

Trends in treatment and healthcare utilization among older Americans with colorectal cancer

Kathy Lang, PhD¹(klang@bhei.com),

Lisa M. Lines, MPH,¹ David W. Lee, PhD,² Jonathan R. Korn, BA,¹

David J. Vanness, PhD,³ Craig Earle, MD,⁴ Joseph Menzin, PhD¹

¹Boston Health Economics, Inc., Waltham, MA ²GE Healthcare, Waukesha, WI

³University of Wisconsin-Madison, Madison, WI ⁴Harvard Medical School, Boston, MA

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Background

- The annual cost of CRC in the US is approximately \$5.7 billion, second only to breast cancer in terms of burden to the healthcare system
- Many factors influence the cost associated with an illness and changes in costs over time
 - Patient characteristics, treatment modalities, utilization rates, and changes in Medicare reimbursement patterns
- Cost studies can be difficult to interpret without understanding underlying differences in treatment modalities and patterns of care
- Exploring trends in utilization over time could help to explain temporal trends in costs
- Understanding population-based trends in treatment is also important for health services planning as demand for healthcare services increases

Rationale and Objectives

- Rationale
 - None of the existing SEER-Medicare studies of CRC costs have included healthcare utilization estimates
 - Little has been published on overall utilization or treatment patterns in CRC—most studies have been limited to specific populations, services, or treatment modalities
- Objectives
 - To describe healthcare utilization associated with CRC
 - To assess temporal trends in treatment patterns and initial treatment modalities

Methods

- Database analysis using SEER-Medicare data (1992-2005)
- Two cohorts:
 - Patients newly diagnosed with CRC in a SEER registry
 - A comparison group without this cancer
- Cohorts were matched 1:1 on age, sex, and census region
- Patients were required to be aged 66 years or older, eligible for benefits for entire study period and not enrolled in HMO
- Patients were followed from index date until death or end of Medicare claims data
 - Index date: for CRC patients = diagnosis date, for comparators = diagnosis date of matched CRC patient

Study Measures

- Initial treatment modality
 - Surgery, chemotherapy, radiotherapy, or combinations of these three treatments received from 30 days before to 90 days after index
- Healthcare utilization
 - Hospitalization, outpatient hospital or clinic use, skilled nursing facility utilization, physician visits, and use of home health and hospice care

Data Analyses

- Demographic and clinical characteristics
- Initial treatment modalities and healthcare utilization by site (colon/rectal), age at diagnosis, stage at diagnosis, and year of diagnosis
- Healthcare utilization over entire follow-up and over fixed 3-year follow-up
- Resource use attributable to CRC defined as difference between CRC and comparison cohorts
- *P* values were two-sided and SAS was used for all analyses

Results: Demographics

- Both cohorts included 80,974 patients
 - CRC cohort included 58,516 colon cancer (CC) and 22,458 rectal cancer (RC) patients
- Mean age \pm SD = 77.4 \pm 7.1 years; 55.2% female and over 85% were white
- Mean Charlson score (excluding cancer): 1.9 \pm 1.9; most common comorbidity was chronic pulmonary/respiratory disease (33.0%), followed by congestive heart failure (32.5%) and diabetes without chronic complications (26.1%)
- CC was most commonly diagnosed at Stage II (31%), whereas RC was most commonly diagnosed at Stage I (27%)
- Only 7% of the overall CRC cohort was diagnosed at Stage 0, and more than twice that many were diagnosed at Stage IV
- For both CC and RC patients, the percentage of patients diagnosed in Stage I increased during the study period, while the percentage diagnosed in Stage IV decreased for CC patients but remained relatively steady for RC patients

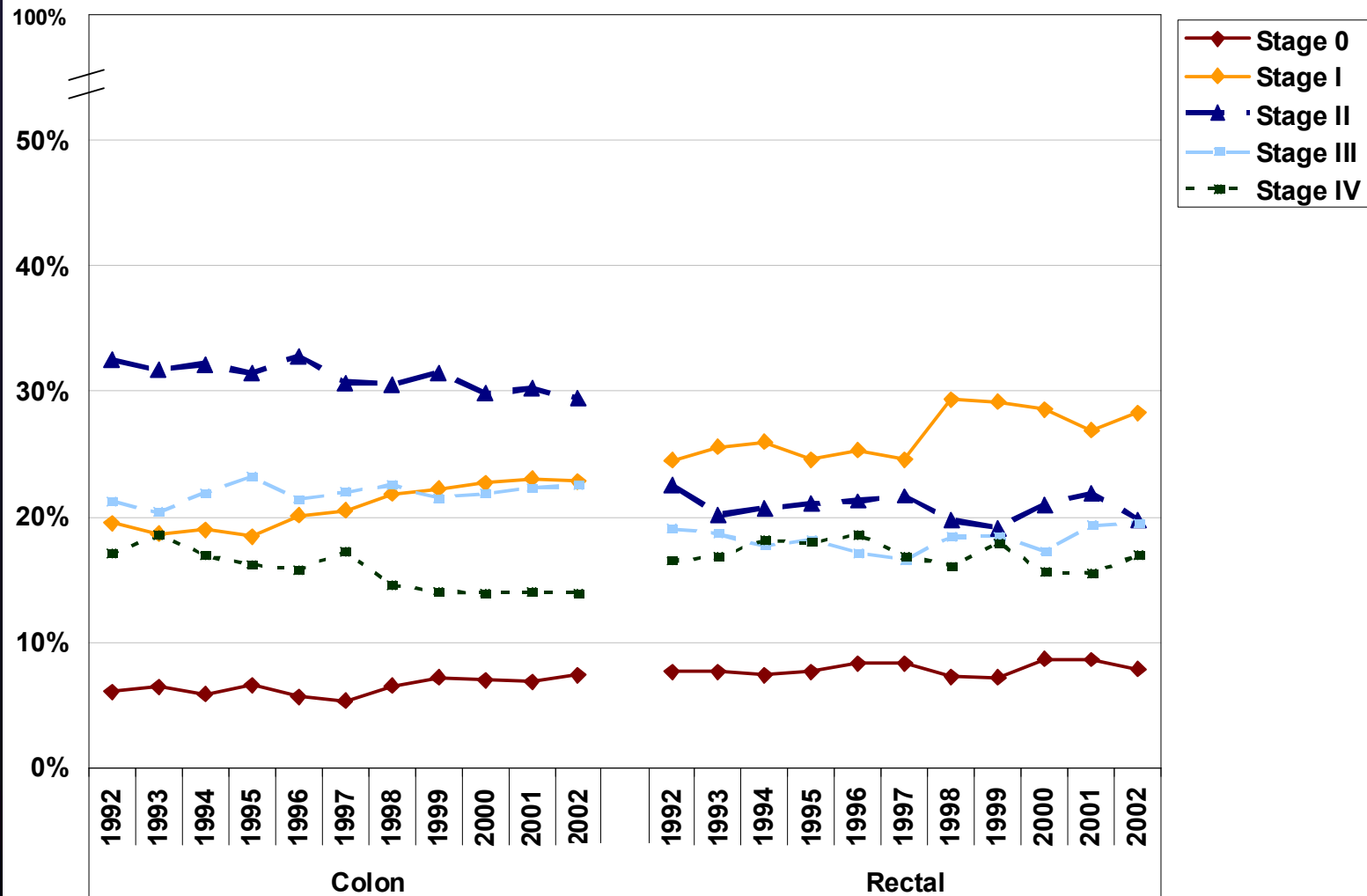
Table 1. Selected Demographic and Clinical Characteristics

Variable	CRC Cohort			Comparison Cohort
	Colon Cancer Patients	Rectal Cancer Patients	All CRC Patients	
N	58,516	22,458	80,974	80,974
Age in years, mean (\pm SD)*	77.7 (7.1)	76.9 (7.1)	77.4 (7.1)	77.4 (7.1)
Sex, % female*	57.0%	50.6%	55.2%	55.2%
Race				
White, non-Hispanic	85.8%	86.8%	86.1%	86.7%
African American, non-Hispanic	8.1%	6.3%	7.6%	6.6%
Hispanic, any race	1.1%	1.2%	1.1%	1.9%
Other	5.0%	5.7%	5.2%	4.8%
Census region*				
Northeast	20.1%	20.4%	20.2%	20.2%
Midwest	26.6%	26.4%	26.6%	26.6%
West	41.7%	42.2%	41.9%	41.9%
South	11.6%	11.0%	11.4%	11.4%
Charlson score, mean (\pm SD) ¹	1.9 (1.9)	1.7 (1.8)	1.9 (1.9)	1.9 (1.9)
Stage at diagnosis (%)				
Stage 0	6.6%	8.0%	7.0%	-
Stage I	21.2%	26.8%	22.8%	-
Stage II	30.9%	20.8%	28.1%	-
Stage III	22.0%	18.3%	20.9%	-
Stage IV	15.3%	16.8%	15.7%	-
Unknown	4.0%	9.3%	5.5%	-

Source: SEER-Medicare data, 1992-2002. *Variables used in matching cohorts. ¹Modified Charlson comorbidity index excluding cancer-related comorbidities; SD: Standard deviation.

Figure 1. Stage at Diagnosis by Site and Year of Diagnosis

Percent of sample

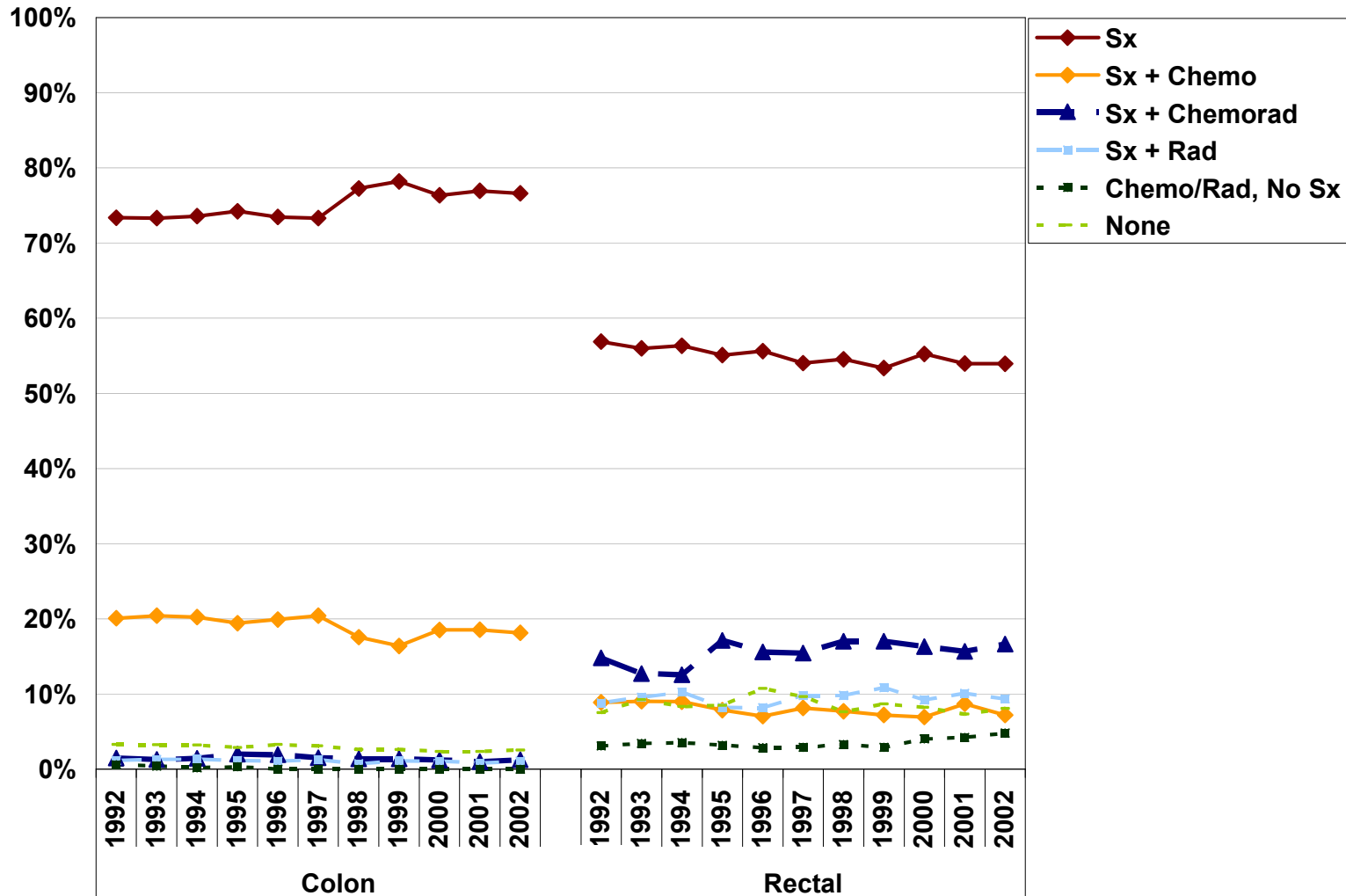


Results: Initial Treatment Modalities and Trends in Treatment

- Initial treatment modalities were markedly different for CC and RC patients
 - 97% of CC patients received surgery, mostly alone (75%) or in combination with chemotherapy (19%), while very few received any radiation therapy (about 2%)
 - In contrast, 88% of RC patients received surgery; 55% alone, 33% with another modality (chemotherapy, radiotherapy, or both)
 - More RC patients received none of these 3 modalities (8%) than CC patients (3%)
- During the 1990s, there appears to have been a trend away from surgery + chemotherapy for CC patients and toward surgery alone (73.4% received surgery alone in 1992 and 78.1% in 1999)
- In RC, the rate of chemoradiation therapy has increased and the rate of surgery alone has decreased over time

Figure 2. Initial treatment modalities by year of diagnosis and cancer site

Percent of sample receiving treatment



Results: Initial Treatment Modalities

Modalities by age at diagnosis

- In both CC and RC, older patients were more likely to only receive surgery and also more likely to receive no treatment than younger patients
- Multimodality therapy for Stage III CC varied greatly by age: for example, 65% of 66- to 74-year-olds were treated with surgery plus chemotherapy in 1997, compared to only 11% of those aged 85 years or older

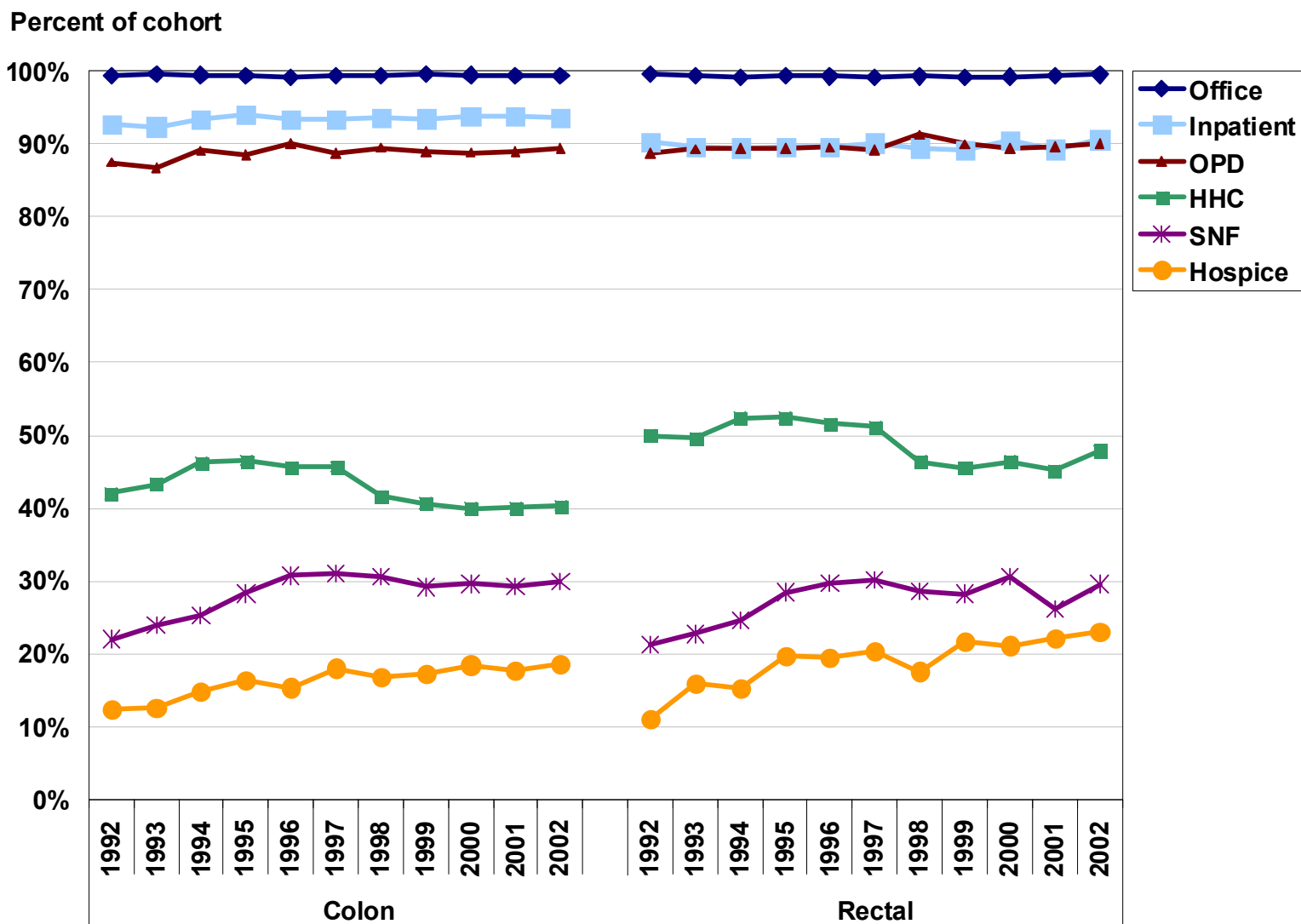
Modalities by stage at diagnosis

- Most patients with Stage I disease were treated with surgery only
- In Stages II and III, patients were more likely to receive chemotherapy, radiotherapy, or both
 - Stage III RC patients were about equally likely to receive surgery or surgery plus chemotherapy and radiation, with a trend over time toward the multimodality approach
- About a quarter of Stage IV RC patients and 8% of Stage IV CC patients received no treatment

Results: Trends in Healthcare Utilization

- Utilization rates for inpatient hospitalizations and office visits remained steady over time
- RC patients were more likely than CC patients to use home health services, but use declined among both
- SNF and hospice use rates increased over time
- Hospice use was more common among RC patients

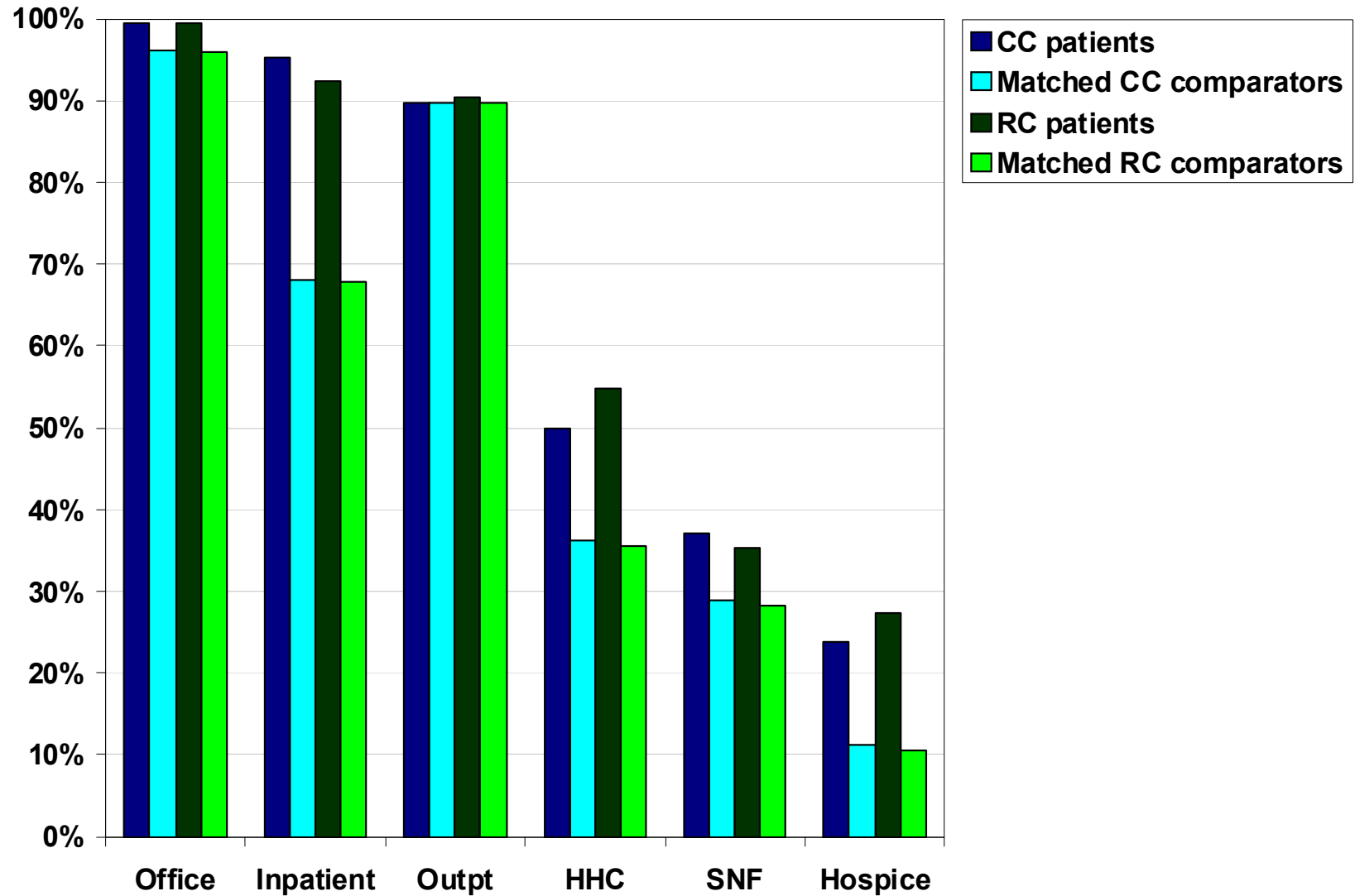
Figure 3. Utilization trends by year of diagnosis and cancer site



Results: Use Rate Comparisons

- Compared to patients of similar age and sex, with similar comorbidities, and in similar regions of the US, CRC patients in this study had an average of 22 fewer months of follow-up
- CRC patients:
 - Were hospitalized 28% more often than comparators
 - Spent 41% more days in the hospital
 - Received hospice care 56% more often
 - Received home health services 30% more often
 - Received care in a SNF 22% more often (all $P < .001$)

Figure 4. Comparison of use rates among cancer patients and matched comparators



Results: Resource Use by Stage

- Stage IV patients were hospitalized an average of 2.1 times per year of follow-up
 - Stage I patients averaged 0.8 hospitalizations per year of follow-up
 - Comparison patients averaged 0.4 hospitalizations per year of follow-up
- Stage II and III patients accrued the most hospital days over their follow-up periods (28.7 days and 28.5 days, respectively)
- Hospice use was much more intense among Stage IV patients (48.2%) than Stage I (14.6%), II (18.9%), or III (29.3%) patients
- Utilization rates of home health care were more similar between stages
 - Low of 50.4% (Stage I) and high of 56% (Stage III)

Discussion

- Several previous studies have explored the healthcare resource use of cancer patients, mostly related to hospice care and none specifically focused on CRC patients
- Our study appears to be the first to use SEER-Medicare data to describe resource utilization (eg, home health and SNF utilization rates) for CRC patients
- CC and RC patients are treated with very different approaches, a reflection of the anatomical difficulties of surgery for RC
- The perioperative use of radiation therapy in RC is intended to reduce the rate of local recurrences, which are more frequent in RC because of the difficulty in achieving total resection in the bony constraints of the pelvis¹

¹Wolpin BM, Meyerhardt JA, Mamon HJ, Mayer RJ. Adjuvant treatment of colorectal cancer. CA Cancer J Clin. 2007;57:168-185.

Limitations

- Limited to Medicare population only (age 65+)
- Potential coding errors and incomplete data
- Potential underreporting for chemotherapy and radiation
- No data on drugs approved since 2004 (oxaliplatin, bevacizumab, cetuximab, and panitumumab)

Conclusions

- This study of over 80,000 CRC patients found that treatment patterns in CRC have remained relatively constant over the study period, with wide variations by age, site, and stage
- CRC patients use significantly more resources, such as hospice and home health care, than similar patients without CRC
 - Over time, there has been an increase in the use of SNFs and hospice care and a decrease in the use of home health care in this population
 - Among CRC patients, RC patients use more home health and hospice services, while CC patients use more inpatient and SNF services
- Our findings may be useful for understanding changes in cost and cost drivers over time, tracking trends in treatment modality, and forecasting resource needs for CRC patients in the future