Prostate Cancer Screening in Hospitalized Patients: Results from The Nationwide Inpatient Sample

Thu Nguyen, MS- 3; Patrick Karabon, MS

Oakland University William Beaumont School of Medicine, Rochester, MI

OU WB School of MEDICINE

OAKLAND UNIVERSITY WILLIAM BEAUMONT

INTRODUCTION

The second leading cause of death in the US is cancer.[1] Prostate cancer (PCa) is the most common and the second leading causes of cancer death in men in the US.[2] Among 164,690 new cases of prostate cancer diagnosed in 2018, an estimated 29,430 cases resulted in death.[2] From 1993 to 2015, there is a 52% drop in death rate from prostate cancer which can be attributed to early detection via PSA screening and advances in treatment.[2]

Since the risks of prostate cancer screening in men outweigh the benefits, in 2008, US Preventative Services Task Force (USPSTF) recommended against PSA screening for prostate cancer for men of age 75 or older.[3] In 2012, the USPSTF recommended against PSA screening for prostate cancer for men of all ages.[4] During this time period, the American Cancer Society (ACS) and the American Urological Association (AUA) each issued their own recommendation: men should make informed decision with their provider regarding prostate cancer screening test, and informed decision making in combination with recommendation against prostate cancer screening for men of age 70 or older, respectively.[5][6] Following the 2012 USPSTF recommendations, there is a greater decline in PSA screen for patients seeking preventive care at primary care physicians compared to urologists.[7]

OBJECTIVES

Studies have shown that hospitalized patients are more receptive to preventive screenings due to their vulnerability from recent encounter with a serious health problem.[12] Hospital setting, therefore, can be utilized to promote healthy behavior and preventive screenings. Blood testing is a standardized procedure for hospitalized patients and PSA test is tested via blood, making it convenient to be collected. Moreover, the normal barriers to cancer screening such as lack of time and transportation were eliminated for hospitalized patients making it an ideal setting for prostate cancer screening.[13]

Given the heterogeneity in screening recommendations and practices, this study aims to:
- Quantify the national prevalence and trends of screening for malignant neoplasm of prostate cancer from 2006 to 2014 in hospitalized patients in the USA.
- Determine demographic, concomitant diagnoses and procedures associated with screening for malignant neoplasm of prostate to lay the groundwork for a prediction model for a more defined prostate cancer screening guideline recommendation.
- Determine sociodemographic predictors of inpatient prostate cancer screening such as household income, hospital location, and teaching status.

METHODS

Data from the National Inpatient Sample (NIS) database from 2006 to 2014 was examined to determine the rate of prostate cancer screening among hospitalized patients in the USA. The NIS, the largest de-identified hospitalized patients' database, contains data reported on millions of patients annually.

Inclusion criteria:
- All biologically male hospitalized patients aged 45 or over,
- Received prostate cancer screening during the study period (regardless of diagnosis)
- Note on why we chose age 45 and above: Current USPSTF, ACS and AUA guidelines do not recommend prostate cancer screening for men of any age, but rather making informed decision with the providers. However, the National Comprehensive Cancer Network (NCCN) 2018 guideline recommend PSA screening in men age 45 and above so this suggestion is used to define studied patients.[8]

Exclusion criteria:
- Individuals with history of prostate cancer
- Individuals with family history of prostate cancer possess high risk for prostate cancer

Independent variables collected:
- Year of discharge,
- Age,
- Race,
- Concomitant diagnosis,
- Concomitant procedures,
- Median household income quartile,
- Source of primary payment (patient insurance status),
- Charlson-Deyo Score (comorbidity index),
- Hospital characteristics (urban or rural, teaching or nonteaching, bedsize)

RESULTS

Between 2006 and 2014, the overall rate of inpatient PCa screening encounters for average-risk hospitalized patients is rare, at approximately 2.57 per 100,000 hospitalizations. Fig. 1 illustrates the trend of inpatient PCa screening encounters among hospitalized patients during our study period. **Factors that could be attributed to inpatient PCa screening encounters were evaluated.**
- The average age of screened men was 56.41.
- Better socioeconomic status was associated with lower rates of inpatient PCa screening encounters.
- The rate went from 4.3 per 100,000 hospitalizations in the lowest quartile of median household income down to 1.17 per 100,000 hospitalizations in the highest quartile of household income (P = 0.0008; Table 1).
- The rate of prostate cancer screening encounters was much higher in rural hospitals (10/100,000 hospitalizations) than in urban nonteaching (3.02/100,000 hospitalizations), and urban teaching (0.65/100,000 hospitalizations) hospitals (P = < 0.0001).
- Hospital region also impacted the rate of prostate cancer screening encounters, with the Midwest (60.75%) had a much higher rate of screening than any other regions in the country (P = < 0.0001).
- There was not enough evidence to conclude there was a significant association between race (P = 0.1936) or Charlson-Deyo Score (P = 0.3531) and prostate cancer screening encounters

Predictors of prostate cancer screening were weighted in a multivariate logistic regression analysis to determine the factors associated with the difference in inpatient prostate cancer screening.
- As compared to men aged 45-69 and adjusted for all other factors in the model, men 55-64 had significantly higher odds of undergoing a prostate cancer screening encounter during hospitalization (all AOR > 1 and P < 0.05).
- As compared to private insurance hospitalizations and adjusted for all other factors in the model, Medicare hospitalizations (AOR: 3.07; P = 0.0016) and self-pay/uninsured (AOR: 1.74; P = 0.0371) had significantly higher odds of undergoing an inpatient PCa screening encounter.
- As compared to urban teaching hospital and adjusted for all other factors in the model, Rural hospitals (AOR: 11.9; P = < 0.0001) and urban Nonteaching hospitals (AOR: 5.26; P = < 0.0001) had significantly higher odds of inpatient PCa screening encounter.
- As compared to South hospitals and adjusted for all other factors in the model, Midwest hospitals had significantly higher odds of inpatient PCa screening encounter (AOR: 4.9; P = < 0.0001).
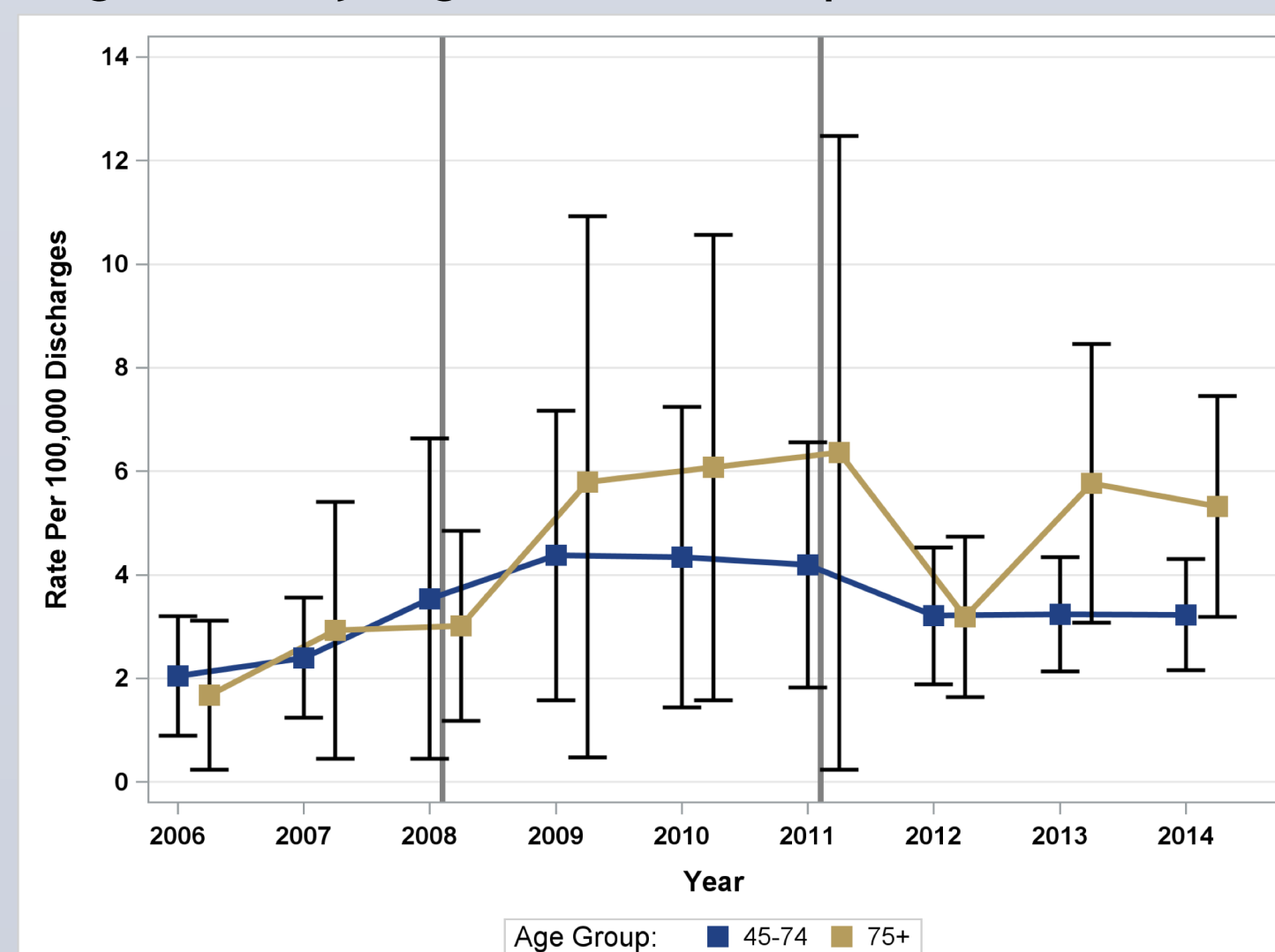
Figure 1. The trend of inpatient PCa screening encounters among hospitalized patients during 2006 - 2014

CONCLUSIONS

Hospitalized patients represent potential candidates for opportunistic cancer screening of common and preventable malignancies including those of the prostate, colon, breast, lung, and cervix. Our study found that routine inpatient PCa screening encounters in US hospitals was rare. According to current guidelines set by the USPSTF, AUA, American College of Physicians, American Society of Clinical Oncology, American Cancer Society and the National Comprehensive Cancer network, PSA screening should be a shared decision in patients that indicate a preference. In light of the reality that not all Americans have equal access to quality healthcare, this exceptionally low rate of inpatient screening may indicate that there exists a potential opportunity to offer screening to hospitalized patients. Screening tools such as PSA are non-invasive modalities that can help screen individuals at increased risk for the development of prostate cancer, allowing for early detection, prevention, improved rates of cure and ultimately, decreased rates of mortality.

REFERENCES

1. Heron M. National Vital Statistics Reports Volume 67, Number 5 July 26, 2018. *Natl Vital Stat Reports*. 2018;67(6):1-15.
2. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2019. *CA Cancer J Clin*. 2019;69(1):7-34. doi:10.3322/caac.21551
3. Adult R, Schedule I, States U. Screening for Prostate Cancer: U.S. Preventive Services Task Force Recommendation Statement. *Ann Intern Med*. 2008;147(10):725-729.
4. Moyer V U. Screening for Prostate Cancer: U.S. Preventive Services Task Force Recommendation Statement. *Ann Intern Med*. 2012;157(2).
5. American Cancer Society Recommendations for Prostate Cancer Early Detection. https://www.cancer.org/cancer/prostate-cancer/early-detection/acs-recommendations.html. Accessed June 7, 2019.
6. Carter HB, Albertsen PC, Barry MJ, et al. American Urological Association (AUA) Guideline GUIDELINE American Urological Association Early Detection of Prostate Cancer. 2018:1-27.
7. Zavaski ME, Meyer CP, Sammon JD, et al. Differences in Prostate-Specific Antigen Testing Among Urologists and Primary Care Physicians Following the 2012 USPSTF RecommendationsDifferences in Prostate-Specific Antigen TestingLetters. *JAMA Intern Med*. 2016;176(4):546-547. doi:10.1001/jamainternmed.2015.7901
8. Carroll PH, Mohler JL. NCCN guidelines updates: Prostate cancer and prostate cancer early detection. *JNCCN J Natl Compr Cancer Netw*. 2018;16(5S):620-623. doi:10.6004/jnccn.2018.0036