Variation in staging and treatment of rectal cancer by National Cancer Institute (NCI) designation and medical school affiliation: Analysis of Surveillance, Epidemiology and End Results (SEER)-Medicare data

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Background

- Previous studies have shown patients treated at higher volume, specialized centers (as compared to lower volume hospitals) have improved outcomes
- Lower permanent stoma rates
- Lower 30-day post-op procedural interventions & post-op mortality
- Decreased local recurrence rates and
- Greater overall survival
- Studies examining surgeon volume have found the majority of rectal cancer patients are operated on by low volume surgeons
- No significant shift to high-volume centers for rectal cancer treatment has occurred despite complex staging, technical surgical challenges, and wide variations in outcomes

Objective

- To evaluate the impact of facility characteristics on the performance of recommended staging and treatment:
- Transrectal ultrasound (TRUS) or pelvic magnetic resonance Imaging (MRI)
- Pelvic computed tomography (CT)
- Abdominal CT or MRI
- Chest CT or x-ray
- Carcinoembryonic antigen (CEA) testing
- Pre-operative radiation and chemotherapy

Methods – Study Population

- Medicare beneficiaries in SEER regions diagnosed with stage II/III rectal adenocarcinoma from 2005-2009
- ≥ 66 years
- Parts A/B Medicare coverage for >1 year pre-diagnosis through 1 year post-diagnosis
- Had a facility claim for cancer-directed surgery and lived for >90 days post diagnosis

Methods – Hospital Classification

- Patients allocated to hospitals according to location of first rectal cancer surgery

- Hospitals classified by the following characteristics derived from the Hospital File created by the National Cancer Institute (NCI):
  - NCI designated cancer center (Yes/No)
  - Residency program (Yes/No)
  - Medical school affiliation (Major/Limited/None)

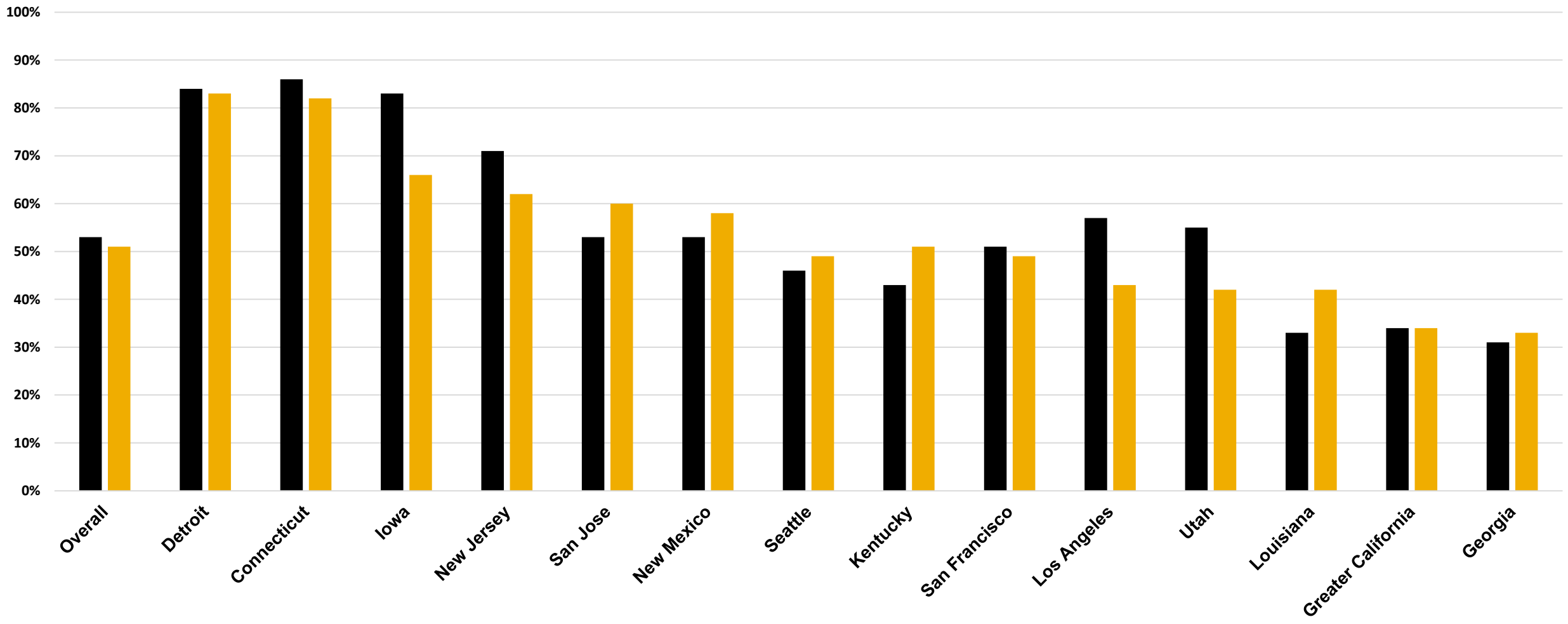
Results:

Characteristics of Study Population

N = 2,300

Mean Age	76 years
Male Gender	52%
White Race	85%
Married	53%
Rural	19%
Stage	
II	46%
III	54%
Charlson Co-morbidities	
0	59%
1	26%
2+	15%

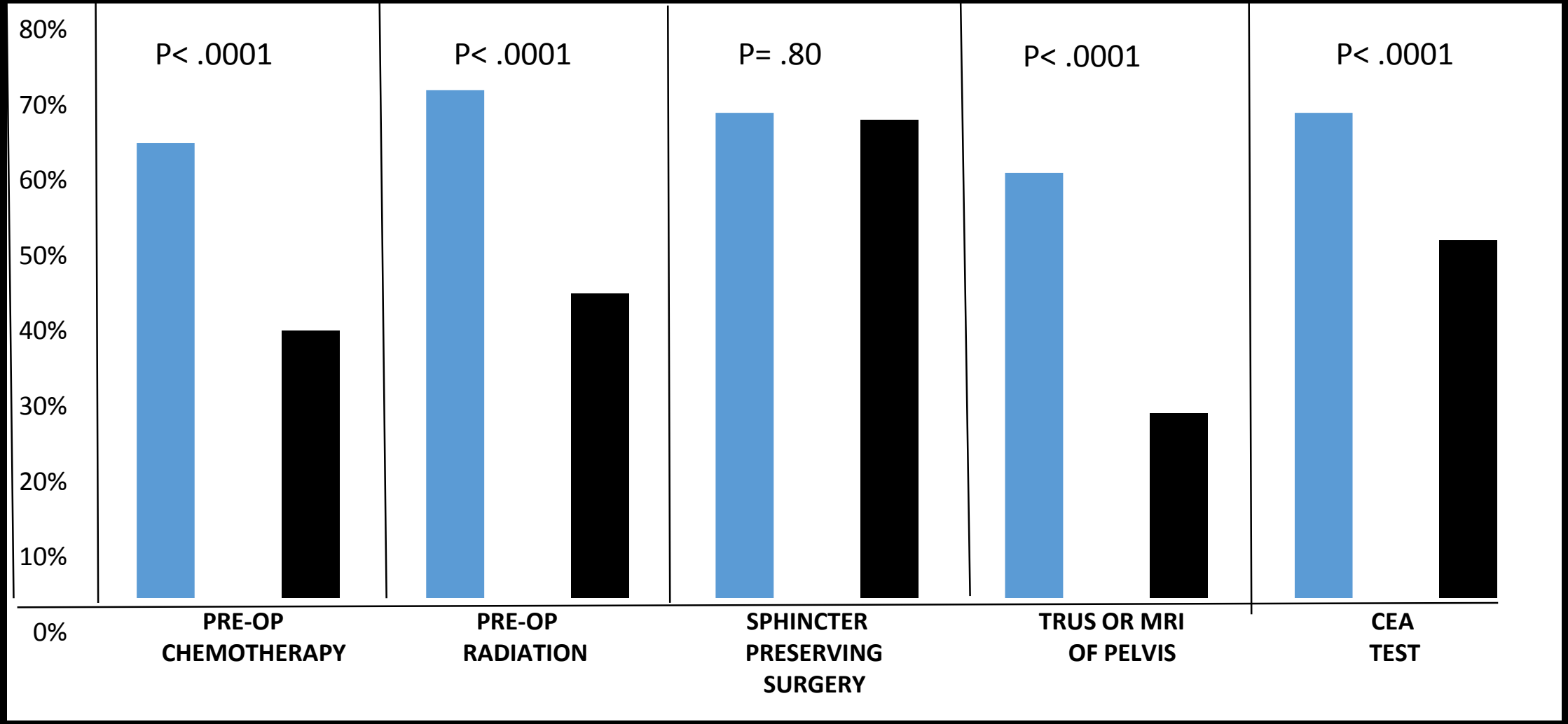
Figure 1. Hospital Type Where Rectal Cancer Surgery Received by SEER Registry*



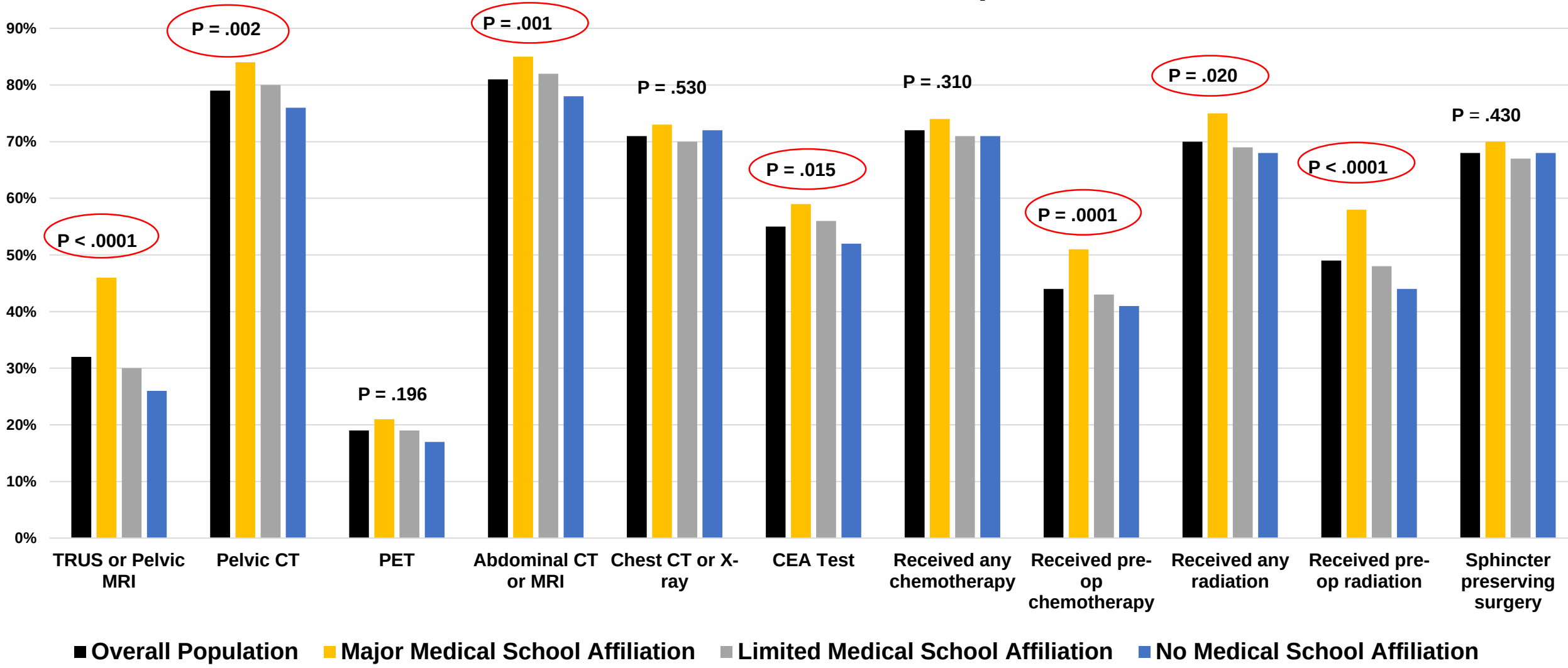
Results: Patient Characteristics by Hospital Facility Type

- Patients treated at NCI-designated centers were younger than those who were not treated at these centers
- No differences in age, gender, race, stage, Charlson co-morbidity count among patients treated at hospitals with a medical school affiliation or residency program vs. without
- Greater proportions of those treated at hospitals with residency programs or major medical school affiliations were urban compared to those who were not

Treatment & Staging by NCI Designation



Percent of Patients Receiving Recommended Staging and Treatment by Medical School Affiliation Status of Hospital



	NCI Designation		Residency Program		Medical School Affiliation			
	Yes vs. No		Yes vs. No		Major vs. None		Limited vs. None	
Service	O.R.	95% CI	O.R.	95% CI	O.R.	95% CI	O.R.	95% CI
Clinical Staging								
TRUS or Pelvic MRI	**3.41**	**2.50-4.65**	**1.74**	**1.43-2.13**	**2.16**	**1.72-2.71**	1.22	0.96-1.55
Pelvic CT	**1.57**	**1.04-2.37**	1.18	0.95-1.48	**1.43**	**1.09-1.87**	1.20	0.93-1.57
PET	**1.53**	**1.08-2.17**	**1.34**	**1.06-1.70**	**1.40**	**1.06-1.84**	1.33	1.00-1.75
Abdominal CT or MRI	**1.86**	**1.18-2.91**	1.19	0.95-1.50	**1.43**	**1.08-1.88**	**1.43**	**1.08-1.88**
Chest CT or X-ray	1.28	0.91-1.80	0.99	0.81-1.22	1.07	0.85-1.36	0.91	0.72-1.15
CEA Test	**1.77**	**1.28-2.43**	**1.38**	**1.15-1.66**	**1.37**	**1.10-1.70**	1.21	0.98-1.50
Chemotherapy								
Any Chemotherapy	**1.88**	**1.21-2.88**	1.14	0.92-1.43	1.18	0.91-1.54	1.02	0.79-1.31
Pre-op Chemotherapy	**2.40**	**1.75-3.31**	**1.45**	**1.20-1.75**	**1.52**	**1.21-1.90**	1.15	0.92-1.44
Radiation Therapy								
Any Radiation	**1.94**	**1.29-2.90**	1.15	0.93-1.42	**1.31**	**1.01-1.68**	1.09	0.86-1.39
Pre-op Radiation	**2.87**	**2.05-4.02**	**1.60**	**1.32-1.94**	**1.76**	**1.40-2.20**	1.24	0.99-1.55
Sphincter preserving surgery	1.06	0.77-1.47	1.12	0.93-1.37	1.18	0.93-1.48	0.99	0.79-1.24

Results: Staging & Treatment by Hospital Facility Type

- Those receiving surgery at NCI-designated hospitals or hospitals with residency programs or medical school affiliations received more guideline-recommended care, even after controlling for patient factors

Limitations

- Study population limited to those ≥ 66 years old and may not be generalizable to younger patients
- Potential for misclassification due to inconsistent coding in claims data
- Did not examine differences in treating physicians

Summary & Conclusions

- Many patients receive rectal cancer surgery at hospitals with no NCI designations or teaching programs
  - These patients are at greater risk of receiving sub-optimal care
- Initiatives that increase patient awareness, surgeon education, or referral patterns to higher volume centers may increase appropriate use of recommended pre-surgical staging and treatment, and may ultimately improve outcomes
- Virtual tumor boards have been explored in some areas to share the expertise of high-volume centers with smaller community hospitals
- Establishing performance targets that reflect the proportion of Stage II/III rectal cancer patients that could reasonably be expected to receive recommended treatment after accounting for patient refusals or contraindications could guide future interventions