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Basic Original Report

# Contemporary prostate cancer radiation therapy in the United States: Patterns of care and compliance with quality measures

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**Abstract**

**Purpose:** Quality measures represent the standards of appropriate treatment agreed upon by experts in the field and often supported by data. The extent to which providers in the community adhere to quality measures in radiation therapy (RT) is unknown.

**Methods and materials:** The Comparative Effectiveness Analysis of Surgery and Radiation study enrolled men with clinically localized prostate cancer in 2011 and 2012. Patients completed

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surveys and medical records were reviewed. Patients were risk-stratified according to D'Amico classification criteria. Patterns of care and compliance with 8 quality measures as endorsed by national consortia as of 2011 were assessed.

**Results:** Overall, 926 men underwent definitive RT (69% external beam radiation therapy [EBRT]), 17% brachytherapy (BT), and 14% combined EBRT and BT with considerable variation in radiation techniques across risk groups. Most men who received EBRT had dose-escalated EBRT (>75 Gy; 93%) delivered with conventional fractionation (<2 Gy; 95%), intensity modulated RT (76%), and image guided RT (85%). Most men treated with BT received I125 (77%). Overall, 73% of the men received EBRT that was compliant with the quality measures (dose-escalation, image-guidance, appropriate use of androgen deprivation therapy, and appropriate treatment target) but only 60% of men received BT that was compliant with quality measures (postimplant dosimetry and appropriate dose). African-American men (64%) and other minorities (62%) were less likely than white men (77%) to receive EBRT that was compliant with quality measures.

**Conclusions:** Most men who received RT for localized prostate cancer were treated with an appropriately high dose and received image guidance and intensity modulated RT. However, compliance with some nationally recognized quality measures was relatively low and varied by race. There are significant opportunities to improve the delivery of RT and especially for men of a minority race.


## Introduction

With the passage of the Patient Protection and Affordable Care Act, there is renewed emphasis on improving the quality of medical care while containing costs.[1,2] This is particularly relevant in prostate cancer (PCa) care where considerable variations in the quality of cancer care exist,[3-5] and the costs of care are expected to increase at least 35% over the next decade.[6] Quality measures are tools that evaluate health care processes that are associated with high-quality health care.[7] Quality measures for PCa radiation therapy (RT) have largely been identified by a combination of dedicated research groups and consensus recommendations.[8,9] These groups have set standards with regard to radiation doses and techniques.

Although considerable effort has been made to identify radiation oncology quality measures,[10-12] contemporary RT practice patterns and compliance with quality measures have not been well-characterized for PCa. Therefore, we evaluated radiation practice patterns and characterized treatment compliance with radiation quality measures among men who enrolled in the prospective population-based Comparative Effectiveness Analysis of Surgery and Radiation (CEASAR) study.

## Methods and materials

### Patient population

The CEASAR study enrolled men from January 2011 to February 2012 who were <80 years of age with clinically localized PCa and a prostate-specific antigen level <50 ng/mL. Patients were recruited from 5 Surveillance, Epidemiology, and End Results Program (SEER) registries (Atlanta, Los Angeles, Louisiana, New Jersey, and Utah) and a PCa patient registry (Cancer of the Prostate Strategic Urologic Research Endeavor).[13] Details of the study design and objectives of the CEASAR study were described previously.[14] The 926 men who underwent definitive RT for their PCa were evaluated for this analysis (Fig. 1).

### Data collection

Baseline surveys that were completed by the study subjects captured sociodemographic data and comorbidity as previously described.[14] Treatment details were obtained from medical chart abstraction that was performed 1 year after enrollment. The records of a total of 878 of 926 men underwent medical chart abstraction. Comorbidity was scored in accordance with the Total Illness Burden Index for Prostate Cancer.[15] Race and ethnicity was categorized into Caucasian, African-American (AA), and other races/ethnicities on the basis of patient reports or, when missing, registry data.

### Quality measures

Five quality measures for external beam radiation therapy (EBRT) and 3 for brachytherapy (BT) were selected from the recommendations of the 2011 National Comprehensive Cancer Network Prostate Cancer guidelines,[16] American Brachytherapy Society guidelines,[17] Quality Research in Radiation Oncology (QRRO),[9,18] Physician Quality Reporting Initiative,[19] and National Radiation Oncology Registry[20] (Table 1). Radiation treatment guidelines change over time so compliance was measured as adherence to the guidelines that were established at the time of study enrollment as of 2011. However, we evaluated the more inclusive BT doses as recommended by the American Brachytherapy Society that were published during the enrollment period rather than the more stringent BT doses as recommended by the 2011 National Comprehensive Cancer Network guidelines.

Men who received EBRT alone (without BT) were evaluated for adherence with: 1) Prescription dose ≥75 Gy if treated with conventional fractionation[9,16,18,20]; 2) treatment with image guided radiation therapy (IGRT)[9,16,18,20]; 3)