Ovarian | 2,143 | -3,590, 7,875 | 0.5 |
| Cervical | -5,559 | -14,799, 3,680 | 0.2 |
| Fallopian Tube | -3,113 | -13,070, 6,844 | 0.5 |
| Vaginal | 77,580 | 34,330, 120,831 | <0.001 |
| Vulvar | 107,673 | 21,749, 193,597 | 0.014 |
| Other Female Reproductive | -3,543 | -15,522, 8,437 | 0.6 |
| Abbreviation: CI = Confidence Interval | | | |