

Do Rural Patients with Early-Stage Prostate Cancer Gain Access to All Treatment Choices?

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Background

Many cancers, such as early-stage prostate cancer, have multiple, equally effective treatment options,¹ yet the treatments have very different rates of complications.² Optimal care allows early-stage prostate cancer patients to choose from among these treatment options after careful consideration of their risks and benefits. Definitive treatments (localized treatments with curative intent) for early-stage prostate cancer include surgery—radical prostatectomy—or one of three types of radiation therapy: one-time prostatic implantation of radioactive pellets (brachytherapy), five to eight weeks of external beam radiation, or a combination of the two. Radical prostatectomy is associated with more urinary incontinence and sexual dysfunction than external beam radiation therapy,^{3,4} whereas radiation therapy is associated with more bowel dysfunction than prostatectomy.² Brachytherapy is associated with higher initial risk of urinary retention and urinary urgency and urge incontinence compared to external beam radiation, but over time these differences resolve. Both forms of radiation therapy are associated with similar sexual and bowel side effects.⁵ Due to a scarcity of local cancer specialists and long distances to some cancer care facilities such as radiation treatment centers,^{6,7} rural residents have more limited local cancer treatment choices.

Study Aim

To compare rates of receipt of definitive treatment overall, and rates of receipt of the four treatment options among early-stage prostate cancer patients living in urban and rural counties; and to examine urban-rural variation in receipt of definitive treatment across 10 states nationally.

Study Design

This cross-sectional study used 2004-2006 Surveillance Epidemiology and End Results (SEER) cancer registry data from 303 rural and 165 urban counties in 10 states (California, Connecticut, Georgia, Hawaii, Iowa, Kentucky, Louisiana, New Mexico, Utah, Washington) representing all four U.S.

regions. These data represent all of the SEER registry areas that include a general population of cancer patients in both rural and urban counties. Patients were categorized by their Federal Information Processing Standard (FIPS) county codes into urban and four levels of rural residence based on the size of the county's largest town and adjacency to urban areas using Urban Influence Codes (UICs)⁸: (1) *adjacent rural*: counties that are geographically adjacent to a metropolitan area (UICs 3-7), (2) *nonadjacent micropolitan*: counties that are not adjacent to a metropolitan area and whose largest town/urban cluster has 10,000 to 49,999 residents (UIC 8), (3) *small rural*: counties that are adjacent to a micropolitan area and whose largest town has less than 10,000 residents (UIC 9, 10), and (4) *remote small rural*: counties that are not adjacent to a micropolitan area and whose largest town has less than 10,000 residents (UIC 11, 12). Availability of urologists and radiation oncologists in each residence county during the study years was obtained from the Area Resource File, based on each physician's preferred professional mailing address.⁹ Rates of different types of treatment for early-stage prostate cancer were calculated among men living in urban and different types of rural counties, using logistic regression analysis to adjust for patient, cancer, and environmental characteristics that were available in the SEER cancer registry data and that either improved the fit of the regression model or were significant predictors of definitive treatment themselves.

Study Population

The study population included 51,982 rural and urban early-stage prostate cancer patients who were categorized as most likely to benefit from definitive treatment: ages 40-74 years with prostate specific antigen (PSA) levels of 20 or less and a Gleason score of less than 8. The Gleason grading score indicates the level of aggressiveness of the tumor (lower scores are representative of less-aggressive tumors). The PSA test is a prostate cancer tumor marker. Higher serum PSA levels are associated with more aggressive tumors, higher tumor volume, and higher risk of disease recurrence and progression after treatment.

Findings

- Over 80 percent of early-stage prostate cancer patients in the 10 study states received definitive treatment regardless of their rural or urban residence location, with the highest rates found in metropolitan counties (87.1%) and remote small rural counties (87.0%) (Table 1).
- The most common treatment for both rural and urban residents overall was radical prostatectomy (48.3%).
- Prostate cancer patients living in adjacent rural counties had the highest rates of brachytherapy (18.8%). Those living in remote small rural and nonadjacent micropolitan rural counties had the highest rates of external beam radiation (22.6% and 20.8%, respectively).
- The rates of no treatment were highest among early-stage prostate cancer patients living in nonadjacent micropolitan (16.6%) and small rural counties (16.3%).
- There was substantial variation in the receipt of definitive treatment by early-stage prostate cancer patients within and

across states. Some types of rural counties in Louisiana, New Mexico, and Georgia had adjusted definitive treatment rates that were more than 5 percentage points below the overall 10-state adjusted rate of 86.8 percent, and had significantly lower adjusted definitive treatment rates than urban counties in the same states (Figure 1).

- The vast majority of rural early-stage prostate cancer patients did not have a radiation oncologist practicing in their county (1.8% in small rural counties up to 43.7% in nonadjacent micropolitan counties, Table 2). The availability of urologists varied across rural places, with patients living in nonadjacent micropolitan counties most likely to have a urologist practicing in their counties (81.3%). Notably, 45.9 percent of patients living in remote small rural counties but only 10.5 percent of patients living in small rural counties had a urologist practicing in their counties. With the exception of patients living in nonadjacent micropolitan places, most rural patients had neither a urologist nor a radiation oncologist practicing in their counties.

Table 1. Adjusted Rates of Different Treatments Received by Early-Stage Prostate Cancer Patients by Patient’s County of Residence

| | Metropolitan, % (N = 45,964) | Adjacent Rural, % (N = 3,547) | Nonadjacent Micropolitan, % (N = 1,381) | Small Rural, % (N = 569) | Remote Small Rural, % (N = 521) | Overall, % (N = 51,982) |
|--|---------------------------------|----------------------------------|--|-----------------------------|------------------------------------|----------------------------|
| Definitive treatment** | 87.1 | 84.3 | 81.4 | 82.3 | 87.0 | 86.8 |
| Radical prostatectomy | 48.7 | 44.4 | 44.7 | 46.4 | 45.3 | 48.3 |
| External beam radiation | 18.6 | 16.9 | 20.8 | 17.9 | 22.6 | 18.6 |
| Brachytherapy | 15.6 | 18.8 | 14.5 | 17.2 | 14.6 | 15.8 |
| Combination of external beam radiation and brachytherapy | 4.2 | 4.2 | 2.8 | 2.5 | 4.8 | 4.2 |
| Non-definitive treatment | 1.4 | 2.8 | 2.2 | 1.9 | 1.0 | 1.6 |
| No treatment* | 11.4 | 12.6 | 16.6 | 16.3 | 12.4 | 11.6 |

Overall chi-square: *P ≤ .05, **P ≤ .01, ***P ≤ .001.

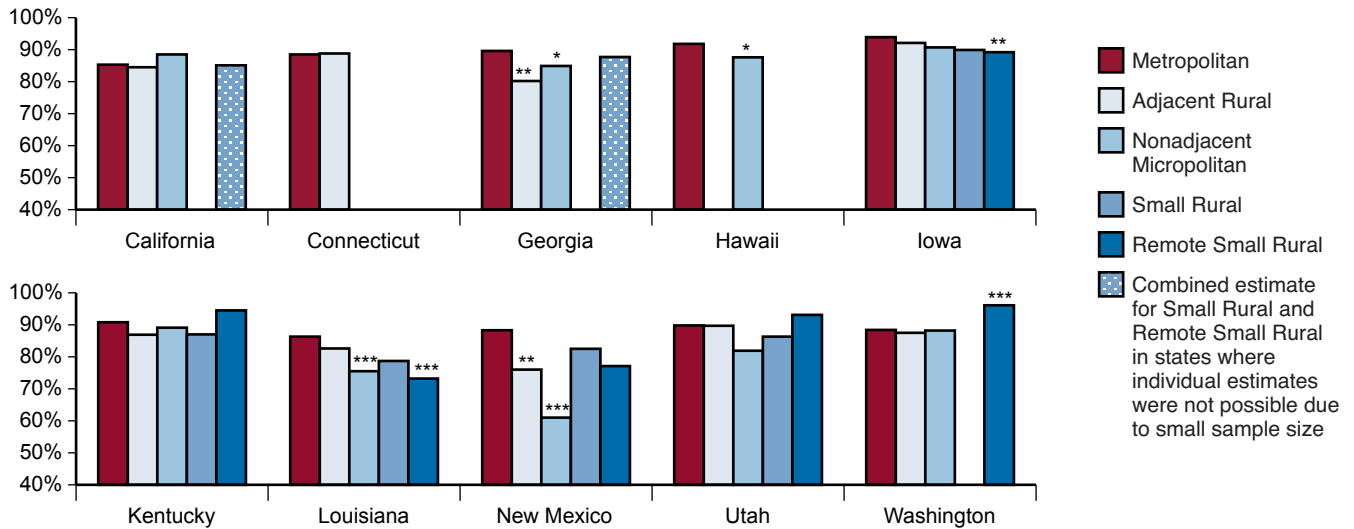
Table 2. Urologist and Radiation Oncologist Availability in Patient’s County of Residence

| Urologist/Radiation Oncologist Combined Availability in County*** | Metropolitan, % (N = 45,964) | Adjacent Rural, % (N = 3,547) | Nonadjacent Micropolitan, % (N = 1,381) | Small Rural, % (N = 569) | Remote Small Rural, % (N = 521) | Overall, % (N = 51,982) |
|---|---------------------------------|----------------------------------|--|-----------------------------|------------------------------------|----------------------------|
| Neither available | 2.8 | 51.5 | 18.7 | 87.7 | 54.1 | 8.0 |
| Urologist available, no radiation oncologist available | 2.8 | 28.3 | 37.6 | 10.5 | 32.1 | 5.8 |
| Radiation oncologist available, no urologist available | 0.2 | 2.0 | 0.0 | 1.8 | 0.0 | 0.4 |
| Both available | 94.2 | 18.2 | 43.7 | 0.0 | 13.8 | 85.8 |

The availability of a urologist and/or radiation oncologist in a county was defined by Area Resource File (ARF) data from the year of diagnosis. The ARF uses the physicians’ preferred professional mailing address from the American Medical Association Physician Masterfile and the American Osteopathic Association, and does not include additional satellite locations.

Overall chi-square: *P ≤ .05, **P ≤ .01, ***P ≤ .001.

Figure 1. Adjusted† Rate of Definitive Treatment by Residence State and Rural-Urban Categorization (N = 51,982)



* $P \leq .05$.
 ** $P \leq .01$.
 *** $P \leq .001$.

† Adjusted for age, race, marital status, stage, PSA level, Gleason score, residence in a low employment county (y/n), and residence in a persistent poverty county (y/n).

Significance tests compare adjusted definitive treatment rates in each type of rural county to the rate in urban counties in each state.

Limitations

Most rural early-stage prostate cancer patients in the SEER registries were concentrated in California, Iowa, Kentucky, Louisiana, New Mexico, and Utah. California accounted for 53.6 percent of the early-stage prostate cancer patients overall and the majority of all urban early-stage prostate cancer patients (58.8%). The SEER registry data do not identify where patients receive their cancer care; thus this study is unable to determine the travel burden for rural prostate cancer patients. Last, urologists’ and radiation oncologists’ satellite locations were unavailable, which could underestimate the presence of these specialists in rural counties.

Conclusions

The majority of rural and urban early-stage prostate cancer patients in all 10 study states were receiving definitive treatment, even though many lived in counties without a radiation oncologist or urologist. A WWAMI Rural Health Research Center (RHRC) study demonstrated that isolated small rural colorectal cancer patients most frequently traveled to urban places for cancer care,⁷ suggesting that the high rates of definitive prostate cancer treatment for men living in remote

small rural places may reflect their receipt of care in urban areas. Although overall there were no substantial disparities in the types of treatment received by rural and urban patients, there were a few rural areas in Louisiana and New Mexico with especially low rates of definitive treatment for early-stage prostate cancer.

Implications for Policy, Delivery, or Practice

This research demonstrated that overall, rural early-stage prostate cancer patients were able to access the full range of prostate cancer treatment options. However, further study is needed to identify both the burdens that travel for treatment place on rural early-stage prostate cancer patients, as well as the availability of local evaluation and treatment in rural areas because of itinerant cancer specialists. States with rural areas that had relatively low definitive treatment rates should explore the patient, social support, and health care system factors that may contribute to these lower treatment rates.

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