IMPACT OF RACE/ETHNICITY AND SES ON ADJUVANT CHEMOTHERAPY USE AMONG ELDERLY PATIENTS WITH STAGE III COLON CANCER

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Background

- Racial/ethnic disparities exist in cancer outcomes
  - More advanced stage of disease at diagnosis among minorities
  - Not receiving guideline-recommended treatment
- Benefits of receiving adjuvant chemotherapy for patient with stage III colon cancer
  - Reduce the risk of recurrence
  - Improve survival

Background

- Administrating adjuvant chemotherapy for stage III colon cancer patients after resection was recommended by NIH Consensus Conference since 1990
- Elderly stage III colon cancer patients received similar benefits as the younger
  - % receiving adjuvant chemotherapy among older patients is much lower
    - Comorbid condition(s)
    - Life expectancy

Study Objectives

- To examine the impact of race/ethnicity and SES on receipt of chemotherapy among patients with stage III colon cancer enrolling in Medicare Parts A and B
- To identify other factors associated with not receiving the guideline-recommended care
- To evaluate trends of utilizing adjuvant chemotherapy by race/ethnicity and SES

Patients and Methods

Data Sources

- Data were obtained from the Surveillance, Epidemiology and End Results (SEER)-Medicare 2000-2007 linked database.
  - Contains cancer cases from 16 SEER population-based cancer registries (26% of the US population)
  - Includes detailed claims information from the Medicare program
    - Hospital inpatient file (MedPAR)
    - Hospital outpatient file
    - Physician file (NCH)
    - Durable Medical Equipment file (DME)

Study Cohort

- Limited to Medicare beneficiaries continuously enrolled in Medicare Parts A and B only
  - Part A: hospitalization, short-term convalescence and rehabilitation in a skilled-nursing facility, hospice and some home health care
  - Part B: physician and outpatient services and durable medical equipment
  - 97% of the elderly (age 65+) enroll in Part A and 96% of those enroll in Part B

Study Cohort

- Inclusion criteria:
  - Medicare-enrolled patients aged 66 years and older
  - Stage III colon cancer diagnosed in years 2000 to 2007
  - Microscopically confirmed
  - Underwent the surgical resection within 6 months after diagnosis

Study Cohort

- Exclusion criteria:
  - Patients had non-colorectal subsequent primary diagnosed within 10 months of primary colon cancer diagnosis (N=394)
  - Patients had number of positive regional nodes examined coded to negative, no node examined, or unknown (N=198)
  - Patients had unknown census tract or census tract coded to either Post Office Box or unknown coding method (N= 420)
  - Patients died within 30 days after surgery (N=859)

Definition of Adjuvant Chemotherapy

- All chemotherapy related administrations received within 4 months after surgery
  - Did not restrict to only the standard intravenous or oral chemotherapeutic agents administered for colon cancer

Codes Used to Define Colon Resection

- Surgery codes obtained from hospital inpatient, outpatient, and physician claims

Coding Sources	Claim files	Codes
ICD-9-CM procedure	Hospital inpatient & outpatient claims	45.7x, 45.8x, 48.4x, 48.5x, and 48.6x
CPT (Current Procedural Terminology): HCPCS Level 1	Physician & outpatient claims	44140-44147, 44150-44160, 44202-44239, 45110-45170, and 45395-45397

Codes Used to Define Chemotherapy

- Obtained from inpatient, outpatient, physician, & DME

Coding Sources	Claim files	Codes
HCPCS	Physician & outpatient claims	J0640, J8500-J9999, Q0083-Q0085 C8953-C8955, G0355-G0363 (year 2005)
ICD-9-CM procedure	Hospital inpatient & outpatient claims	9925
ICD-9-CM diagnosis	Hospital inpatient & outpatient claims	V581, V5811, V662, and V672
CPT (HCPCS Level 1)	Physician & outpatient claims	964xx and 965xx
Revenue center codes	Outpatient claims	0331, 0332, and 0335
National Drug Codes (NDC)	Durable Medical Equipment (DME) files	000041100xx, 000041101xx, 548684143xx, 548685260xx 545695717xx (year 2005)

Description of Independent Variables

Patient Demographics

- Race/ethnicity
- SES
- Sex
- Age at diagnosis
- Marital status
- Urban/Rural

Clinical Variables

- Anatomic subsite
- Histological grade
- # of positive nodes
  - ✓1-3, 4+, Unk
- Intestinal obstruction status
- Intestinal stoma (Colostomy/ileostomy)
- Comorbid conditions
  - ✓0, 1, 2+

Other

- Diagnosis year
  - ✓2000-2003
  - ✓2004-2007
- Hospital type
  - ✓ACoS
  - ✓Non-ACoS

Statistical Analysis

- Multilevel logistic regression
  - To estimate the likelihood of receiving adjuvant chemotherapy within 4 months after surgical resection
- Cochran-Armitage test
  - To access the linear trend of receiving adjuvant chemotherapy over time

Results and Discussion

Data Description

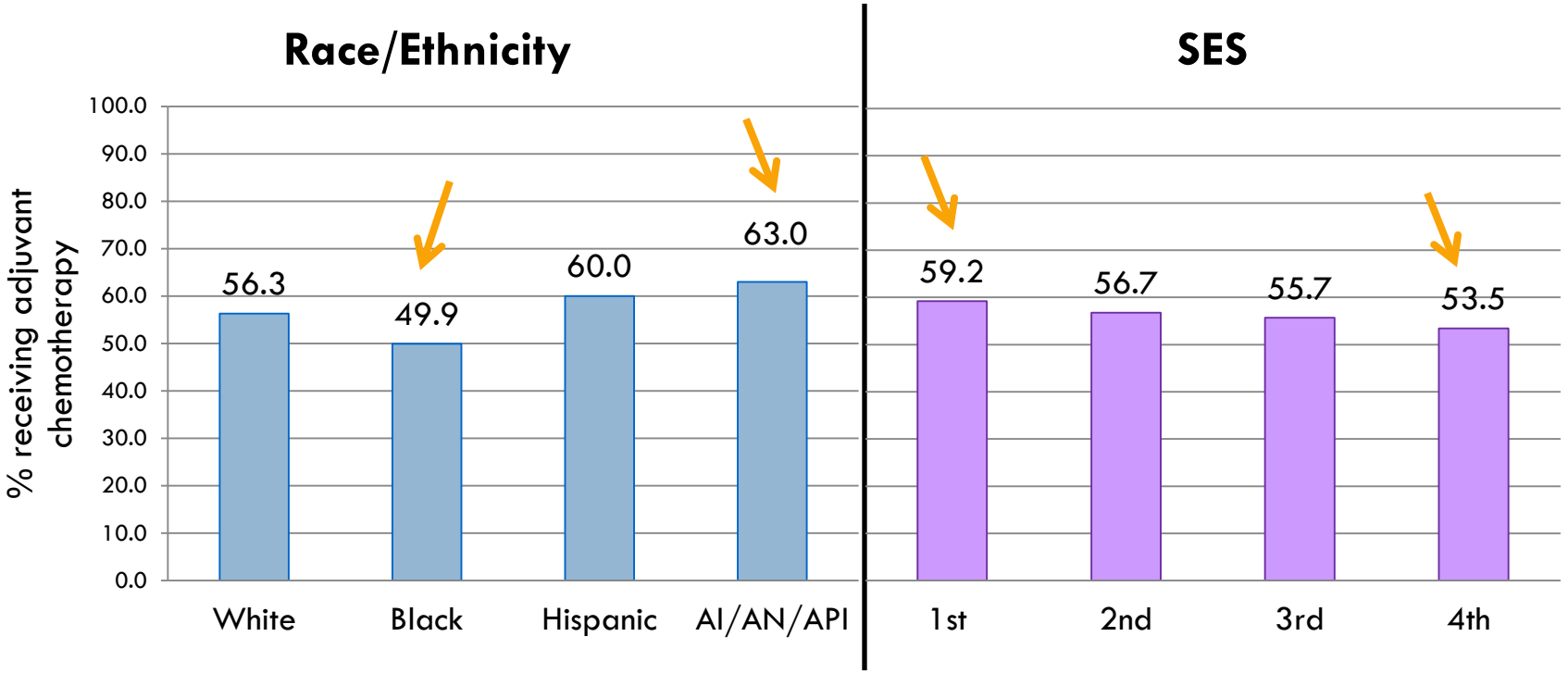
- Total eligible Medicare beneficiaries with resected stage III colon cancer: 13,608
- 58.8% are females
- 80.9% are non-Hispanic whites

SES	White	Black	Hispanic	AI/AN/API†
	(n = 11,011)	(n = 1,120)	(n = 715)	(n = 762)
1st (Most affluent)	27.7	8.2	12.9	24.9
2nd	28.7	10.5	17.5	23.0
3rd	26.2	20.7	26.9	26.1
4th (Least affluent)	17.3	60.6	42.8	26.0
Total	80.9	8.2	5.3	5.6

† American Indian, Alaska native, Asian and Pacific islander.

Receiving Adjuvant Chemotherapy

- 56% of stage III colon cancer patients received adjuvant chemotherapy
- 82% in age 66-69, 30% in age ≥80



Results: Race/Ethnicity and SES

	Unadjusted	Adjusted	
Variables	**OR (95% CI)**	**Model I * OR (95% CI)**	**Model II # OR (95% CI)**
Race/ethnicity			
White	1.00	1.00	1.00
Black	0.78 (0.68, 0.88)	0.83 (0.73, 0.94)	0.69 (0.59, 0.80)
Hispanic	1.16 (1.00, 1.36)	1.22 (1.04, 1.42)	1.07 (0.89, 1.28)
AI/AN/API	1.32 (1.13, 1.54)	1.34 (1.15, 1.56)	1.14 (0.96, 1.36)
SES			
1st (Most affluent)	1.00	1.00	1.00
2nd	0.90 (0.82, 0.99)	0.90 (0.82, 1.00)	0.93 (0.83, 1.03)
3rd	0.87 (0.79, 0.95)	0.87 (0.79, 0.96)	0.90 (0.80, 1.01)
4th (Least affluent)	0.79 (0.72, 0.87)	0.81 (0.73, 0.90)	0.86 (0.76, 0.97)

*Model I includes race/ethnicity and SES

Model II includes all predictors

Results: Other Demographic Factors

	Unadjusted	Adjusted
Variables	**OR (95% CI)**	**OR (95% CI)**
Sex		
Male	1.00	1.00
Female	0.69 (0.65, 0.74)	1.01 (0.93, 1.10)
Age		
66-69	1.00	1.00
70-74	0.67 (0.58, 0.76)	0.68 (0.59, 0.78)
75-79	0.41 (0.36, 0.47)	0.42 (0.37, 0.49)
80+	0.10 (0.09, 0.11)	0.10 (0.09, 0.12)
Marital Status		
Single	1.00	1.00
Married	1.74 (1.57, 1.93)	1.68 (1.49, 1.89)
Widowed	0.63 (0.57, 0.70)	0.99 (0.87, 1.12)
Unknown	1.00 (0.82, 1.21)	1.14 (0.92, 1.41)

Results: Clinical Factors

	Unadjusted	Adjusted
Variables	**OR (95% CI)**	**OR (95% CI)**
Histological grade		
Well/moderately differentiated	1.00	1.00
poorly/undifferentiated	0.94 (0.87, 1.01)	0.98 (0.90, 1.07)
Unknown	0.72 (0.58, 0.89)	0.65 (0.51, 0.83)
Intestinal obstruction		
No	1.00	1.00
Yes	0.60 (0.53, 0.66)	0.63 (0.56, 0.72)
Intestinal stoma		
No	1.00	1.00
Yes	0.62 (0.56, 0.69)	0.62 (0.54, 0.70)
Number of positive nodes		
1-3	1.00	1.00
≥4	1.17 (1.09, 1.26)	1.22 (1.12, 1.33)
Unknown	0.80 (0.62, 1.04)	0.80 (0.59, 1.07)
Comorbidity		
0	1.00	1.00
1	0.77 (0.70, 0.83)	0.78 (0.71, 0.86)
≥2	0.49 (0.44, 0.54)	0.49 (0.44, 0.55)

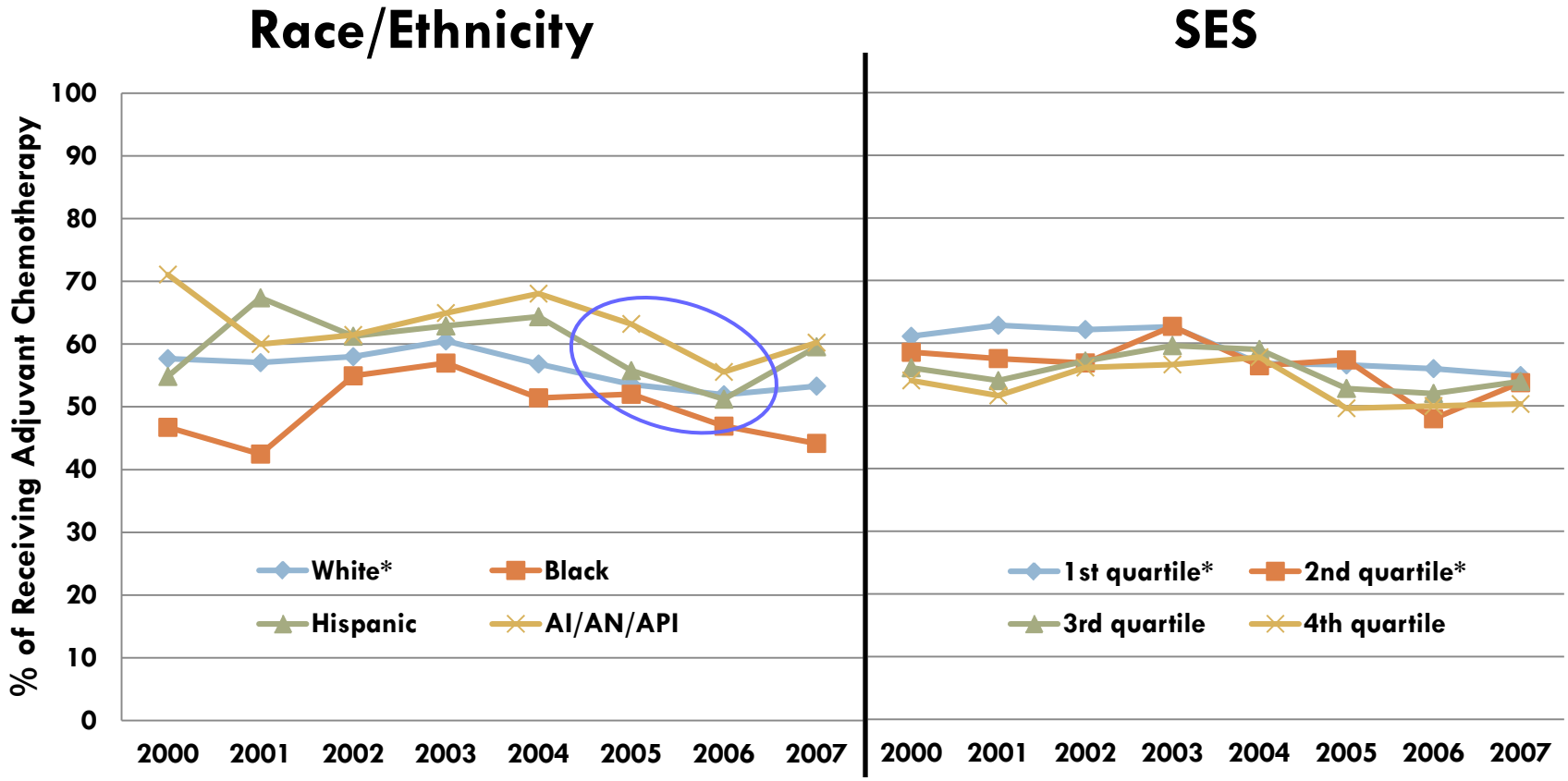
Results: Other Factors

	Unadjusted	Adjusted
Variables	**OR (95% CI)**	**OR (95% CI)**
Diagnosis year		
2000-2003	1.00	1.00
2004-2007	0.85 (0.80, 0.91)	0.83 (0.77, 0.90)
ACoS hospital*		
No	1.00	1.00
Yes	0.96 (0.89, 1.05)	0.95 (0.87, 1.05)

*ACoS hospital is based on the hospital performed colon surgical resection

Trend Analysis: % Receiving Adjuvant Chemotherapy

Decreasing trend was observed: 58% in 2000 to 53% in 2007 ($p < 0.001$).



*Indicates a statistically significant trend ($p < 0.05$).

Conclusions

- Persistent racial/ethnic and SES disparities in utilization of recommended adjuvant chemotherapy among elderly patients with stage III colon cancer
  - Blacks and patient residing in the least affluent SES area tend to have lower probability of receiving guideline-recommended chemotherapy than their counterpart.
- Older age group, number of comorbid conditions, intestinal obstruction status, and creation of intestinal stoma significantly influence patients not receiving adjuvant chemotherapy.

Conclusions

- Married patients and those with more positive LNs are more likely to receive chemotherapy after surgery
- Declining trend was observed
  - Potential reasons that caused decreasing use of adjuvant chemotherapy
    - Chemotherapy drug shortages
    - Change of Medicare reimbursement system on the physician-administered drugs under Part B which was effective in 2005
      - MMA - Drug reimbursement would cap at the average sale price (ASP) plus 6% to cover the practice costs

Limitations

- Did not cover all Medicare beneficiaries
  - Because services provided to a Medicare beneficiary by supplemental health care system do not bill to Medicare.
- Validity of chemotherapy administration information
  - Although the Medicare claims has high level of agreement (88%) with SEER POC data on obtaining chemotherapy administration information, there still exists minor discrepancy in receiving it for colon cancer patients but the impact is considered to be minimal.

Thank You!

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