

# Economic and Humanistic Burden of Uterine Cancer in the United States

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## BACKGROUND

- Uterine cancer is the most common cancer of the female reproductive system. New diagnoses of uterine cancer number 25.7 per 100,000 per year, of which the majority are adenocarcinomas of the endometrium<sup>1</sup>
- Little is known about the economic and humanistic burden of endometrial cancer in the US
- There have been no published studies on healthcare costs, and the quality of life of uterine cancer patients is described in only select populations such as long-term survivors<sup>2</sup> and those undergoing nerve-sparing radical hysterectomy<sup>3</sup>

## OBJECTIVE

- The objective of this study was to describe economic and humanistic burden of uterine cancer patients in the United States, using a nationally representative dataset

## METHODS

- This was a retrospective, cross-sectional analysis of the Medical Expenditure Panel Survey (MEPS) data from 2006-2015
- Uterine cancer patients were identified using ICD-9 CM code 182 or Clinical Classification Software code 25. Patients with a diagnosis of another cancer in addition to uterine cancer were excluded. The control group consisted of women without a diagnosis of cancer
- Study outcomes included the following:
  - Healthcare resource use (number of prescriptions, institutional inpatient and outpatient, ER, and physician office visits)
  - Healthcare costs
  - Activities of daily living (physical, cognitive, social, and activity limitations)
  - Quality of life measures (SF-12v2 physical component score [PCS], mental component score [MCS], EQ-5D health utility, and PHQ-2 depression severity)
- Unadjusted bivariate analyses were conducted using t-tests for continuous variables and chi-square tests for categorical variables
- Multivariate generalized linear models (GLM) that controlled for key sociodemographic and clinical covariates were conducted for adjusted comparisons of study outcomes between uterine cancer patients and non-cancer controls
- All analyses used appropriate procedures to account for the complex survey design of the MEPS

## RESULTS

### Patient Characteristics

- The final cohort consisted of 269,907 uterine cancer patients (unweighted frequency: 253) and 146,061,609 non-cancer controls (unweighted frequency: 171936) (Table 1)
- Uterine cancer patients were significantly older (mean age: 60.8 vs 37.0 years), had a higher BMI (mean BMI: 31.3 vs 26.5 kg/m<sup>2</sup>), and greater comorbidity burden (mean Charlson comorbidity index: 1.5 vs 0.5) compared to controls
- A greater portion of uterine cancer patients had fair/poor perceived general and mental health status than that of controls

Table 1. Patient Demographic and Clinical Characteristics

Statistic or Category	Uterine Cancer (N=269,907)	Non-Cancer (N=146,061,609)
Mean age <sup>a</sup>	60.82 (1.59)	36.98 (0.18)
Race/ethnicity <sup>a</sup>		
White	234,713 (87.0%)	113,614,171 (77.8%)
Black	14,970 (5.6%)	19,683,216 (13.5%)
American Indian/Alaskan Native	1,698 (0.6%)	1,139,810 (0.8%)
Asian/Native Hawaiian/Pacific Islanders	2,895 (1.1%)	8,227,062 (5.6%)
Multiple race	15,632 (5.8%)	3,397,350 (2.3%)
Education <sup>a</sup>		
1st-8th grade	12,352 (4.6%)	26,136,352 (17.9%)
9th-12th grade (no HS diploma/GED)	64,721 (24.0%)	31,000,110 (21.2%)
GED/HS grad	76,399 (28.3%)	24,083,436 (16.5%)
Beyond HS/associate degree/college	58,967 (21.8%)	21,508,455 (14.7%)
BA/4-year college degree	53,444 (19.8%)	19,430,309 (13.3%)
Masters/doctorate/professional	3,144 (1.2%)	10,716,955 (7.3%)
Census region <sup>a</sup>		
Northeast	74,164 (27.5%)	25,987,919 (17.8%)
Midwest	55,253 (20.5%)	31,115,668 (21.3%)
South	74,292 (27.5%)	54,141,696 (37.1%)
West	57,818 (21.4%)	33,792,238 (23.1%)
Insurance status <sup>a</sup>		
Private	176,643 (65.4%)	94,904,453 (65.0%)
Public only	80,726 (29.9%)	35,239,927 (24.1%)
Uninsured	12,538 (4.7%)	15,917,229 (10.9%)
Mean BMI <sup>a</sup>	31.25 (1.06)	26.45 (0.05)
Mean CCI <sup>a</sup>	1.46 (0.19)	0.46 (0.01)
General health <sup>a</sup>		
1 Excellent	22,509 (8.3%)	46,186,208 (31.6%)
2 Very good	68,918 (25.5%)	47,510,019 (32.5%)
3 Good	96,412 (35.7%)	36,080,314 (24.7%)
4 Fair	51,357 (19.0%)	11,434,552 (7.8%)
5 Poor	14,549 (5.4%)	3,529,071 (2.4%)
Mental health <sup>a</sup>		
1 Excellent	62,759 (23.3%)	59,790,006 (40.9%)
2 Very good	71,959 (26.7%)	42,830,335 (29.3%)
3 Good	81,197 (30.1%)	32,774,664 (22.4%)
4 Fair	30,635 (11.4%)	7,467,825 (5.1%)
5 Poor	7,194 (2.7%)	1,859,789 (1.3%)

GED, general equivalency diploma; HS, high school; BA, bachelor of arts; CCI, Charlson comorbidity index.

<sup>a</sup>Statistically significant difference assessed at P-value = 0.05.

Results are presented as mean (SD) for continuous variables, and N (%) for categorical variables.

### Economic Burden

- Unadjusted bivariate analyses suggested that uterine cancer was associated with significantly higher HCRU and costs (Table 2)

Table 2. Unadjusted HCRU and Costs

Variable Description	Uterine Cancer (N=269,907)	Non-Cancer (N=146,061,609)
Number of prescriptions <sup>a</sup>	30.41 (2.77)	10.99 (0.14)
Number of hospitalizations <sup>a</sup>	0.50 (0.06)	0.10 (0.00)
Number of ER visits <sup>a</sup>	0.37 (0.06)	0.20 (0.00)
Number of office-based visits <sup>a</sup>	12.67 (1.26)	5.56 (0.06)
Number of outpatient visits <sup>a</sup>	1.83 (0.27)	0.40 (0.01)
Total healthcare costs <sup>a</sup>	\$15,337 (\$1,704)	\$3,829 (\$55)
Drug cost <sup>a</sup>	\$3,275 (\$391)	\$975 (\$20)
Hospitalization cost <sup>a</sup>	\$7,244 (\$1,340)	\$1,225 (\$34)
ER cost	\$312 (\$80)	\$188 (\$4)
Office-based cost <sup>a</sup>	\$2,855 (\$291)	\$1,070 (\$13)
Outpatient cost <sup>a</sup>	\$1,651 (\$367)	\$371 (\$17)

<sup>a</sup>Statistically significant difference assessed at P-value = 0.05.

- Results from the multivariate GLMs (Figures 1A, 1B) suggested that as compared to non-cancer controls, uterine cancer patients had significantly higher:
  - Number of inpatient visits (0.3 vs 0.1) and costs (\$6,117 vs \$1,446)
  - Outpatient physician visits (0.9 vs 0.5) and costs (\$1,229 vs \$502)
  - Institutional outpatient costs (\$1,965 vs \$1,322)
  - Total all-cause healthcare costs (\$11,490 vs \$4,909)

Figure 1A. Adjusted Healthcare Resource Use from GLM

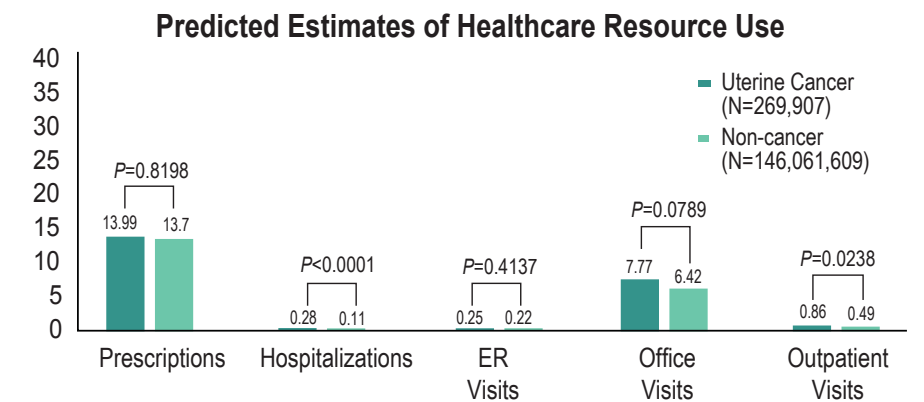
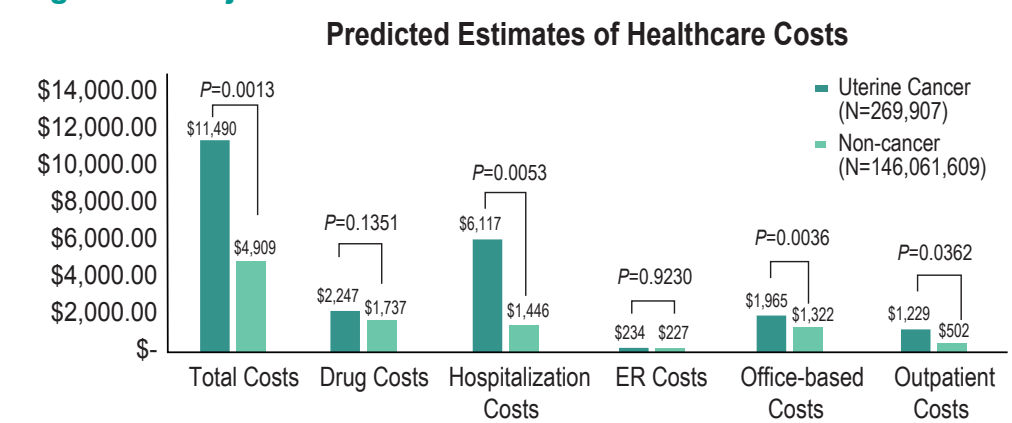


Figure 1B. Adjusted Healthcare Costs from GLM



### Humanistic Burden

- In the unadjusted analysis, physical, activity, social, and cognitive limitations were significantly higher while EQ-5D utility scores were significantly lower for uterine cancer patients compared to non-cancer controls (Table 3)
- In the adjusted analyses, uterine cancer patients did not significantly differ from the non-cancer controls in terms of functional and general health status (Figure 2, Figure 3)
- Uterine cancer was significantly associated with lower EQ-5D utility (Beta coefficient = -0.273; P=0.013) compared to non-cancer controls (P<0.05)

Table 3. Unadjusted Analysis of PRO Measures in Uterine Cancer Population

Variable Description	Uterine Cancer (N=269,907)	Non-Cancer (N=146,061,609)
Physical limitations, N (%) <sup>a</sup>	84,171 (31.2%)	14,877,178 (10.2%)
Activity limitations, N (%) <sup>a</sup>	60,357 (22.4%)	10,976,127 (7.5%)
Social limitations, N (%) <sup>a</sup>	36,217 (13.4%)	6,226,559 (4.3%)
Cognitive limitations, N (%) <sup>a</sup>	21,173 (7.8%)	5,619,573 (3.9%)
SF-12 PCS, Mean (SD)	41.50 (1.08)	49.20 (0.08)
SF-12 MCS, Mean (SD)	50.32 (0.85)	50.40 (0.06)
PHQ-2 score, Mean (SD)	0.86 (0.12)	0.74 (0.01)
SF-6D utility score, Mean (SD)	0.56 (0.01)	0.56 (0.00)
EQ5D utility score, Mean (SD) <sup>a</sup>	0.79 (0.01)	0.86 (0.00)

<sup>a</sup>Statistically significant difference assessed at P-value = 0.05.

Figure 2. Adjusted Functional Limitation and Health Status

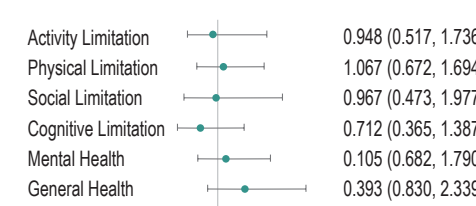
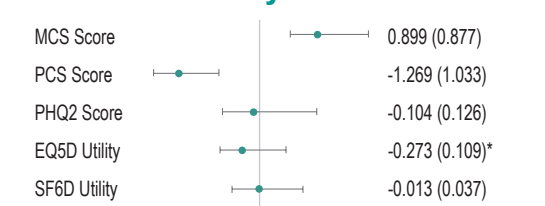


Figure 3. Adjusted SF-12, PHQ-2, and Health Utility Scores



Statistically significant difference assessed at P-value = 0.05.

## STUDY LIMITATIONS

- The study employed a cross-sectional design, which precludes us from drawing causal inferences about the relationship between uterine cancer and the study outcomes
- Other variables such as cancer staging information or time since diagnosis were not available in the data
- The detected cancer patients only represent the "treated prevalence" and therefore the cancer patients might have been under- or over-estimated due to potential misclassification issues related to using 3-digit ICD and CCC codes

## CONCLUSIONS

- Uterine cancer is associated with significant healthcare resource use and cost burden, and health utility impairment
- These results are generalizable to the population of non-institutionalized US adults and should be considered by payers in making resource allocation decisions and by clinicians in drafting uterine cancer screening/treatment guidelines

### References

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### Disclosures

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