

## STATISTICAL BRIEF #22

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### Hospital Stays for Cervical Cancer, 2004

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#### Introduction

Cervical cancer is preventable and curable if detected early. Timely cervical cancer screening through Papanicolaou (Pap) tests has been recognized as the most effective way to identify the earliest signs of cervical cancer. Although the number of women newly diagnosed with cervical cancer and the risk of dying from this disease have decreased by roughly 50 percent over the past 20 years, there are currently over 250,000 women living with cervical cancer.<sup>1</sup>

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on the treatment of cervical cancer in U.S. hospitals in 2004. The utilization and cost of hospital stays for cervical cancer are compared with hospital stays for all female-specific cancers (i.e., cancers of the breast, uterus, cervix, ovary, and other female genital organs). Additionally, age, payer, and regional differences among these hospital stays are noted. Finally, the utilization of hysterectomy among women hospitalized for cervical cancer is examined. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

#### Findings

In 2004, cervical cancer accounted for approximately 24,800 hospital stays, which represented 13.2 percent of all female-specific cancers (i.e., cancers of the breast, uterus, cervix, ovaries, and other female genital organs), as shown in table 1. The total cost of hospital stays for cervical cancer amounted to approximately \$186 million, which was 11.9 percent of the total hospital costs associated with female-specific cancers.

##### *General characteristics of hospital stays for cervical cancer*

Women hospitalized for cervical cancer were nearly 13 years younger than women hospitalized for all female-specific cancers (table 1). Hospital stays for cervical cancer and all female-specific cancers had comparable lengths of stay (3.7 days versus 3.9 days), slightly lower mean costs (\$7,500 versus \$8,300), and higher emergency admission rates (11.1 percent versus 8.7 percent).

#### Highlights

- In 2004, there were 24,800 admissions for cervical cancer resulting in approximately \$186 million in total hospital costs.
- Between 1994 and 2004 the rate of hospitalization for cervical cancer declined from 25.9 admissions per 100,000 females to 16.6 admissions per 100,000 females—a 36 percent decrease.
- On average, women hospitalized for cervical cancer were nearly 13 years younger than women hospitalized for all female-specific cancers (i.e., cancers of the breast, uterus, cervix, ovary, and other female genital organs).
- Half of hospitalizations for cervical cancer occurred among women ages 18–44, with women ages 35–44 accounting for about one-third of all cervical cancer admissions. Stays for all other female-specific cancers occurred most often among women 45 and older.
- Private insurance and Medicaid were the most common sources of payment for hospital charges related to cervical cancer admissions.
- The hospitalization rate for cervical cancer was highest in the South and lowest in the West.
- Women ages 18 to 44, those with private insurance, and those hospitalized in the West were most likely to have a hysterectomy while hospitalized for cervical cancer.

<sup>1</sup>Surveillance, Epidemiology, and End Results (SEER) Program and the National Center for Health Statistics. <http://seer.cancer.gov/> (Accessed October 16, 2006)

The rate of hospitalization for cervical cancer among women in the U.S. has been on the decline over the past 10 years, consistent with the decreased incidence of the disease. In 2004, 16.6 hospital stays per 100,000 females were due to cervical cancer. This rate represents a 36.0 percent decrease from 25.9 hospitalizations per 100,000 females in 1994 (figure 1).

#### *Differences in hospital stays for cervical cancer, by region*

When adjusted for the female population in each region, the lowest rate of hospitalization for cervical cancer was in the West, where there were 13.2 hospitalizations per 100,000 females in 2004. Cervical cancer hospitalizations were over 40 percent higher in the South, with a rate of 19.0 admissions per 100,000 females (figure 2). The rates in the Northeast and the Midwest were nearly identical—16.0 and 16.7 hospitalizations per 100,000 females, respectively. In contrast, all other female-specific cancers (i.e., cancers of the breast, ovary, uterus, and other female genital organs) were most likely to occur in the Northeast at a rate of 137.3 admissions per 100,000 females (data not shown). The hospitalization rate for all other female-specific cancers was lowest in the South and West regions (100.1 and 102.5 admissions per 100,000 females, respectively).

#### *Differences in hospital stays for cervical cancer, by age and payer*

Figure 3 illustrates that about half (50.4 percent) of the hospital stays for cervical cancer occurred among women ages 18 to 44. Women ages 35 to 44 accounted for the majority (62.5 percent) of admissions in this age group, or about one-third of all cervical cancer hospital stays (data not shown). Women ages 45 to 64 accounted for 36.8 percent of all cervical cancer hospitalizations. Conversely, hospitalizations for breast, uterine, and ovarian cancers occurred most often among women ages 45 to 64. Women 65 and older represented the majority of admissions for cancer of other female genital organs, which includes cancer of the vagina, vulva, and uterine adnexa.

Figure 4 shows that private insurance and Medicaid were the most common sources of payment for charges related to cervical cancer hospital stays. Private insurance was billed for about half (50.4 percent) of charges for cervical cancer hospitalizations, and Medicaid was billed for 28.4 percent of these hospital charges. This is expected given that these two payers insure the majority of 18 to 64 year olds, and cervical cancer tends to afflict younger females.

In contrast, Medicare, a government insurance program that largely provides insurance for the elderly, was billed for only 10.7 percent of cervical cancer admissions. For all other female-specific cancers, hospitalizations occurred most often among women 45 and older and were most frequently billed to Medicare and private insurance. Medicaid was billed for a smaller percentage of non-cervical cancer hospital stays.

Uninsured women comprised 6.9 percent of hospital stays for cervical cancer. This percentage was two to three times higher than for other female-specific cancers, where the rate of uninsured hospital stays ranged from 2.4 percent to 3.8 percent.

#### *Hysterectomies performed during hospital stays for cervical cancer*

Hysterectomy was performed in 60 percent of all hospital stays for cervical cancer and was the procedure most commonly associated with these stays.<sup>2</sup> Figure 5 illustrates the age, payer, and regional differences in the percentage of hospital stays for cervical cancer during which a hysterectomy was performed. Hysterectomy was performed during 72.6 percent of all cervical cancer hospitalizations among women ages 18 to 44. This was nearly 40 percent higher than for women ages 45 to 64 hospitalized for cervical cancer (52.6 percent) and more than twice the percentage for women ages 65 and older hospitalized for this disease (34.9 percent).

Hysterectomies were performed in 72.6 percent of all cervical cancer hospitalizations billed to private insurance—significantly higher than the percentage of these procedures performed during cervical cancer stays billed to Medicaid (49.4 percent), the uninsured (47.1 percent), and Medicare (42.2 percent).

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<sup>2</sup>A simple hysterectomy involves the surgical removal of a woman's cervix and uterus, generally leaving the surrounding tissues, pelvic lymph nodes, ovaries, and fallopian tubes in tact. During a radical hysterectomy, a portion of the vagina, ligaments, and tissues surrounding the uterus are removed along with the lymph nodes. Ovaries and fallopian tubes are not removed unless medically necessary.

The West had the highest percentage of hysterectomies performed during stays for cervical cancer hospitalizations (75.7 percent), as compared with cervical cancer stays in the Northeast (55.4 percent), the South (56.8 percent), and the Midwest (58.9 percent).

## Data Source

The estimates in this Statistical Brief are based on data from the HCUP 2004 Nationwide Inpatient Sample (NIS). Historical data were drawn from the 1994–2003 NIS. Supplemental sources included data on age group population estimates from Table 2: Annual Estimates of the Population by Selected Age Groups and Sex for the United States: April 1, 2000 to July 1, 2005 (NST-EST2005-02) and the archives from the Population Division, U.S. Census Bureau (<http://www.census.gov/popest/estimates.php>).

## Definitions

### *Types of hospitals included in HCUP*

HCUP is based on data from community hospitals, defined as short-term, non-Federal, general and other hospitals, excluding hospital units of other institutions (e.g., prisons). HCUP data include OB-GYN, ENT, orthopedic, cancer, pediatric, public, and academic medical hospitals. They exclude long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals, but these types of discharges are included if they are from community hospitals.

### *Unit of analysis*

The unit of analysis is the hospital discharge (i.e., the hospital stay), not a person or patient. This means that a person who is admitted to the hospital multiple times in one year will be counted each time as a separate "discharge" from the hospital.

### *Region*

Region is one of the four regions defined by the U.S. Census Bureau:

- Northeast: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania
- Midwest: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas
- South: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas
- West: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii

### *Costs and charges*

Total hospital charges were converted to costs using cost-to-charge ratios based on hospital accounting reports from the Centers for Medicare and Medicaid Services (CMS).<sup>3</sup> Costs will tend to reflect the actual costs of production, while charges represent what the hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used because detailed charges are not available across all HCUP States. Hospital charges reflect the amount the hospital charged for the entire hospital stay and does not include professional (physician) fees. For the purposes of this Statistical Brief, costs are reported to the nearest hundreds.

### *Payer*

Up to two payers can be coded for a hospital stay in HCUP data. When this occurs, the following hierarchy is used:

- If either payer is listed as Medicaid, the payer is "Medicaid."
- For non-Medicaid stays, if either payer is listed as Medicare, the payer is "Medicare."
- For stays that are neither Medicaid nor Medicare, if either payer is listed as private insurance, the payer is "private insurance."
- For stays that are not Medicaid, Medicare or private insurance, if either payer is some other third-party payer, the payer is "other," which consists of Worker's Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.

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<sup>3</sup>HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2003. U.S. Agency for Healthcare Research and Quality, Rockville, MD. [www.hcup-us.ahrq.gov/db/state/costtocharge.jsp](http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp)

- For stays that have no third-party payer and the payer is listed as “self-pay” or “no charge,” the payer is “uninsured.”

#### *Diagnoses, ICD-9-CM, and Clinical Classifications Software (CCS)*

The principal diagnosis is that condition established after study to be chiefly responsible for the patient's admission to the hospital. Secondary diagnoses are concomitant conditions that coexist at the time of admission or that develop during the stay. All-listed diagnoses include the principal diagnosis plus these additional secondary conditions.

ICD-9-CM is the International Classification of Diseases, Ninth Revision, Clinical Modification, which assigns numeric codes to diagnoses. There are about 12,000 ICD-9-CM diagnosis codes.

CCS categorizes ICD-9-CM diagnoses into 260 clinically meaningful categories.<sup>4</sup> This "clinical grouper" makes it easier to quickly understand patterns of diagnoses and procedures.

The following ICD-9-CM diagnosis codes are included in the CCS category 26 (cancer of cervix):

- 180.0 Malignant neoplasm of cervix uteri (endocervix)
- 180.1 Malignant neoplasm of cervix uteri (exocervix)
- 180.8 Malignant neoplasm of cervix uteri (other specified sites of cervix)
- 180.9 Malignant neoplasm of cervix uteri (cervix uteri, unspecified)
- 233.1 Carcinoma in situ of breast and genitourinary system (cervix uteri)
- 795.0 Abnormal Papanicolaou smear of cervix and cervical HPV

For this report, female-specific cancers were defined as CCS categories:

- 24 Cancer of breast
- 25 Cancer of uterus
- 26 Cancer of cervix
- 27 Cancer of ovary
- 28 Cancer of other female genital organs

#### *Procedures and Clinical Classifications Software (CCS)*

The principal procedure is the procedure that was performed for definitive treatment rather than one performed for diagnostic or exploratory purposes (i.e., the procedure that was necessary to take care of a complication). If two procedures appear to meet this definition, the procedure most related to the principal diagnosis was selected as the principal procedure. All-listed procedures include the principal procedure plus any additional secondary procedures.

CCS categorizes procedure codes into clinically meaningful categories. This "clinical grouper" makes it easier to quickly understand patterns of procedure use.

The following ICD-9-CM procedure codes are included in the CCS procedure category 124 (hysterectomy, abdominal and vaginal):

- 68.3 Subtotal abdominal hysterectomy
- 68.31 Subtotal abdominal hysterectomy (laparoscopic supracervical hysterectomy [LSH])
- 68.39 Subtotal abdominal hysterectomy (other subtotal abdominal hysterectomy, NOS)
- 68.4 Total abdominal hysterectomy
- 68.5 Vaginal hysterectomy
- 68.51 Vaginal hysterectomy (laparoscopically assisted vaginal hysterectomy [LAVH])
- 68.59 Vaginal hysterectomy (other vaginal hysterectomy)
- 68.6 Radical abdominal hysterectomy
- 68.7 Radical vaginal hysterectomy
- 68.9 Other and unspecified hysterectomy

### **About the NIS**

The HCUP Nationwide Inpatient Sample (NIS) is a nationwide database of hospital inpatient stays. The NIS is nationally representative of all community hospitals (i.e., short-term, non-Federal, non-rehabilitation

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<sup>4</sup>HCUP CCS. Healthcare Cost and Utilization Project (HCUP). August 2006. U.S. Agency for Healthcare Research and Quality, Rockville, MD. [www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp](http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp)

hospitals). The NIS is a sample of hospitals and includes all patients from each hospital, regardless of payer. It is drawn from a sampling frame that contains hospitals comprising 90 percent of all discharges in the United States. The vast size of the NIS allows the study of topics at both the national and regional levels for specific subgroups of patients. In addition, NIS data are standardized across years to facilitate ease of use.

## About HCUP

HCUP is a family of powerful health care databases, software tools, and products for advancing research. Sponsored by the Agency for Healthcare Research and Quality (AHRQ), HCUP includes the largest all-payer encounter-level collection of longitudinal health care data (inpatient, ambulatory surgery, and emergency department) in the United States, beginning in 1988. HCUP is a Federal-State-Industry Partnership that brings together the data collection efforts of many organizations—such as State data organizations, hospital associations, private data organizations, and the Federal government—to create a national information resource.

For more information about HCUP, visit <http://www.hcup-us.ahrq.gov/>.

HCUP would not be possible without the contributions of the following data collection Partners from across the United States:

**Arizona** Department of Health Services  
**Arkansas** Department of Health & Human Services  
**California** Office of Statewide Health Planning & Development  
**Colorado** Health & Hospital Association  
**Connecticut** Integrated Health Information (Chime, Inc.)  
**Florida** Agency for Health Care Administration  
**Georgia** GHA: An Association of Hospitals & Health Systems  
**Hawaii** Health Information Corporation  
**Illinois** Health Care Cost Containment Council and Department of Public Health  
**Indiana** Hospital & Health Association  
**Iowa** Hospital Association  
**Kansas** Hospital Association  
**Kentucky** Cabinet for Health and Family Services  
**Maryland** Health Services Cost Review Commission  
**Massachusetts** Division of Health Care Finance and Policy  
**Michigan** Health & Hospital Association  
**Minnesota** Hospital Association  
**Missouri** Hospital Industry Data Institute  
**Nebraska** Hospital Association  
**Nevada** Division of Health Care Financing and Policy, Department of Human Resources  
**New Hampshire** Department of Health & Human Services  
**New Jersey** Department of Health & Senior Services  
**New York** State Department of Health  
**North Carolina** Department of Health and Human Services  
**Ohio** Hospital Association  
**Oregon** Office for Oregon Health Policy and Research and Oregon Association of Hospitals and Health Systems  
**Rhode Island** Department of Health  
**South Carolina** State Budget & Control Board  
**South Dakota** Association of Healthcare Organizations  
**Tennessee** Hospital Association  
**Texas** Department of State Health Services  
**Utah** Department of Health  
**Vermont** Association of Hospitals and Health Systems  
**Virginia** Health Information  
**Washington** State Department of Health  
**West Virginia** Health Care Authority  
**Wisconsin** Department of Health & Family Services

For additional HCUP statistics, visit HCUPnet, our interactive query system at [www.hcup.ahrq.gov](http://www.hcup.ahrq.gov).

## References

For a detailed description of HCUP and more information on the design of the NIS and methods to calculate estimates, please refer to the following publications:

Steiner, C., Elixhauser, A., Schnaier, J. The Healthcare Cost and Utilization Project: An Overview. *Effective Clinical Practice* 5(3):143–51, 2002.

*Design of the HCUP Nationwide Inpatient Sample, 2004*. Online. August 8, 2006. U.S. Agency for Healthcare Research and Quality. [http://www.hcup-us.ahrq.gov/db/nation/nis/reports/NIS\\_2004\\_Design\\_Report.pdf](http://www.hcup-us.ahrq.gov/db/nation/nis/reports/NIS_2004_Design_Report.pdf)

Houchens, R., Elixhauser, A. *Final Report on Calculating Nationwide Inpatient Sample (NIS) Variances, 2001*. HCUP Methods Series Report #2003-2. Online. June 2005 (revised June 6, 2005). U.S. Agency for Healthcare Research and Quality. <http://www.hcup-us.ahrq.gov/reports/CalculatingNISVariances200106092005.pdf>

Houchens RL, Elixhauser A. *Using the HCUP Nationwide Inpatient Sample to Estimate Trends*. (Updated for 1988-2004). HCUP Methods Series Report #2006-05 Online. August 18, 2006. U.S. Agency for Healthcare Research and Quality. [http://www.hcup-us.ahrq.gov/reports/2006\\_05\\_NISTrendsReport\\_1988-2004.pdf](http://www.hcup-us.ahrq.gov/reports/2006_05_NISTrendsReport_1988-2004.pdf)

## Suggested Citation

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AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of health care in the United States. We also invite you to tell us how you are using this Statistical Brief and other HCUP data and tools, and to share suggestions on how HCUP products might be enhanced to further meet your needs. Please e-mail us at [hcp@ahrq.gov](mailto:hcp@ahrq.gov) or send a letter to the address below:

Irene Fraser, Ph.D., Director  
Center for Delivery, Organization, and Markets  
Agency for Healthcare Research and Quality  
540 Gaither Road  
Rockville, MD 20850

**Table 1. Hospital stays for cervical cancer compared with hospital stays for all female-specific cancers, 2004\***

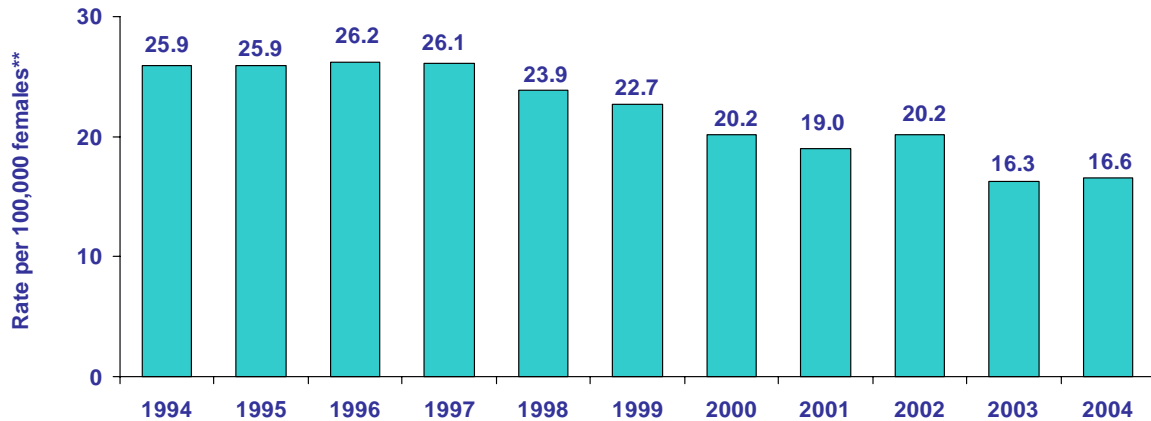
	Hospital stays for cervical cancer	Hospital stays for all female-specific cancers
Number of hospital stays (percentage of all female-specific cancers)	24,800 (13.2%)	188,200 (100%)
Mean length of stay, days	3.7	3.9
Mean age	46.8	59.6
Mean cost per hospital stay	\$7,500	\$8,300
Mean cost per day	\$2,000	\$2,100
Aggregate cost (percentage of total costs for female-specific cancers)	\$185.7 million (11.9%)	\$1.6 billion (100%)
Percentage admitted through the emergency department	11.1%	8.7%

\*Based on principal diagnosis.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004.



**Figure 1. Hospitalization rates for cervical cancer, 1994-2004\***



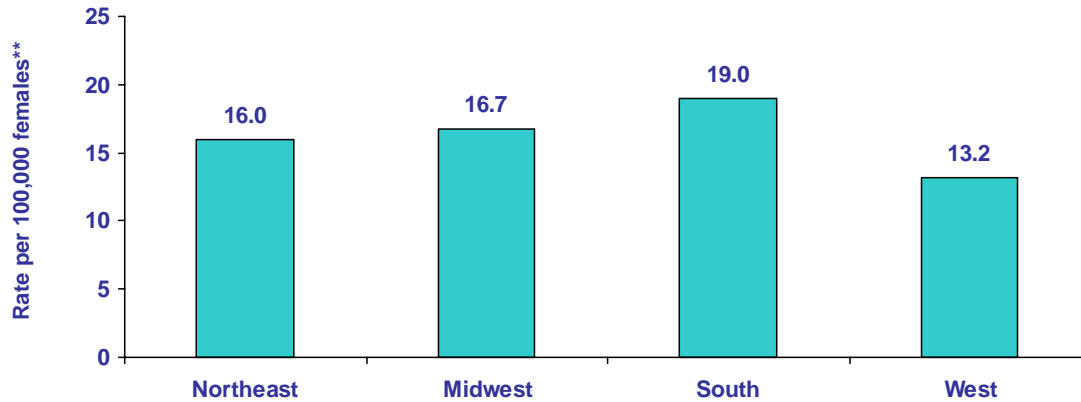
\*Based on principal diagnosis.

\*\*U.S. Census Bureau, Population Division, Census 1994-2004.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1994-2004.



**Figure 2. Hospitalization rates for cervical cancer, by region, 2004\***



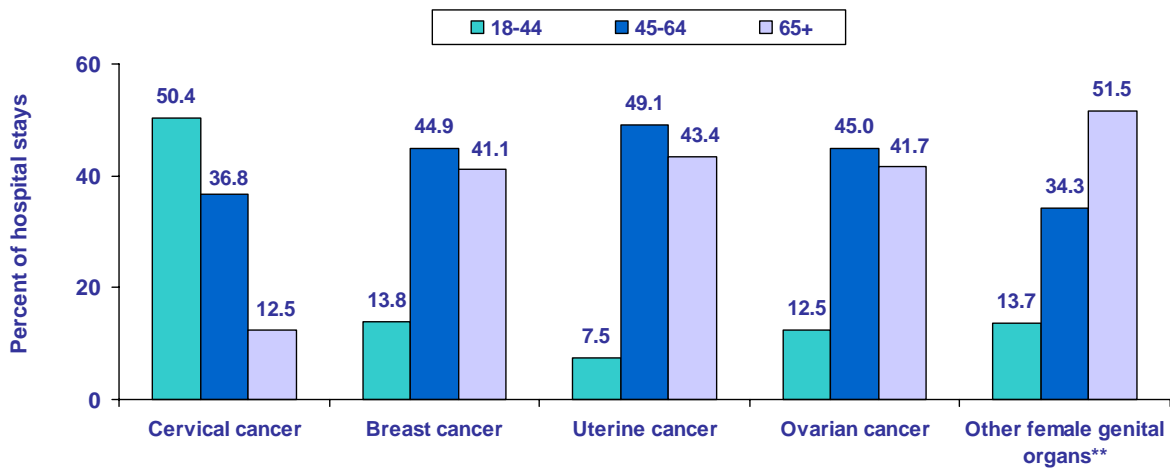
\*Based on principal diagnosis.

\*\*U.S. Census Bureau, Population Division, Census 2004.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004.



**Figure 3. Distribution of hospitalizations for cervical cancer and other female-specific cancers, by age, 2004\***



\*Based on principal diagnosis.

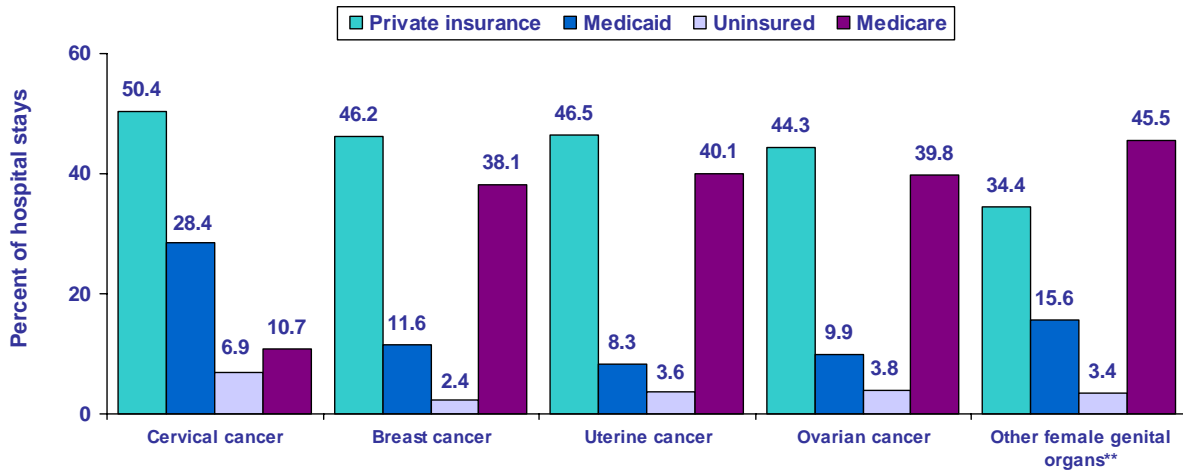
\*\*Other female genital organs include cancers of the vagina, vulva, and uterine adnexa.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004.





**Figure 4. Distribution of hospitalizations for cervical cancer and other female-specific cancers, by payer, 2004\***



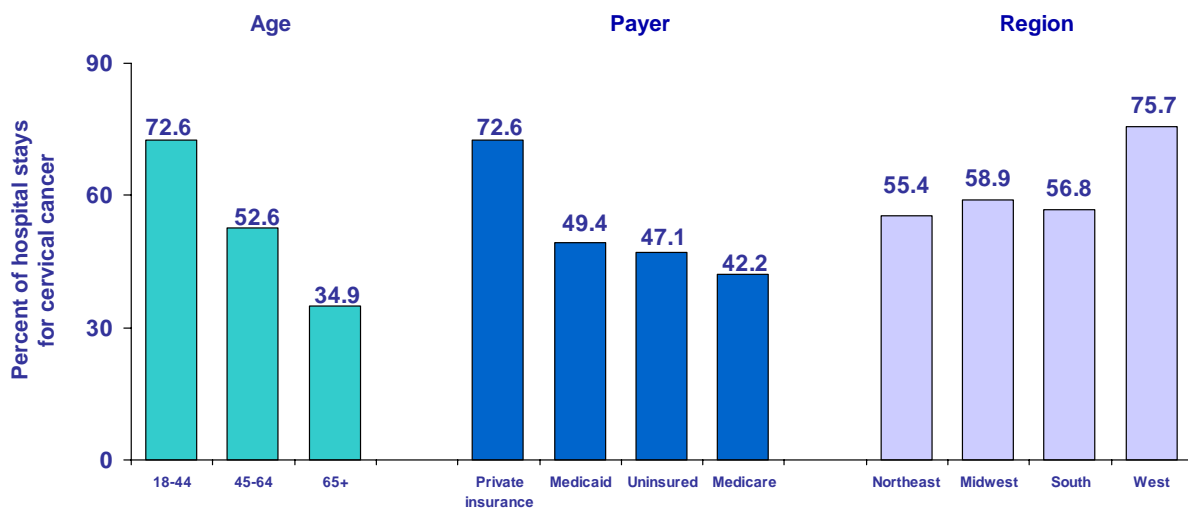
\*Based on principal diagnosis.

\*\*Other female genital organs include cancers of the vagina, vulva, and uterine adnexa.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004.



**Figure 5. Hysterectomies performed during hospital stays for cervical cancer, by age, payer, and region, 2004\***



\*Based on all-listed procedures.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004.