



Overview of the SEER-Medicare Data

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What are the SEER - Medicare data?

The SEER Program:

- NCI has contracted with universities and state health departments since 1973 to operate population-based cancer registries
- SEER collects data on incident cancer cases
- Since 1992, SEER has included 12 geographic areas, 14.5% of U.S. population; expanded in 2001 to include 26% of U.S. population

SEER-Medicare data:

- NCI matches people in the SEER data to the Medicare's master enrollment file
- For SEER cases who have Medicare, NCI obtains all claims for Medicare covered health services
- There are currently over 1.5 million persons age 65+ in the files
- Years of data currently available:
 - SEER cases from 1973-2005
 - Medicare claims from 1991-2007

Persons included in the SEER-Medicare Data

- 100% of patients in the SEER data who are found to be Medicare eligible
- 5% random sample of persons residing in the SEER areas who have not been diagnosed with cancer
 - Comparison groups for assessing screening, diagnostic testing and treatment practices in the 65+ population

What is included in the SEER-Medicare Data?

- SEER Data includes:
 - Incidence, anatomic site, stage, initial treatment, demographics and vital status, cause of death
- Medicare claims for:
 - Short stay hospitals
 - Physician and lab services
 - Hospital outpatient claims
 - Home health and hospice bills
- Recurrences/progression not reported from either data source

Why Link the SEER-Medicare Data?

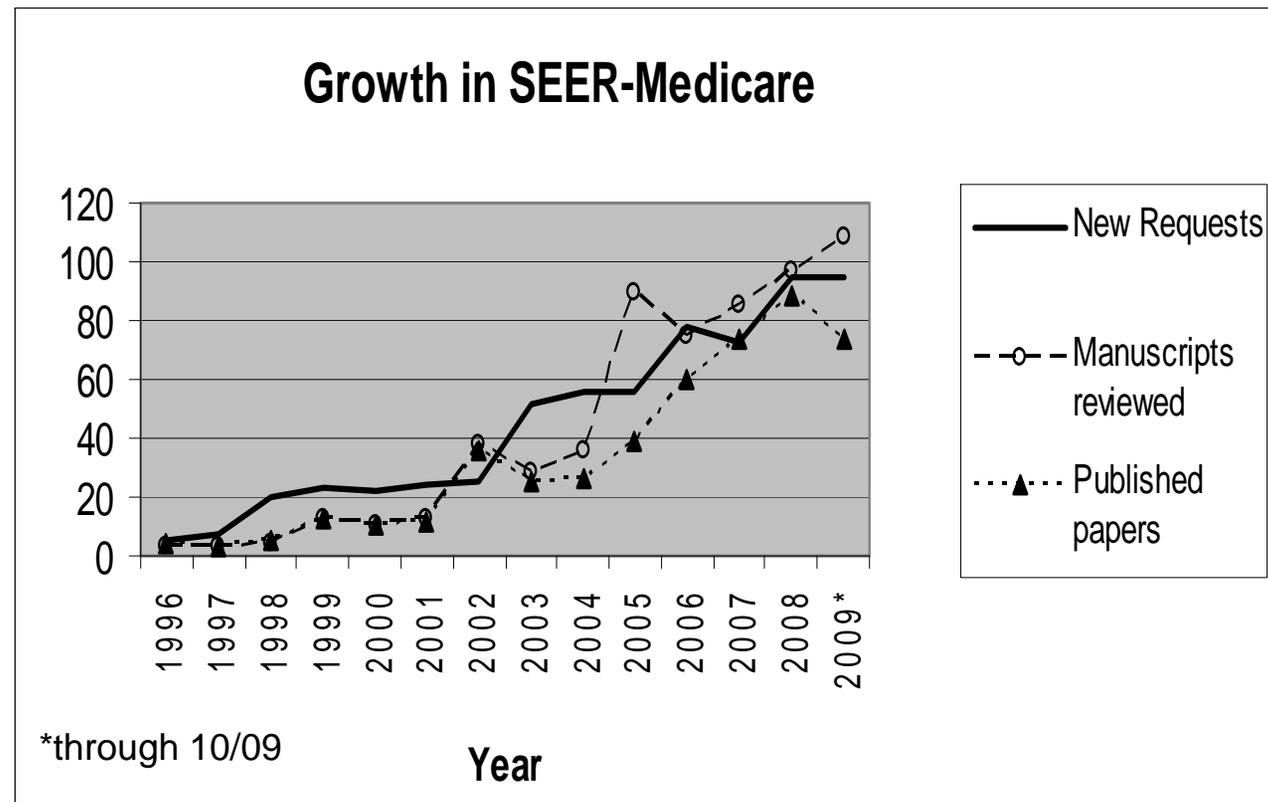
Linked data can address questions across the cancer continuum

Screening / → Detection	Diagnosis/ → Treatment	Survivorship →	Second Cancer	→ Death/ Terminal Care
Use of PSA testing, mammography sigmoidoscopy/ colonoscopy Impact of new technology or practice patterns on cancer detection/ incidence	Patterns of care Peri-operative complications Volume outcomes studies Extent of staging Comorbidities	Late effects of treatment Post-diagnostic testing Treatment of prevalent cancers	Rates of second primaries Relationship of second events to initial treatment and ongoing surveillance	Use of hospice End-of-life patterns of care Survival

← Health disparities, quality of care and cost of treatment →

Growth of SEER-Medicare for Research

The SEER and Medicare data were first linked in 1992 for the purpose of a single research project to assess the cost of care. Since then, research uses and users have increased significantly.



Advantages of Using SEER-Medicare Data

- SEER-Medicare data:
 - include large numbers of cases
 - are longitudinal- from the time of Medicare coverage until death
 - span most clinical areas where health care is delivered
 - represent a diversity of geographic areas across the U.S.
 - are population-based and thus reflect “real world” practice
 - include data on multiple disease conditions so can adjust for complexity of disease and care

Key Limitations of the SEER-Medicare Data

- Observational data, thus selection bias
- Non-covered services excluded: prescription drugs (until 7/2006), long-term care, free screenings
- Reasons for & results of tests/procedures not known
- Limited population
 - Does not include claims for persons in HMOs (~ 22% in SEER areas)
 - Under 65 population includes only the disabled/ESRD
- Lag of 4 years to obtain linked data (not “rapid”)

More Details on the SEER-Medicare data

SEER-Medicare WEB site

appliedresearch.cancer.gov/seermedicare

The WEB site has information on

- Publications using the data (>400)
- How to obtain the files
- Some technical support



Comparative Effectiveness Research Using SEER-Medicare Data

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Overview

- Rationale
- Examples
 - Adjuvant chemotherapy for colon cancer
 - Primary treatment for prostate cancer
 - Evaluation of a new technology
 - Survival after primary prostate cancer treatment
 - Comparisons of systems of care
- Methodology for observational data

Rationale for Using SEER-Medicare Data for Comparative Effectiveness Research

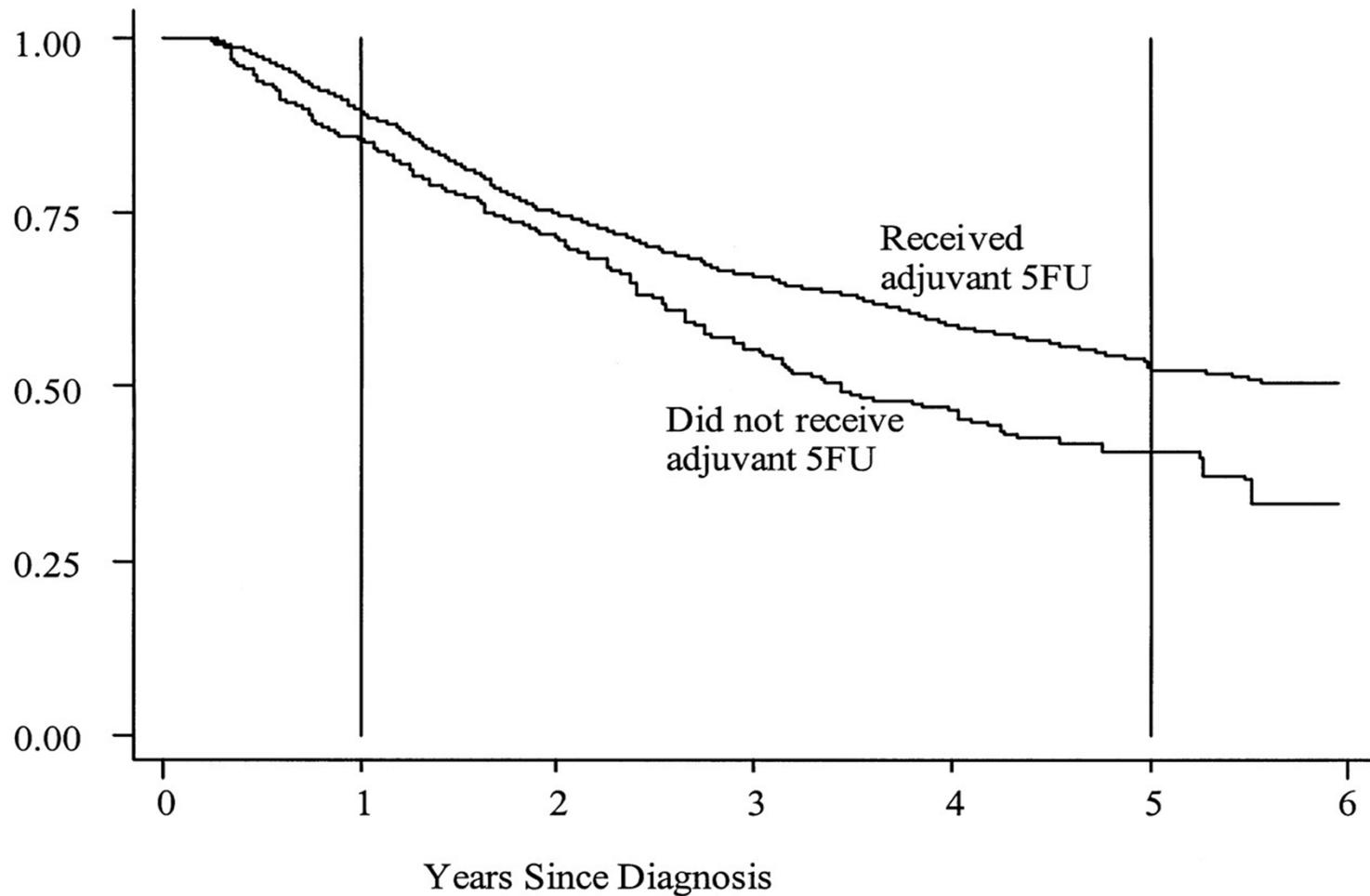
- Limitations of randomized controlled trials
 - Not feasible for many interventions
 - Certain populations underrepresented (elderly, sick, minorities, low SES)
- Population-based observational data better than single institution studies
- Longitudinal data with large N's from various regions across US
- Statistical methods available to address nonrandom assignment

Example 1: Adjuvant Chemotherapy for Stage III Colon Cancer

- Adjuvant chemotherapy improves survival for stage III colon cancer
 - Older patients underrepresented in trials
- Low rates of adjuvant chemotherapy for older patients
 - Is this appropriate patient selection or underuse of effective care?

Example 1: Adjuvant Chemotherapy for Stage III Colon Cancer

Propensity-Adjusted Kaplan Meier Survival Curve



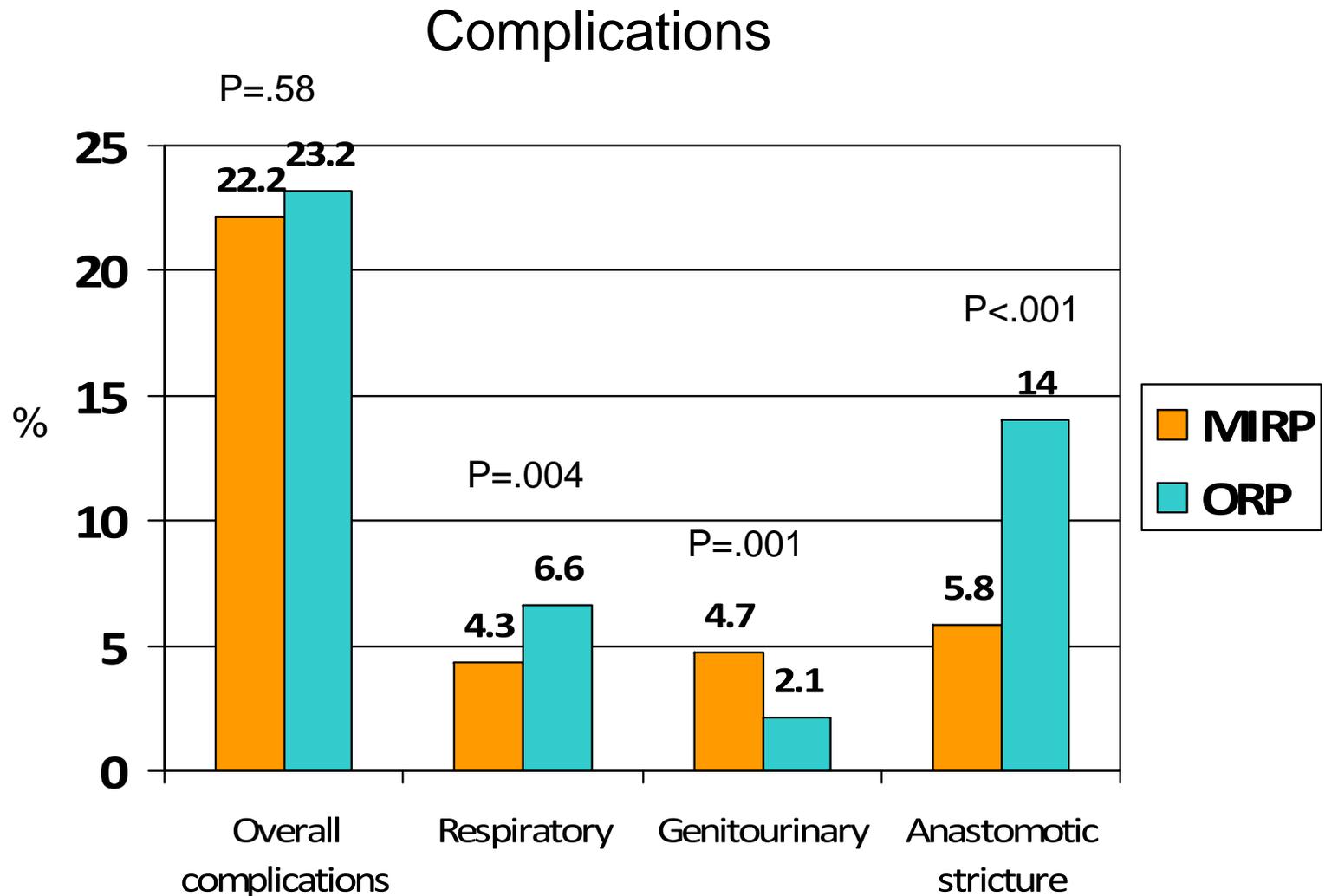
Remaining Questions

- Were treatment groups similar?
 - Or were treated patients healthier?
- Since results are consistent with RCT, does this prove effectiveness in this population?
- Would we believe results if they contradicted RCT findings?

Example 2: Minimally-Invasive vs. Open Radical Prostatectomy

- Minimally-invasive radical prostatectomy (MIRP) has diffused rapidly in recent years
- Few data about benefits over open surgery
- High costs to adopt technology

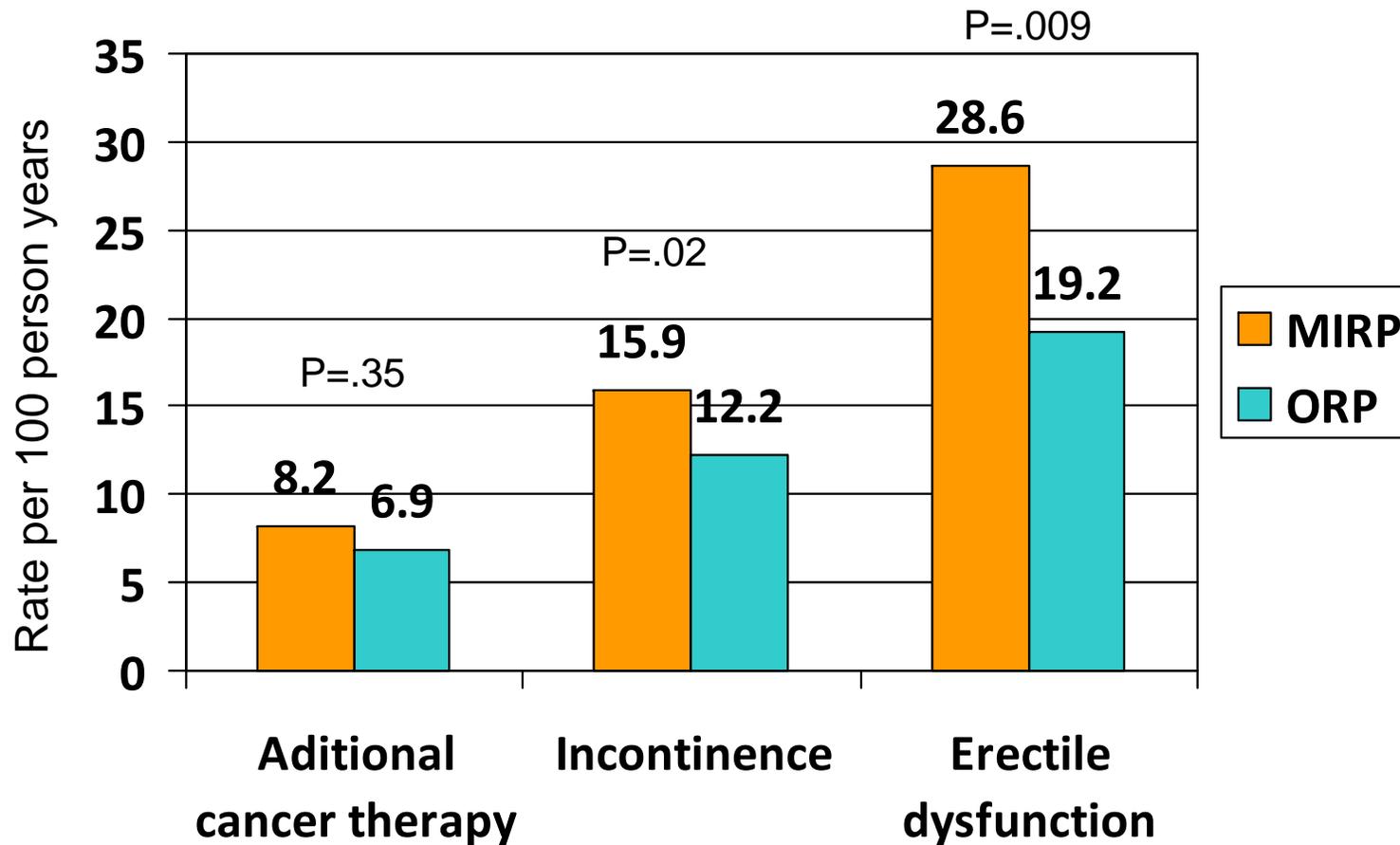
Example 2: Minimally-Invasive vs. Open Radical Prostatectomy



Hu, Keating et al, JAMA 2009

Example 2: Minimally-Invasive vs. Open Radical Prostatectomy

Short-term Outcomes



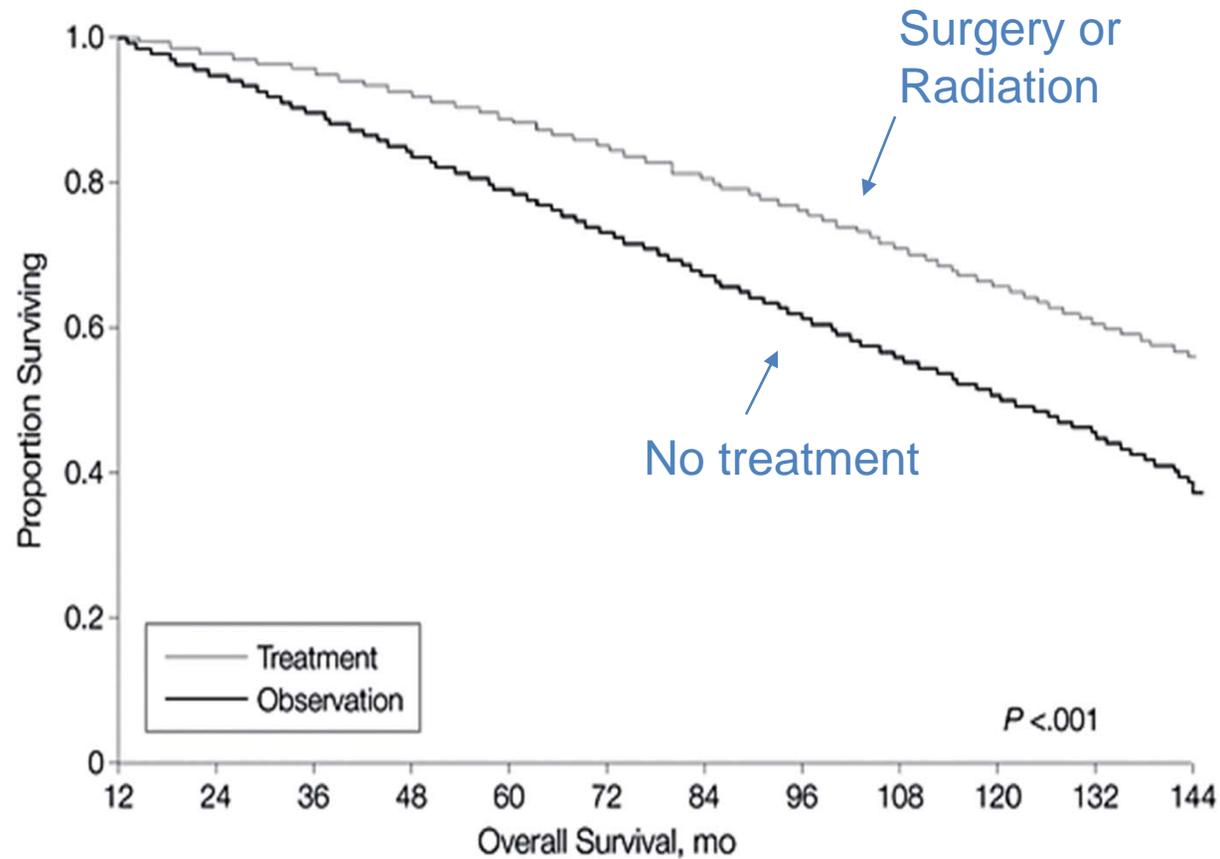
Remaining Questions

- Are men in both groups similar?
 - Or are men who choose MIRP more likely to complain about incontinence and erectile dysfunction post operatively?
- Are urologists in SEER-Medicare cohort representative of surgeons elsewhere
 - Steep learning curve, outcomes related to experience
 - SEER areas include 2 very high volume areas
- Would patient-reported outcomes differ?

Example 3: Survival Following Primary Treatment of Localized Prostate Cancer

- Uncertainty about benefits of treatments due to lack of clinical trials
- Most men with prostate cancer will not die of their cancer
- What can we learn about long term outcomes after prostate cancer treatment?

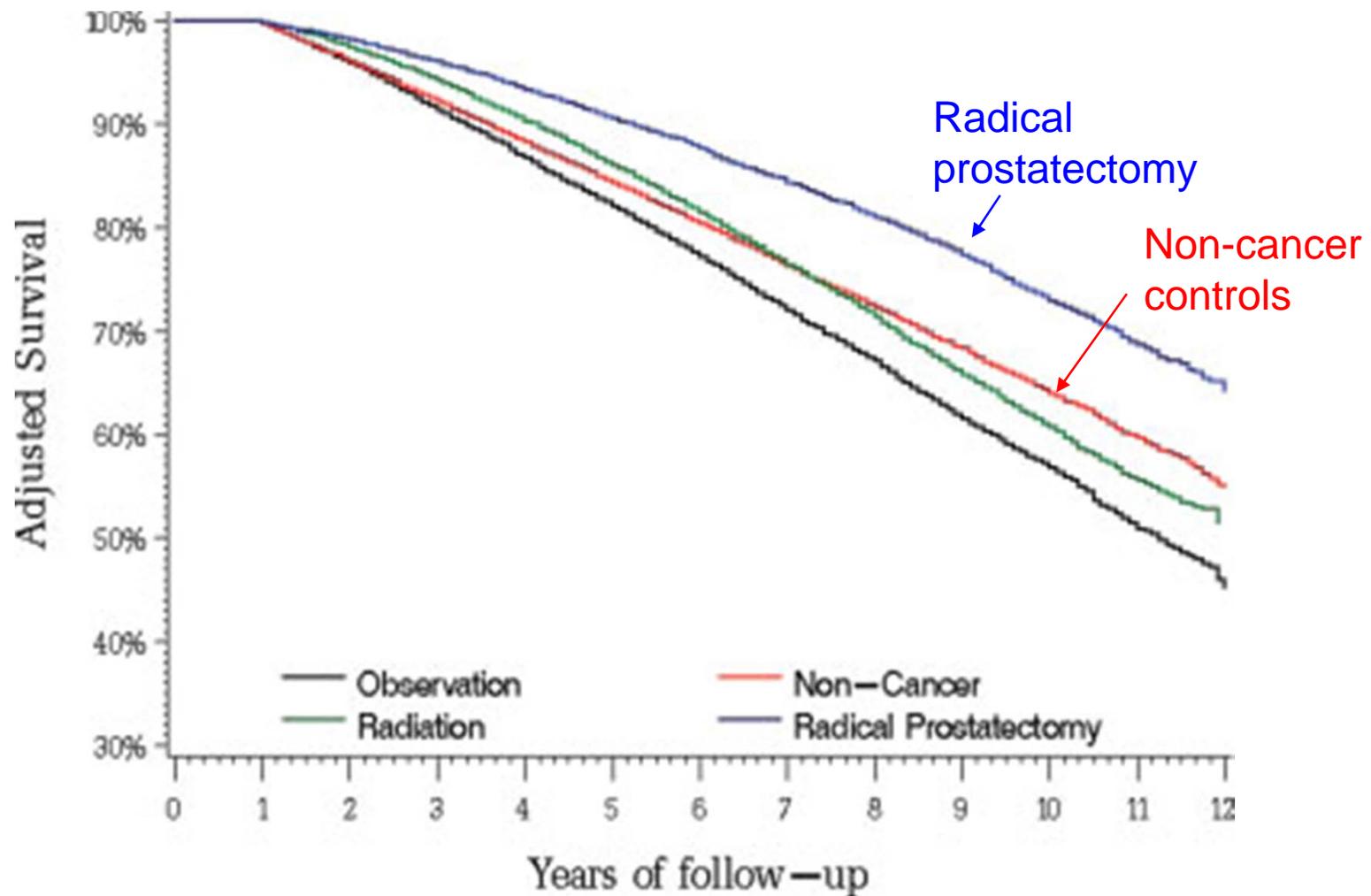
Example 3: Overall Survival Following Primary Treatment for Prostate Cancer



No. at Risk

Treatment	32022	31378	30546	26519	22630	18724	15148	11674	8755	5805	2522	226
Observation	12608	11986	11308	9696	8124	6587	5163	3769	2608	1527	685	82

But Treated Patients have BETTER Survival than Controls without Cancer



Challenges in Examining Associations of Treatment and Survival

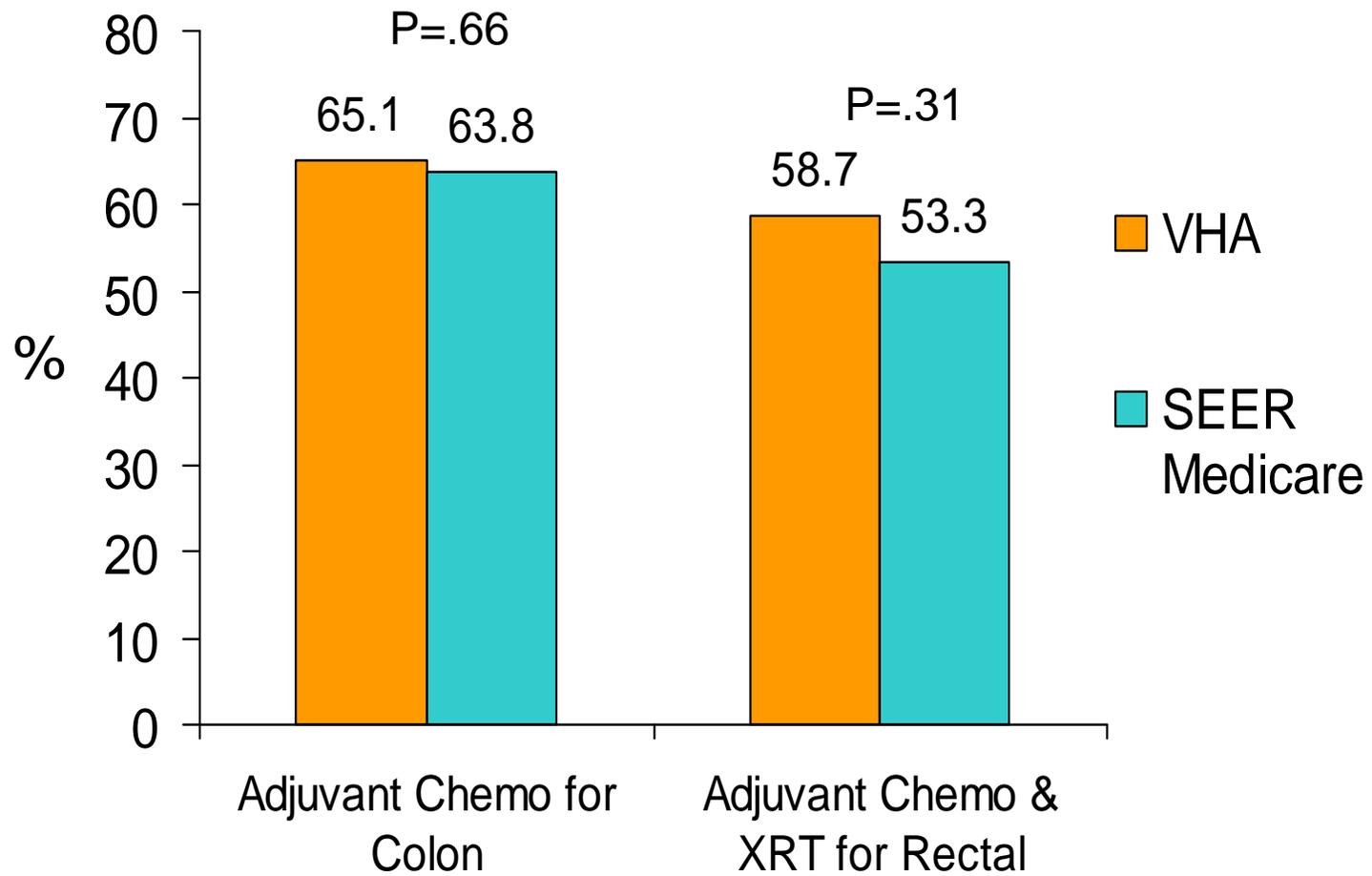
- Selection to different treatments not random
 - Health status of patient an important unmeasured confounder
- Difficult to account for follow up care, additional treatments, new comorbidities

Comparisons of Systems of Care

- Improvements to care delivery a priority
- SEER-Medicare data can be used for comparisons if other similar data available
 - Veterans Health Administration (VHA)
 - Cancer registry data linked with administrative data on visits, medications, labs

Example 4: Cancer Care in the VHA vs. SEER-Medicare for Older Men

Adjusted Rates of Adjuvant Therapy for Colorectal Cancer



Keating et al, unpublished

Challenges to Comparisons of Care Systems

- Patients may differ
 - Veterans typically have more comorbid illness and are of lower socioeconomic status
- Data may differ
 - Administrative data in VHA not use for billing purposes

Methods for Observational Data

- Standard regression methods typically insufficient for observational data analyses
- Propensity score methods and instrumental variables methods can help to address unobserved confounding
 - But may not overcome all biases
- Development and application of new methods for rigorous observational studies greatly needed
 - This will be an active area of research under Comparative Effectiveness Research initiatives



Future Plans for SEER-Linked Data

- Enhancing Data Resources
- Facilitating Sophisticated Research Uses
- Communicating Research Results

Enhancing Data Resources: Potential for Augmenting SEER-Medicare for CER

- Addition of Part D medication data to SEER-Medicare
 - In data validation phase – not yet approved for public release
- Expansion to non-SEER area registries with Medicare data
 - Only 19 of the 65 NCI cancer centers are in SEER areas
 - CDC exploring potential to link Medicare data to some state registries
 - Could enhance ability to study effect of health care systems on care
- Link SEER to claims data sources other than Medicare
 - Medicaid: enrollment data would be helpful; claims data of uncertain quality and timeliness.
 - Private insurance claims, i.e. BCSC (Health Core), however, proprietary nature of data have limited release for research

Enhancing Data Resources: Other SEER Linkages

- SEER–Medical Health Outcomes Survey (SEER-MHOS)
<http://outcomes.cancer.gov/surveys/seer-mhos>
 - Includes HRQOL data from Medicare beneficiaries in HMOs
 - Data set spans from 1998 – 2004
 - 40,000+ cancer patients and survivors; 200,000+ respondents never diagnosed with cancer (controls)
- SEER–Consumer Assessment in Healthcare Providers and Systems (SEER-CAHPS) *in development*
 - CAHPS items include reports about care (e.g., how well doctors communicate) and ratings of care (e.g., health plan, primary or specialist care)
 - One CAHPS survey includes Medicare beneficiaries enrolled in Medicare managed care plans and includes over 2 million beneficiaries for the period 1998-2007
 - The second CAHPS survey includes 1.5 million Medicare beneficiaries enrolled in Medicare fee-for-service from 2000-2007

Facilitating Sophisticated Research Uses: Training

- Issue: Increased use of SEER-Medicare data, has resulted in an increase in inexperienced users
- NCI Response: Training and Technical Advice
 - SEER-Medicare training offered by NCI bi-annually
 - Contracts awarded to provide more support throughout the process, including understanding data as investigators design research studies
 - SEER-Medicare WEB site has been enhanced to include technical advice and a question function which allows investigators to submit and receive timely responses to questions

Facilitating Sophisticated Research Uses: Methods and Validation Research

- Issue: The expanded use of SEER-Medicare data has resulted in projects that propose questions for which SEER-Medicare data may not be appropriate
- NCI Response: Support validation research to examine if SEER-Medicare data can address key questions
 - Can SEER-Medicare data be used to identify:
 - persons with disease recurrence/ progression?
 - specific chemotherapy regimens and dosage?
 - CER: Assessing treatment effectiveness using observational data is complicated because of non-random assignment. Can new methods control for differences between groups?

Facilitating Sophisticated Research Uses: Tools

- SEER*Stat software allows investigators to obtain rapid answers using variables collected by SEER
- A comparable “SMART” software system using variables from the SEER-Medicare data is under development. This will be able to provide rapid answers for questions such as:
 - Chemotherapy use
 - Costs of care
 - Comorbidities

Example of the SMART system: Use of chemotherapy among Medicare patients with Stage III colon cancer by age group and race

Session Type: Frequency

Suggested Citation

Software: Surveillance Research Program, National Cancer Institute SEER*Stat software (www.seer.cancer.gov/seerstat) version 6.3.3-beta.
Data: User created database. No citation specified. SEER*Stat database: SEER Medicare

Data

Database: SEER Medicare

Statistic

Statistic: Frequencies

Selection

Case: {Patient Characteristics & Diagnosis.Modified AJCC stage 3rd ed (1988+)} = '10', '20', '30'
AND {Patient Characteristics & Diagnosis.Site rec with Kaposi and mesothelioma} = 'Colon excluding Rectum'
AND {Year-Specific Variables.Chemotherapy flag} = 'Yes chemotherapy given'
AND {Year-Specific Variables.Follow-up year} = 'Year 1 (dx to dx+11)'
AND {Patient Characteristics & Diagnosis.Year of diagnosis} = '2001', '2002'
AND {Year-Specific Variables.Complete and continuous entitlement flag} = 'Complete entitlement'

Table

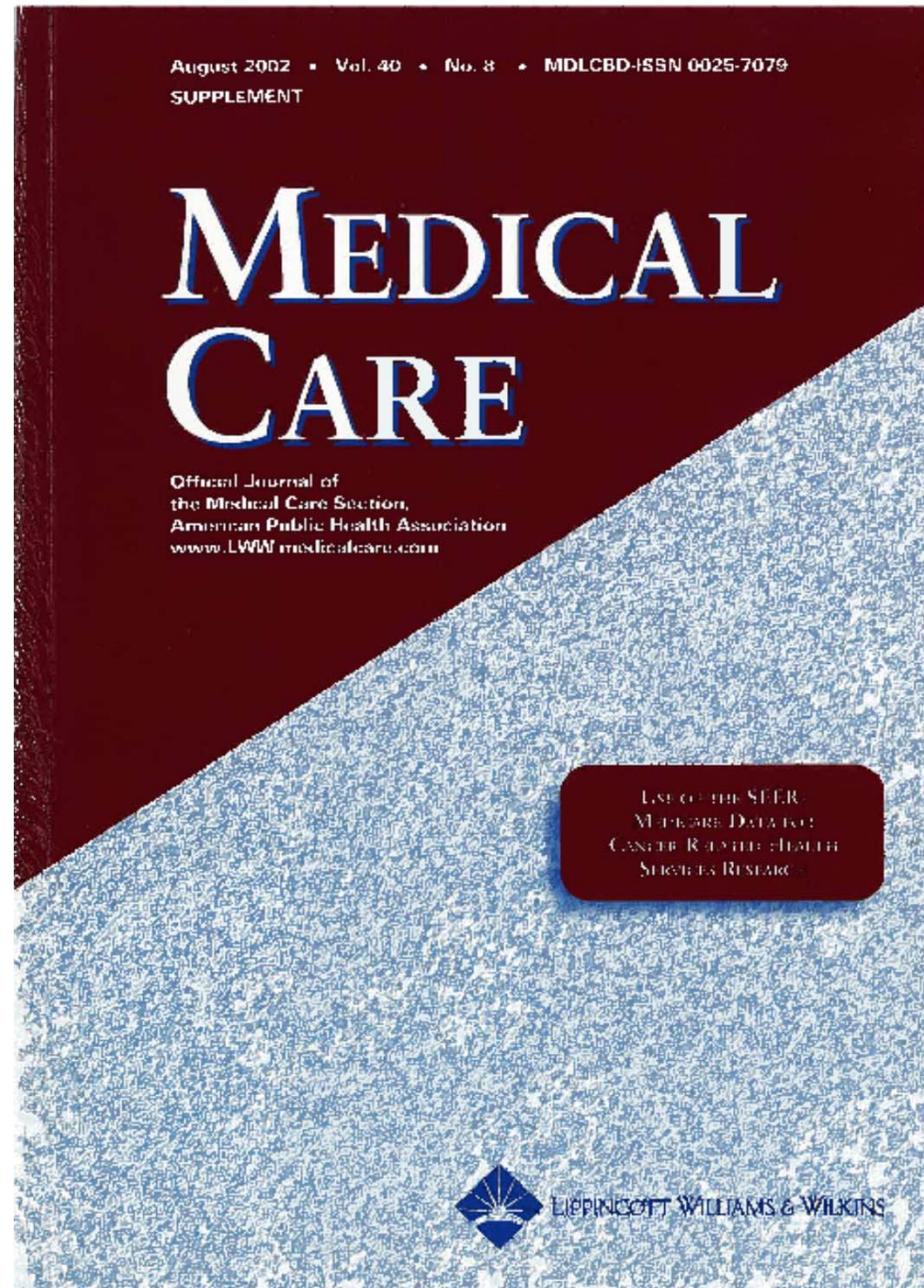
Row: Race (White, Black, Other) [Race]

Column: Age at diagnosis - 10 year groups [Age at diagnosis recode]

	65-74 years	75-84 years	85+ years
White	1,768	1,325	154
Black	169	97	9
Other	138	88	4

Communicating Research Results

- Researchers
 - Publications and meetings
 - Methods
 - Journal supplements
 - Web
- Clinicians
 - Work with DCTD/DCP
- Policy
- Public



CER related SEER-Medicare publications

The New England Journal of Medicine

Special Article

VARIATIONS IN MORBIDITY AFTER RADICAL PROSTATECTOMY

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ABSTRACT
Background Recent studies of surgery for cancer have demonstrated variations in outcomes among hospitals and among surgeons. We sought to examine variations in morbidity after radical prostatectomy for prostate cancer.
Methods We used the Surveillance, Epidemiology, and End Results–Medicare linked data base to evaluate health-related outcomes after radical prostatectomy. The rates of postoperative complications, late urinary complications (strictures or fistulas 31 to 365 days after the procedure), and long-term incontinence (more than 1 year after the procedure) were inferred from the Medicare claims records of 11,522 patients who underwent prostatectomy between 1992 and 1998. These rates were analyzed in relation to hospital volume and surgeon volume (the number of procedures performed at individual hospitals and by individual surgeons, respectively).

STUDIES of the outcomes of surgery for cancer have typically focused on the procedures performed at a hospital (volume) as a proxy for the experience of surgeons who operate at the hospital. The observation that there are consistent relations between the number of operations and better outcome for patients has led to in-depth investigations to determine the differences in the processes of care that exist between hospitals. If the trends are especially strong, it can be made for regionalizing care on the basis of hospital volume alone — that is, referring to high-volume hospitals.¹ Procedures for which consistent trends have been observed are hysterectomy² and esophagectomy.^{3,4} More complex procedures, including primary surgery for colon cancer,^{5,6} lung cancer,⁷ and

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JOURNAL OF CLINICAL ONCOLOGY ORIGINAL REPORT

Use and Outcomes of Adjuvant Chemotherapy in Older Women With Breast Cancer

Sharon H. Giordano, Zhigang Duan, Yong-Fang Kao, Gabriel N. Hortobagyi, and James S. Goodwin

ABSTRACT

Purpose This study was undertaken to determine patterns and outcomes of adjuvant chemotherapy use in a population-based cohort of older women with primary breast cancer.

Patients and Methods Women were identified from the Surveillance, Epidemiology, and End Results–Medicare-linked database who met the following criteria: age ≥ 65 years, stage I to III breast cancer, and diagnosis between 1991 and 1999. Adjuvant chemotherapy use was ascertained by Common Procedural Terminology J codes. Logistic regression analysis was performed to determine factors associated with chemotherapy use. Multivariate Cox proportional hazards models were used to calculate the hazard of death for women with and without chemotherapy.

Results A total of 41,390 women met study criteria, of whom 4,500 (10.9%) received chemotherapy. The use of chemotherapy was significantly associated with age, race, education, and comorbidities.

ORIGINAL CONTRIBUTION

Comparative Effectiveness of Minimally Invasive vs Open Radical Prostatectomy

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Context Minimally invasive radical prostatectomy (MIRP) has diffused rapidly, but limited data on outcomes and greater costs compared with open retropubic prostatectomy (RRP).

Objective To determine the comparative effectiveness of MIRP vs RRP.

Design, Setting, and Patients Population-based observational cohort study using US Surveillance, Epidemiology, and End Results–Medicare linked data from 2000 to 2007. We identified men with prostate cancer who underwent MIRP (n = 193) or RRP (n = 6899).

Main Outcome Measures We compared postoperative 30-day complication rates (urinary stricture 31 to 365 days postoperatively, long-term incontinence, and dysfunction more than 18 months postoperatively), and postoperative use of medical cancer therapies, a surrogate for cancer control.

Results Among men undergoing prostatectomy, use of MIRP increased from 5.2% (95% confidence interval [CI], 3.1%–10.5%) in 2003 to 43.2% (95% CI, 38.6%–46.9%) in 2006–2007. Men undergoing MIRP vs RRP were more likely to have a history of hypertension, diabetes, and cardiovascular disease.

Conclusion The use of MIRP has increased significantly since 2003. The comparative effectiveness of MIRP vs RRP remains unclear because of limited data on outcomes and greater costs compared with open retropubic prostatectomy.

ARTICLE

JNCI

Provider Treatment Intensity and Outcomes for Patients With Early-Stage Bladder Cancer

Brent K. Hollenbeck, Zaojun Ye, Rodney L. Dunn, James E. Montle, John D. Birkmeyer

Background Bladder cancer is among the most prevalent and expensive to treat cancers in the United States. In the absence of high-level evidence to guide the optimal management of bladder cancer, urologists may vary widely in how aggressively they treat early-stage disease. We examined associations between initial treatment intensity and subsequent outcomes.

Methods We used the Surveillance, Epidemiology, and End Results–Medicare database to identify patients who were diagnosed with early-stage bladder cancer from January 1, 1992, through December 31, 2002 (n = 20,713), and the physician primarily responsible for providing care to each patient (n = 940). We ranked the providers according to the intensity of treatment they delivered to their patients (as measured by their average bladder cancer expenditures reported to Medicare in the first 2 years after a diagnosis) and then grouped them into quartiles that contained approximately equal numbers of patients. We assessed associations between treatment intensity and outcomes, including survival through December 31, 2005, and the need for subsequent major interventions by using Cox proportional hazards models. All statistical tests were two-sided.

Results The average Medicare expenditure per patient for providers in the highest quartile of treatment intensity was more than twice that for providers in the lowest quartile of treatment intensity (\$7131 vs \$2930, respectively). High-treatment intensity providers more commonly performed endoscopic surveillance and used more intravesical therapy and imaging studies than low-treatment intensity providers. However, the intensity of initial treatment was not associated with a lower risk of mortality (adjusted hazard ratio of death from any cause for patients of low- vs high-treatment intensity providers = 1.03, 95% confidence interval, 0.91–1.16).