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Hospitalizations for Colorectal Cancer, 2006

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Introduction

In the United States, colorectal cancer (cancer of the large intestine or rectum) is the third most commonly diagnosed cancer in both men and women, and is also the third leading cause of cancer-related deaths.[1] Unlike most cancers, colorectal cancer is considered preventable in many cases with screening and early detection.[1] In 2008, an estimated 148,000 people were newly diagnosed with colorectal cancer.[2] Though treatment for colorectal cancer may vary based on the stage of the cancer, many patients require inpatient or outpatient surgery, outpatient chemotherapy and/or radiotherapy.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on characteristics of hospital stays related to the treatment of colorectal cancer in 2006, including cancers of the colon, rectum, and anus. Characteristics of stays for colorectal cancer are compared to all non-maternal, non-neonatal hospitalizations. Differences by age, gender, payer, and region are also investigated for principal and secondary colorectal cancer diagnoses. Additionally, common principal diagnoses and procedures associated with colorectal cancer-related stays are outlined. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

Findings

In 2006, there were nearly 571,700 hospitalizations related to colorectal cancer in the U.S., a rate of 191.4 hospitalizations per 100,000 population. About one in four colorectal cancer-related stays had a principal diagnosis of colorectal cancer (50.8 stays per 100,000 population) and resulted in $2.6 billion in hospital costs. As a secondary diagnosis, there were about 419,800 hospitalizations (140.5 stays per 100,000 population).

Highlights

- There were nearly 571,700 hospitalizations related to colorectal cancer in 2006, or nearly 191.4 stays per 100,000 population.
- Between 1995 and 2006, the rate of hospitalizations with a principal diagnosis of colorectal cancer decreased by 15 percent, while increasing 15 percent for hospitalizations listing colorectal cancer as a secondary diagnosis.
- The rate of colorectal cancer-related hospitalization is dramatically higher among patients 65 years and older; men over 65 had the highest rates of hospitalization for colorectal cancer.
- The Northeast had the highest rates of hospitalizations with a diagnosis of colorectal cancer.
- More than one-third of all colorectal cancer-related hospitalizations had some form of cancer or cancer therapy as the principal reason for admission. The remaining cases were admitted for treatment of conditions that are likely sequelae of cancer and its treatment—intestinal obstruction, pneumonia, sepsis, and complications of medical care.

[1] National Cancer Institute. http://www.cancer.gov (Accessed February 17, 2009).
[2] National Cancer Institute. Surveillance, Epidemiology, and End Results (SEER): http://seer.cancer.gov/faststats/index.php. Fast Stats. 2008. (Accessed February 17, 2009).

Since 1995, the overall rate of colorectal cancer-related hospital stays has remained relatively stable. However, hospitalizations primarily for colorectal cancer decreased by 15 percent between 1995 and 2006, while hospital stays that included colorectal cancer as a secondary diagnosis increased by 15 percent (figure 1).

Utilization characteristics of colorectal cancer hospitalizations
Although stays principally for colorectal cancer were nearly four days longer than the average non-maternal, non-neonatal hospitalization (8.8 days versus 5.1 days), the average cost per day was the same ($1,900 per day). Compared to the average hospitalization, the mean cost per day of stays with a secondary diagnosis of colorectal cancer was slightly lower ($1,700 versus $1,900), indicating a somewhat lower intensity of care for patients with a secondary diagnosis of colorectal cancer.

Patients hospitalized principally for colorectal cancer were less likely to be admitted through the emergency department (ED) than the average hospitalization (25.9 percent versus 55.7 percent), indicating most were planned hospitalizations. Patients with a secondary diagnosis of colorectal cancer were admitted through the ED at about the same rate as the average hospitalization (54.7 percent), suggesting that a large proportion were admitted for urgent care.

In-hospital deaths were significantly higher for stays involving colorectal cancer than the average non-maternal, non-neonatal hospitalization. In 2006, 4.5 percent of stays principally for colorectal cancer and 3.8 percent of hospitalization with colorectal cancer as a secondary diagnosis resulted in an in-hospital death—73 percent and 46 percent higher than the average non-maternal, non-neonatal hospital stay (2.6 percent).

Medicare was the most common primary payer for hospitalizations involving colorectal cancer, accounting for 59.1 percent of stays principally for colorectal cancer and 71.5 percent of hospitalizations with a secondary diagnosis of colorectal cancer. Private insurance was the second most common primary payer for both principal and secondary stays, at 29.7 and 19.7 percent, respectively. Medicaid covered about 5 percent of colorectal cancer-related hospitalizations. The uninsured accounted for 3.2 percent of principal colorectal cancer stays and 1.8 percent of stays with a secondary diagnosis of colorectal cancer—both less than the average non-maternal, non-neonatal hospitalization (5.8 percent).

Colorectal cancer hospitalizations, by age and gender
The average age of patients hospitalized with a colorectal cancer diagnosis was 10 to 14 years older than the average non-maternal, non-neonatal hospitalized patient (68.3 years and 72.2 years, respectively, versus 58.1 years). In fact, the rate of hospitalization for colorectal cancer was dramatically higher among patients 65 years and older (table 1 and figure 2). Patients under the age of 45 were rare—patients 44 years and younger accounted for only 5.3 percent of stays principally for colorectal cancer (7.1 stays per 100,000 population) and 3.7 percent of stays with a secondary colorectal cancer diagnosis (13.9 stays per 100,000 population). About two-thirds of colorectal cancer-related stays occurred among patients 65 years and older—a rate of 254.1 stays per 100,000 population for principal colorectal cancer and a rate of 818.0 stays per 100,000 population for stays with colorectal cancer as a secondary diagnosis.

Overall, males were hospitalized less frequently than females for colorectal cancer. Males accounted for 49.5 percent of stays principally for colorectal cancer and 48.6 percent of stays with a secondary colorectal cancer diagnosis (table 1). However, figure 3 indicates that males in older age groups had a much higher rate of hospitalization than females. In fact, males over the age of 65 had the highest rates of hospitalization among all colorectal cancer patients, with 281.4 stays per 100,000 population for principal colorectal cancer hospitalizations (20 percent higher than females in the same age group) and 920.4 stays per 100,000 population for stays with a secondary colorectal cancer diagnosis (24 percent higher than females in the same age group).

Colorectal cancer hospitalizations, by region
As shown in figure 4, the Northeast had the highest rates of colorectal cancer-related hospitalizations (247.6 stays per 100,000 population), while the West had the lowest rates (135.4 stays per 100,000

population). However, rates of hospitalization by region varied by the type of colorectal cancer diagnosis. As a principal diagnosis, hospitalization rates for colorectal cancer were nearly equal in the Northeast, Midwest, and South. As a secondary diagnosis, the Northeast had a hospitalization rate of 192.3 stays per 100,000 population—twice the rate found in the West (95.8 stays per 100,000 population).

Principal diagnoses for colorectal cancer hospitalizations
Nearly three out of four hospitalizations related to colorectal cancer had the disease listed as a secondary diagnosis; another condition was generally listed as the principal reason for admission. Table 2 lists the top principal diagnoses for stays where colorectal cancer was present as any diagnosis. More than one-third of all colorectal cancer-related hospitalizations had some form of cancer or cancer therapy noted as the principal diagnosis, including colorectal cancer (26.6 percent), secondary malignancies (4.8 percent), chemotherapy or radiotherapy (3.1 percent), and other cancers (1.9 percent)—lung, prostate, breast, and other forms.

Other disorders affecting the gastrointestinal system were also common principal diagnoses for hospitalizations related to colorectal cancer. Intestinal obstruction without hernia accounted for 4.3 percent of stays, followed by other gastrointestinal disorders (2.4 percent) and gastrointestinal hemorrhage (1.5 percent). Other conditions reflect the severity of illness associated with cancer—pneumonia, fluid and electrolyte disorders, septicemia, and acute renal failure. About four percent of patients experienced some complication of medical care (2.4 percent) or device, implant or graft (1.9 percent). Most other conditions are associated with old age, regardless of the presence of a cancer-related stay.

Common procedures associated with colorectal cancer-related hospitalizations
Table 3 compares the frequency of the ten most common procedures performed during stays principally for colorectal cancer with the frequency of these procedures among hospitalization noting a secondary diagnosis of colorectal cancer. About 80 percent of stays principally for colorectal cancer had a colorectal resection (the standard surgical treatment used to remove malignant tumors in the colon), and one-fifth (21.8 percent) cited a colonoscopy or biopsy. In comparison, only 2.3 percent of stays with a secondary colorectal cancer diagnosis noted colorectal resection, while only 4.2 percent noted a colonoscopy or biopsy.

However, other procedures directly related to the diagnosis or surgical treatment of the colorectal cancer itself were common in all colorectal cancer-related hospitalizations. These procedures included blood transfusion, upper gastrointestinal endoscopy and biopsy, excision and lysis of peritoneal adhesions, and respiratory intubation and mechanical intubation.

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2006 Nationwide Inpatient Sample (NIS). Historical data were drawn from the 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, and 2005 NIS. Supplemental source included data on regional population estimates from Table 8: Annual Estimates of the Population for the United States, Regions, and Divisions: April 1, 2000 to July 1, 2007 (NST-EST2007-01), Population Division, U.S. Census Bureau, release date: December 27, 2007. (http://www.census.gov/popest/states/tables/NST-EST2007-01.xls).

Definitions

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.

ICD-9-CM is the International Classification of Diseases, Ninth Revision, Clinical Modification, which assigns numeric codes to diagnoses. There are about 13,600 ICD-9-CM diagnosis codes.

CCS categorizes ICD-9-CM diagnoses into a manageable number of clinically meaningful categories.[3] This "clinical grouper" makes it easier to quickly understand patterns of diagnoses and procedures.

Case Definition
For this report, colorectal cancer was defined as CCS diagnoses:

- 14: Cancer of colon
- 15: Cancer of rectum and anus

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.

Costs and charges
Total hospital charges were converted to costs using HCUP Cost-to-Charge Ratios based on hospital accounting reports from the Centers for Medicare and Medicaid Services (CMS).[4] 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 hundred.

Payer
Payer is the expected primary payer for the hospital stay. To make coding uniform across all HCUP data sources, payer combines detailed categories into more general groups:

- Medicare includes fee-for-service and managed care Medicare patients.
- Medicaid includes fee-for-service and managed care Medicaid patients. Patients covered by the State Children's Health Insurance Program (SCHIP) may be included here. Because most state data do not identify SCHIP patients specifically, it is not possible to present this information separately.
- Private insurance includes Blue Cross, commercial carriers, and private HMOs and PPOs.
- Other includes Worker's Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.
- Uninsured includes an insurance status of "self-pay" and "no charge."

When more than one payer is listed for a hospital discharge, the first-listed payer is used.

[3]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
[4]HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2005. U.S. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/db/state/costtocharge.jsp

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

Admission source
Admission source indicates where the patient was located prior to admission to the hospital. Emergency admission indicates the patient was admitted to the hospital through the emergency department. Admission from another hospital indicates the patient was admitted to this hospital from another short-term, acute-care hospital. This usually signifies that the patient required the transfer in order to obtain more specialized services that the originating hospital could not provide. Admission from long-term care facility indicates the patient was admitted from a long-term facility such as a nursing home.

Discharge status
Discharge status indicates the disposition of the patient at discharge from the hospital, and includes the following six categories: routine (to home), transfer to another short-term hospital, other transfers (including skilled nursing facility, intermediate care, and another type of facility such as a nursing home), home health care, against medical advice (AMA), or died in the hospital.

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.

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
California Office of Statewide Health Planning and Development
Colorado Hospital Association
Connecticut Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Health Information Corporation
Illinois Department of Public Health
Indiana Hospital Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Maine Health Data Organization
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 Department of Health and Human Services
New Hampshire Department of Health & Human Services
New Jersey Department of Health and Senior Services
New York State Department of Health
North Carolina Department of Health and Human Services
Ohio Hospital Association
Oklahoma State Department of Health
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 and Family Services

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 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 about 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.

For More Information

For more information about HCUP, visit www.hcup-us.ahrq.gov.

For additional HCUP statistics, visit HCUPnet, our interactive query system, at www.hcup.ahrq.gov.

For information on other hospitalizations in the U.S., download *HCUP Facts and Figures: Statistics on Hospital-based Care in the United States in 2006*, located at http://www.hcup-us.ahrq.gov/reports.jsp.

For a detailed description of HCUP, 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.

Introduction to the HCUP Nationwide Inpatient Sample, 2006. Online. May 14, 2008. U.S. Agency for Healthcare Research and Quality.
http://www.hcup-us.ahrq.gov/db/nation/nis/2006NIS_INTRODUCTION.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 R.L., 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

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http://www.hcup-us.ahrq.gov/reports/statbriefs/sb69.pdf
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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 hcup@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. Characteristics of hospitalizations related to colorectal cancer compared to hospitalizations for all conditions, 2006

	Hospital stays principally for colorectal cancer	Hospital stays with a secondary diagnosis of a colorectal cancer	Hospital stays for all conditions*
Total number of hospitalizations	151,900	419,800	30,142,300
Stays per 100,000 population	50.8	140.5	10,089.3
Utilization characteristics			
Mean length of stay, days	8.8	5.6	5.1
Mean cost per hospitalization	$17,000	$9,800	$9,900
Mean cost per day	$1,900	$1,700	$1,900
Aggregate costs	$2.6 billion	$4.1 billion	$297.6 billion
Percentage admitted through the emergency department	25.9%	54.7%	55.7%
Percentage died in hospital	4.5%	3.8%	2.6%
Percentage by primary payer:			
Medicare	59.1%	71.5%	48.7%
Private insurance	29.7%	19.7%	29.5%
Medicaid	5.5%	5.1%	12.3%
Uninsured	3.2%	1.8%	5.8%
Patient characteristics			
Mean age, years	68.3	72.2	58.1
Percentage by age group:			
18 to 44 years	5.3%	3.7%	18.5%
45 to 64 years	32.4%	23.7%	30.2%
65 years and older	62.3%	72.6%	44.7%
Percentage of patients male	49.5%	48.6%	46.4%

*Stays for neonates and maternal conditions have been excluded

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2006

Table 2. Top 20 principal diagnoses among all colorectal cancer-related hospitalizations, 2006*

Rank	Principal diagnosis	Number of stays	Percentage of all colorectal cancer hospitalizations
1	Cancer of colon, rectum, or anus	151,900	26.6%
2	Secondary malignancies	27,600	4.8%
3	Intestinal obstruction without hernia	24,800	4.3%
4	Maintenance chemotherapy, radiotherapy	17,800	3.1%
5	Pneumonia	15,300	2.7%
6	Congestive heart failure, nonhypertensive	14,800	2.6%
7	Other gastrointestinal disorders	13,800	2.4%
8	Complications of surgical procedures or medical care	13,600	2.4%
9	Fluid and electrolyte disorders	12,700	2.2%
10	Septicemia (except in labor)	11,000	1.9%
11	Other cancers	10,800	1.9%
12	Complication of device, implant or graft	10,700	1.9%
13	Cardiac dysrhythmias	9,900	1.7%
14	Coronary atherosclerosis	9,700	1.7%
15	Gastrointestinal hemorrhage	8,700	1.5%
16	Urinary tract infections	8,700	1.5%
17	Acute and unspecified renal failure	8,300	1.5%
18	Rehabilitation care, fitting of prostheses, and adjustment of devices	7,500	1.3%
19	Acute myocardial infarction	7,300	1.3%
20	Acute cerebrovascular disease	7,100	1.2%

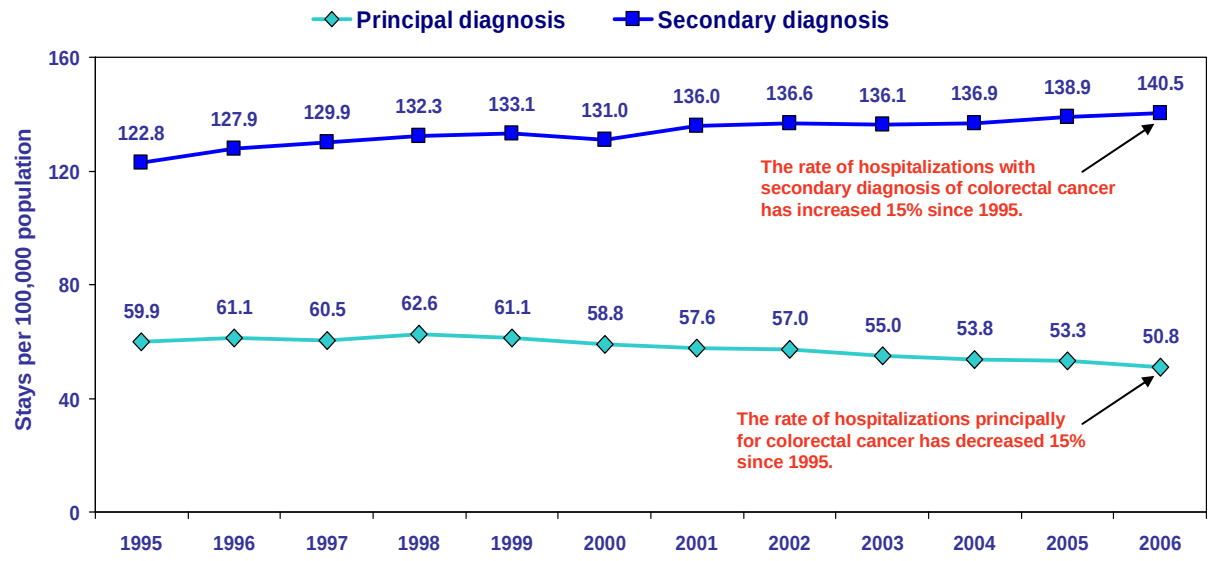
*Hospitalizations with colorectal cancer as a principal or secondary diagnosis (n=571,700)
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2006

Table 3. Top 10 all listed procedures for principal colorectal cancer stays compared to stays with a secondary colorectal cancer diagnosis, 2006

All listed procedure	Rank	Percentage of principal colorectal cancer stays (n=151,900)	Rank	Percentage of stays with a secondary diagnosis of colorectal cancer (n=419,800)
Colorectal resection	1	80.2%	14	2.3%
Blood transfusion	2	22.8%	1	13.3%
Other OR lower GI therapeutic procedures	3	22.3%	8	4.5%
Colonoscopy and biopsy	4	21.8%	10	4.2%
Other vascular catheterization, not heart	5	13.5%	4	6.6%
Upper gastrointestinal endoscopy, biopsy	6	9.1%	6	5.2%
Excision, lysis peritoneal adhesions	7	8.1%	11	3.3%
Respiratory intubation and mechanical ventilation	8	7.1%	9	4.2%
Proctoscopy and anorectal biopsy	9	7.1%	48	0.8%
Other OR gastrointestinal therapeutic procedures	10	7.0%	13	2.6%

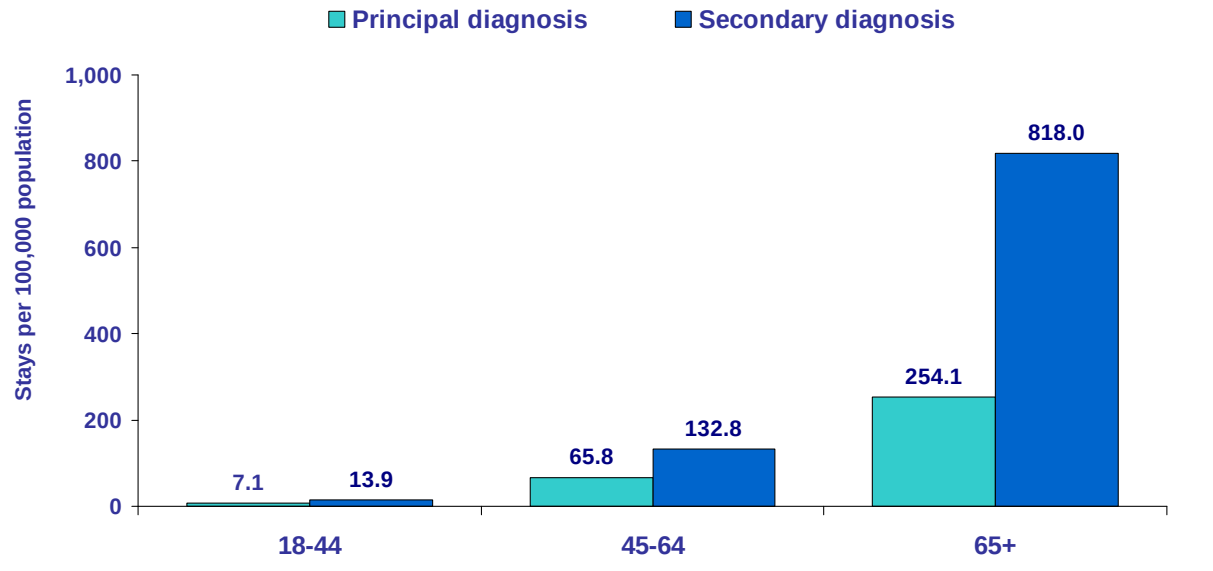
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2006

Figure 1. Between 1995 and 2006, the rate of hospitalizations principally for colorectal cancer decreased 15 percent, while increasing 15 percent for secondary colorectal cancer



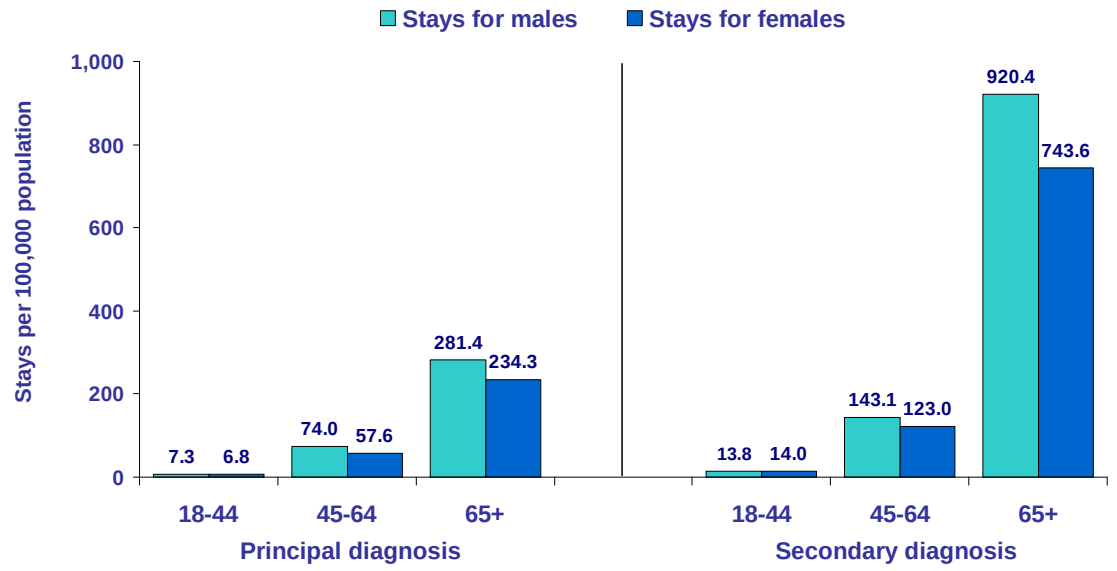
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, HCUPnet , Nationwide Inpatient Sample, 2006

Figure 2. The rate of colorectal cancer-related hospitalizations was dramatically higher among patients 65 years and older, 2006



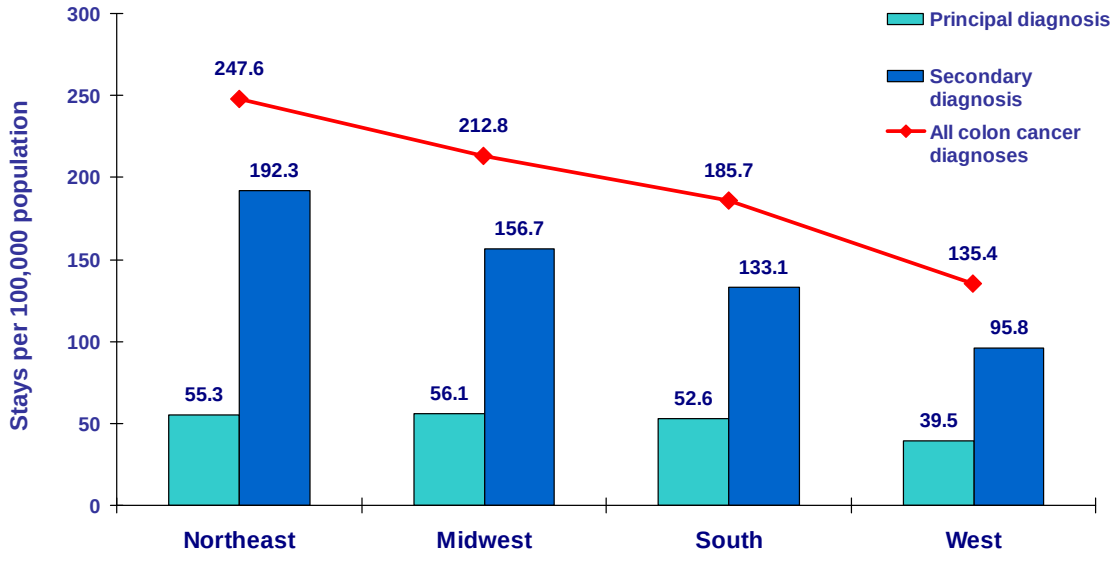
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, HCUPnet , Nationwide Inpatient Sample, 2006

Figure 3. The rate of colorectal cancer-related hospitalizations was highest among men 65 years and older, 2006



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, HCUPnet , Nationwide Inpatient Sample, 2006

Figure 4. The rate of hospitalization was highest in the Northeast for stays related to colorectal cancer, 2006



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, HCUPnet , Nationwide Inpatient Sample, 2006