Decline in Prostate Cancer Screening by Primary Care Physicians: An Analysis of Trends in the Use of Digital Rectal Examination and Prostate Specific Antigen Testing

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Purpose: Prostate cancer screening by digital rectal examination and prostate specific antigen testing has been routine clinical practice in the United States for the last 25 years. Recent studies have shown a national decline in prostate specific antigen testing following the USPSTF (United States Preventive Services Task Force) recommendation against routine prostate specific antigen screening. However, to our knowledge the effect of this recommendation on digital rectal examination utilization remains unknown.

Materials and Methods: We used NAMCS (National Ambulatory Medical Care Survey) to characterize trends in the rate of digital rectal examination and prostate specific antigen testing by primary care physicians in men older than 40 years presenting for preventive care. From 2005 to 2012 NAMCS contained 3,368 such visits (unweighted) for the study of digital rectal examination trends and 4,035 unweighted visits from 2002 to 2012 for the study of prostate specific antigen trends.

Results: Following the USPSTF recommendation the proportion of visits where digital rectal examination was performed decreased from 16.0% (95% CI 13.1–19.5) to 5.8% (95% CI 4.0–8.3, $p < 0.001$). Similarly, the proportion of visits where prostate specific antigen testing was performed decreased from 27.3% (95% CI 24.5–30.3) to 16.7% (95% CI 12.9–21.2, $p < 0.001$). This represents a relative 64% decrease in digital rectal examination and a 39% decrease in prostate specific antigen testing. Among men 55 to 69 years old the number of visits where digital rectal examination and prostate specific antigen testing were performed decreased 65% and 39%, respectively ($p < 0.001$).

Conclusions: Utilization of digital rectal examination and prostate specific antigen has declined significantly following the release of the USPSTF recommendation against prostate specific antigen screening. This suggests that prostate cancer screening is rapidly disappearing from primary care practice.

Key Words: prostatic neoplasms, mass screening, prostate specific antigen, digital rectal examination, practice guideline

Abbreviations and Acronyms

DRE = digital rectal examination

PCP = primary care physician

PLCO = Prostate, Lung, Colorectal and Ovarian

PSA = prostate specific antigen

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Digital rectal examination and PSA testing have been a part of routine preventive care in the United States for the last 25 years. While initial screening protocols in the early 1980s relied only on DRE, the absence of evidence supporting a definitive mortality benefit to DRE alone led to

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the addition of PSA as a second component to prostate cancer screening in the early 1990s.[1–11] Two large-scale, randomized, controlled trials of prostate cancer screening were subsequently initiated in part to address concerns regarding over diagnosis and overtreatment of prostate cancer with the use of PSA. In October 2011 following the discordant results of these trials the USPSTF issued a recommendation against routine PSA screening.[12] However, this recommendation failed to explicitly address the role and efficacy of DRE.

The USPSTF recommendation dramatically reshaped the landscape of prostate cancer screening and treatment in the United States. Multiple studies have demonstrated a national decline in PSA testing, reduction in prostate biopsies and even stage migration in diagnosed prostate cancers following the USPSTF recommendation.[12–16] However, the growing literature has largely omitted DRE, which has been a mainstay of prostate cancer screening for decades that predates PSA screening. To our knowledge the impact of the USPSTF recommendation on use of DRE remains unstudied.

Given expert concern that decreased prostate cancer screening may lead to adverse oncologic outcomes, it is critical that policy makers understand the downstream effects of the USPSTF recommendation not only on PSA but also on DRE use.[16] In this study we assessed temporal trends in DRE and PSA for prostate cancer screening by PCPs following the USPSTF recommendation.

METHODS

NAMCS is performed annually by the NCHS (National Center for Health Statistics) of the CDC (Centers for Disease Control and Prevention). NAMCS is based on a sample of patient visits to nonfederal, office based physicians. NAMCS estimates are derived by a multistage estimation procedure with each visit weighted to extrapolate national estimates. As such, each record on the data files represents between 1 and thousands of actual visits depending on the survey. The sampling weight is a product of the reciprocal of the sampling proportions at each stage in the multistage sampling process, including a post-ratio adjustment factor. National estimates are generated from samples so that each estimate is surrounded by a margin of error.[17]

Physician use of DRE and PSA testing for prostate cancer screening is captured by NAMCS. We utilized NAMCS data from 2002 to 2012 for analysis of trends in PSA testing and NAMCS data from 2005 to 2012 for analysis of trends in DRE since DRE is coded uniquely for these years. NAMCS previously included community health centers, which were excluded in 2012 and, therefore, analysis was restricted to noncommunity health center visits.[17] The NCHS institutional review board approved the protocols for NAMCS/NHAMCS (National Hospital Ambulatory Medical Care Survey), including a waiver of the requirement for patient informed consent.

NAMCS recommendations suggest use of a minimum of 30 unweighted observations to make reliable estimates, thus, precluding detailed characterization of the population that underwent DRE or PSA testing due to the limited number of examinations performed after release of the USPSTF recommendation. Of 1,279 unweighted observations after the recommendation only 68 showed that a rectal examination was performed and 180 showed a PSA test. Descriptive variables for each patient encounter included patient age, primary reason for patient visit, whether the physician was the patient PCP, and whether PSA testing and/or DRE was performed.

Statistical analysis was performed in accordance with NCHS recommendations, accounting for the complex survey design using STATA/SE™, version 13.1.[18] The Pearson chi-square test was used to compare aggregate rates of screening before and after the 2011 USPSTF recommendation. Sensitivity analysis restricted to 2010 and 2012 was performed. Trends were illustrated using a lowess curve for graphical purposes.

RESULTS

Between 2005 and October 2011, when the USPSTF first recommended against routine PSA screening, men 40 years old or older seeing their primary care physician for preventive care comprised 110 million weighted (2,089 unweighted) visits for the study of trends in DRE. To study trends in PSA testing before the USPSTF recommendation from 2002 to October 2011 men 40 years old or older seeing their PCP for preventive care comprised 146 million (2,756 unweighted) visits. Following the USPSTF recommendation from October 2011 to December 2012 there were 22 million (1,279 unweighted) visits eligible for study.

Figure 1 shows the annual proportion of visits where prostate cancer screening was performed. After the USPSTF recommendation the proportion of visits where DRE was performed decreased from 16.0% (95% CI 13.1–19.5) to 5.8% (95% CI 4.0–8.3, $p < 0.001$). Similarly, the proportion of visits where PSA testing was performed decreased from 27.3% (95% CI 24.5–30.3) to 16.7% (95% CI 12.9–21.2, $p < 0.001$). This translates to a relative 64% decrease in DRE and a relative 39% decrease in PSA testing after release of the USPSTF recommendation. Sensitivity analysis comparing only 2010 to 2012 demonstrated a significant decrease during these survey years in PSA testing and DRE ($p = 0.003$ and <0.001, respectively).

We performed subset analysis in men 55 to 69 years old, for whom PSA guidelines are discrepant.[12,19,20] The rate of digital rectal examination in this group decreased from 18.2% (95% CI 13.9–23.6) to 6.3% (95% CI 4.0–9.8, $p < 0.001$). The rate of PSA testing among these men decreased from 32.6% (95% CI