



Colonoscopist and Primary Care Physician Supply and Disparities in Colorectal Cancer Screening.

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INTRODUCTION

- 142,570 cases and 51,370 death from colorectal cancer in 2010.
- Blacks have higher incidence and death rates when compared to whites.
- Routine screening can provide early detection and improved survival.
- Aproximately, 1.6 million screening colonoscopy are performed anually.

INTRODUCTION

- It is estimated that 6 to 8 million screening colonoscopy would need to be performed to meet requirements for screening eligible patients.
- Racial disparities exist in colorectal cancer screening.
- Physician supply has been associated to increase use of screening tests in various cancers.

OBJECTIVES

- Examine the association between the availability of colonoscopist and PCP and rates of colonoscopy.
- Describe racial/ethnic differences in colonoscopy rates
- Examine the interaction between availability of colonoscopist/PCP and race/ethnicity in colonoscopy rates.

METHODS

Data Source

- 100% Texas medicare beneficiaries claims 2002-2007
 - Denominator file
 - Outpatient SAF
 - Carrier SAF
 - MEDPAR

METHODS

Cohort

- Medicare beneficiaries aged 66-79 in 2007 (N=1,504,783)
 - Beneficiaries with interruption in medicare enrollment or additional HMO enrollment were excluded. (N=509,378)
 - Beneficiaries whose race was not white, black or hispanic were excluded. (N=20,526)
- Final cohort of 974,879 beneficiaries.

METHODS

Study outcome

- Receipt of colonoscopy for any reason between 2003-2007.
 - CPT codes: 44388, 44389, 44392, 44393, 44394, 45378, 45380, 45382, 45383, 45384, 45385.
 - HCPCS codes: G0105, G0121.
 - ICD-9-CM codes: 45.23, 45.25, 45.27, 45.41, 45.42, 45.43, 48.36.
- Follow up period for each beneficiary varies by age.

METHODS

Study variables

- Age.
- Gender.
- Race/ethnicity.
- Income.
- Risk of colon cancer: FAP (V15.81), HNPCC (V16.0), Personal history of adenomatous polyps (V12.72), CRC (V10.05), IBD (555.0-9 and 556.0-6)
- Comorbidities: Using Elixhauser index.

METHODS

Physician availability

- Defined as number of physician per 10,000 elders in a specific Health Service Area (HSA).
- Physician providing care in more than one HSA, were considered available in both.
- Individual providers identified using UPIN or NPI.
- Colonoscopist defined as a physician who performed more than 5 colonoscopies/year.
- PCP defined as general practitioner, family physician, general internist or geriatrician.

METHODS

Physician availability

- Physician availability was estimated using population estimates and physician counts. weighted these availability estimates by the relative population size in the HSA for that year, and summed the weighted availability measures.

$$\begin{aligned} & (\text{physician availability in 2003} \times \text{weight}_{2003}) \\ & + \\ & (\text{physician availability in 2007} \times \text{weight}_{2007}) \end{aligned}$$

$$\text{Weight 2003} = \frac{\text{No of study cohort subject resided in HSA in 2003}}{\text{No of study cohort subject resided in HAS in 2003} + 2007}$$

$$\text{Weight 2007} = \frac{\text{No of study cohort subject resided in HSA in 2007}}{\text{No of study cohort subject resided in HAS in 2003} + 2007}$$

METHODS

Statistical analysis

- Chi-square used to determine differences in colonoscopy rates between racial/ethnic groups.
- Cochran-Armitage test used to examine trends in colonoscopy rates with increasing physician availability or income
- Hierarchical generalized linear mixed model used to determine effect of physician availability on colonoscopy use.

RESULTS

Characteristics of Medicare Beneficiaries in Texas, 2007

	Overall		White		Black		Hispanic		
	N	%	N	%	N	%	N	%	
Total	974,879	100	866,828	100	70,202	100	37,849	100	
Age	66-69	335,656	34.4	300,177	34.6	26,050	37.1	9,429	24.9
	70-73	282,875	29.0	255,176	29.4	20,758	29.6	6,941	18.3
	74-76	190,206	19.5	169,222	19.5	12,813	18.3	8,171	21.6
	77-79	166,142	17.0	142,253	16.4	10,581	15.1	13,308	35.2
Sex	Male	432,910	44.4	387,190	44.7	28,381	40.4	17,339	45.8
	Female	541,969	55.6	479,638	55.3	41,821	59.6	20,510	54.2

RESULTS

Characteristics of Medicare Beneficiaries in Texas, 2007

		Overall		White		Black		Hispanic	
		N	%	N	%	N	%	N	%
Risk of colon cancer	No	911,084	93.5	808,851	93.3	66,633	94.9	35,600	94.1
	Yes	63,795	6.5	57,977	6.7	3,569	5.1	2,249	5.9
Comorbidity	No	452,043	46.4	410,311	47.3	25,975	37.0	15,757	41.6
	Yes	522,836	53.6	456,517	52.7	44,227	63.0	22,092	58.4
Medicaid eligibility	No	854,481	87.6	787,884	90.9	51,257	73.0	15,340	40.5
	Yes	120,398	12.4	78,944	9.1	18,945	27.0	22,509	59.5

RESULTS

Colonoscopy Rates in Texas Medicare Beneficiaries by Area-Level Characteristics, 2003-2007

		Overall	White	Black	Hispanic
		Colonoscopy rate			
Overall		39.8%	40.7%	35.0%	28.7%
Overall colonoscopist availability	Q1 (0-4.8)	39.2%	39.9%	37.3%	29.8%
	Q2 (4.8-6.9)	39.3%	40.0%	35.8%	30.0%
	Q3 (6.9-8.5)	40.6%	42.2%	33.7%	25.5%
	Q4 (>8.5)	40.3%	41.0%	34.7%	27.1%
PCP availability	Q1 (0-34.1)	37.3%	37.9%	34.8%	28.3%
	Q2 (34.1-45.7)	38.1%	38.8%	34.7%	30.0%
	Q3 (45.7-65.5)	42.5%	43.2%	38.0%	29.4%
	Q4 (>65.5)	41.6%	43.2%	33.8%	25.6%

RESULTS

Effect of physician availability on the odds of colonoscopy in Texas Medicare beneficiaries by multilevel analysis

	Model 1	Model 2	Model 3	Model 4
	Odds Ratio			
Race (Black vs. White)	0.80 (0.79,0.82)	0.80 (0.79,0.82)	0.80 (0.79,0.82)	0.80 (0.79,0.82)
Race (Hispanic vs. White)	0.68 (0.66,0.69)	0.68 (0.66,0.69)	0.68 (0.66,0.69)	0.68 (0.66,0.69)
Colonoscopist availability (4.8-6.9 vs. 0-4.8)	-	1.08 (0.99,1.19)	-	1.08 (0.98,1.19)
Colonoscopist availability (6.9-8.5 vs. 0-4.8)	-	1.12 (1.00,1.26)	-	1.11 (0.99,1.25)
Colonoscopist availability (> 8.5 vs. 0-4.8)	-	1.09 (1.02,1.18)	-	1.09 (1.01,1.18)
PCP availability (34.1–45.7 vs. 0–34.1)	-	-	1.03 (0.96,1.11)	1.02 (0.94,1.10)
PCP availability (45.7–65.5 vs. 0–34.1)	-	-	1.05 (0.95,1.16)	1.03 (0.93,1.14)
PCP availability (> 65.5 vs. 0–34.1)	-	-	1.02 (0.91,1.14)	1.00 (0.89,1.12)

Hierarchical generalized linear mixed models adjusted for patient age and sex, comorbidities, risk of cancer and income (not presented), as well as the variables shown.

RESULTS

Effect of colonoscopist and PCP availability on the racial disparity in colonoscopy rates by multilevel analysis

		Odds ratio*	
		Black vs. White [§]	Hispanic vs. White [§]
Overall colonoscopist availability	Q1 (0-4.8)	0.87 (0.84, 0.90)	0.73 (0.71, 0.76)
	Q2 (4.8-6.9)	0.82 (0.78, 0.85)	0.75 (0.72, 0.78)
	Q3 (6.9-8.5)	0.78 (0.76, 0.80)	0.52 (0.49, 0.55)
	Q4 (>8.5)	0.77 (0.74, 0.80)	0.64 (0.60, 0.68)
PCP availability	Q1 (0-34.1)	0.83 (0.80, 0.86)	0.76 (0.73, 0.80)
	Q2 (34.1-45.7)	0.81 (0.77, 0.84)	0.76 (0.73, 0.79)
	Q3 (45.7-65.5)	0.83 (0.81, 0.86)	0.59 (0.56, 0.62)
	Q4 (>65.5)	0.77 (0.75, 0.79)	0.51 (0.48, 0.54)

*Adjusted with patient age, sex, comorbidity, high risk for CRC, and median income of zip code.

[§]For colonoscopist availability, the odds ratios in the first two quartiles are significantly higher than those in the last two quartiles for both Black vs. White and Hispanic vs. White comparison (p<0.001). For PCP availability, the odds ratios in the first two quartiles are significantly higher than those in the last two quartiles for Hispanic vs. White comparison (p<0.001) but not for Black vs. White comparison (p=0.288).

CONCLUSION

- Overall colonoscopy rates in Medicare beneficiaries did not increase with improved colonoscopist and/or PCP capacity.
- Racial disparities in receipt of colonoscopy widened with an increase in supply.

DISCUSSION

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- Data from the National Health Interview Survey (NHIS).
- Define capacity based on colonoscopies performed (rather than providers) using Medicare data.
 - Ratio per 100,000 residents aged 50 and older.
- Reported a reduction in racial disparities for colorectal cancer screening with increasing colonoscopy capacity.
- No association between PCP supply and colorectal cancer screening rates.

DISCUSSION

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Table 3. Factors Associated With Ever Being Screened for CRC, NHIS

Factor	Individual Characteristics, ^a OR (95% CI)	Individual and Area Characteristics, OR (95% CI)
Individual characteristics		
Race/ethnicity		
White	Reference	Reference
African American	0.87 (0.78-0.96)	0.93 (0.83-1.04)
Hispanic	0.68 (0.60-0.77)	0.73 (0.63-0.84)
County-level capacity measures		
No. of primary care physicians per 100,000 population aged ≥50 years (increments of 100)		1.02 (0.97-1.08)
No. of sigmoidoscopies or colonoscopies per 100,000 population aged ≥50 years (increments of 750)		1.04 (1.01-1.08)
County level racial composition/SES		
Percentage African American (increments of 5%)		0.98 (0.97-1.00)
Percentage Hispanic (increments of 5%)		0.98 (0.96-1.00)
Median household income (increments of \$20,000)		1.14 (1.05-1.23)

LIMITATIONS

- We did not differentiate between screening and diagnostic colonoscopies.
- Did not count for colonoscopies performed before Medicare enrollment at 65 years old.
- Unable to assess patient's preferences for other methods of screening.
- We did not consider the number of colonoscopies performed by each colonoscopist.
- Might not be applicable at national level.

IMPLICATIONS

- An increasing supply of providers has no beneficial effect on the absolute and relative ethnic and racial disparities in receipt of colonoscopy
- Further studies need to be performed to establish better allocation of colonoscopists.
- Additional studies to elucidate the etiology of the increase in racial disparities with increased colonoscopist supply need to be performed to avoid further increases in disparities as capacity expands.

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QUESTIONS?