

# Underutilization of Digital Rectal Examination When Screening for Prostate Cancer

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**Background:** Screening for prostate cancer is controversial. American Cancer Society and American Urology Association recommend screening with both digital rectal examination (DRE) and prostate-specific antigen (PSA) testing. Often, PSA testing is not combined with DRE when screening for prostate cancer.

**Methods:** We collected a list of veteran outpatients who had PSA testing performed between June 1, 1998, and September 30, 1998, from our computerized database. We reviewed their records for documentation of age, race, urinary symptoms, family history of prostate cancer, DRE, and professional training and sex of the health care provider.

**Results:** Of the 588 records reviewed, DRE was not performed in 311 patients (52.9%). Digital rectal examination was not performed in 276 (53.2%) of 519 patients

who had a PSA level less than 4.0 ng/mL; in 202 (58.7%) of 344 patients by male providers and in 109 (44.9%) of 243 patients by female providers ( $P < .001$ ); and in 231 (61.1%) of 378 patients by doctors of medicine (MDs), 24 (40%) of 60 patients by physician assistants (PAs), and in 56 (37.3%) of 150 patients by nurse practitioners (NPs) (MDs vs PAs,  $P < .001$ ; MDs vs NPs,  $P < .001$ ; and NPs vs PAs,  $P = .42$ ).

**Conclusions:** Digital rectal examination is underutilized when screening for prostate cancer. This leads to nondetection of some prostate cancers. Although the DRE rate was poor among all health care providers, female providers and physician extenders outperformed male providers and physicians, respectively.

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**P**ROSTATE CANCER IS THE MOST commonly diagnosed cancer in men (excluding skin) and the second leading cause of death due to cancer.<sup>1</sup> It is diagnosed in about 1 in 10 men.<sup>2</sup> It was estimated that in 2001, approximately 198 100 new cases and 31 500 prostate cancer-related deaths occurred in the United States.<sup>3</sup> Significant risk factors include, but are not limited to, race and age.<sup>4,5</sup> The peak age at diagnosis is the seventh decade. The incidence of prostate cancer is rising worldwide, caused mainly by demographic factors, particularly the increasing elderly population and, more importantly, the increasing number of cases identified following prostate-specific antigen (PSA) testing.<sup>6</sup>

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Screening for prostate cancer is controversial.<sup>7-11</sup> To our knowledge, solid evidence of effectiveness of screening combined with early treatment to lower prostate cancer mortality has not been shown. However, screening for prostate

cancer has been advocated by American cancer and urology societies largely because there is good evidence that administration of the test for PSA results in the detection of cancers at an early stage.<sup>12</sup> In November 1996, the National Center for Health Statistics recorded a decrease in prostate cancer mortality. There is indirect evidence suggesting that prostate cancer screening of men older than 50 years decreased the incidence of distant disease, which influences the mortality rate.<sup>13</sup>

Prostate cancer can be diagnosed by an abnormal finding by digital rectal examination (DRE), serum PSA test, and/or transrectal ultrasound (TRUS), with confirmation by biopsy. Each test identifies a proportion of cancers, with higher rates of detection when they are used in combination.<sup>14</sup> Most organizations recommending screening for prostate cancer advocate the combination of DRE and PSA testing.<sup>15-17</sup> The overall detection rate of cancer in the screened population is 2.5% by DRE, which increases to 4.5% with a combination of PSA test, DRE, and TRUS.<sup>18</sup> The positive predictive value of DRE ranges from 4% to 11% in men with PSA levels of 0 to 2.9 ng/mL

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## METHODS

**Table 1. Patient Demographics and Number Who Had Undergone DRE Within 6 Months of PSA Testing**

	All Patients	White	African American	Hispanic
Age, mean $\pm$ SD, y	66.3 $\pm$ 10.7	66.2 $\pm$ 10.7	59.2 $\pm$ 10.6†	67
No. in each age group, y				
All ages	588	564‡	23	1
31-40	6	6	0	0
41-50	34	29	5	0
51-60	133	125	8	0
61-70	188	180	7	1
71-80	189	187	2	0
81-92	38	37	1	0
No. (%) who had undergone DRE in each age group, y				
All ages	276 (46.9)	267 (47.3)	10 (43.5)	0
31-40	1 (16.7)	1 (16.7)	0	0
41-50	6 (17.6)	5 (17.2)	1 (20.0)	0
51-60	67 (50.4)	64 (51.2)	3 (37.5)	0
61-70	103 (54.8)	99 (55.0)	5 (71.4)	0
71-80	86 (45.5)	85 (45.5)	1 (50)	0
81-92	13 (34.2)	13 (35.1)	0	0

Abbreviations: DRE, digital rectal examination; PSA, prostate-specific antigen.  
 † $P < .002$  compared with the age of the whole group.  
 ‡In fiscal year 2000, 82% of veterans enrolled at the Stratton VA Medical Center were white, 7.0% were African American, and 1.0% were Hispanic. The percentage of whites in this study is significantly increased ( $P < .001$ ) compared with these demographics.

**Table 2. Number of Patients Who Had Undergone DRE Within 6 Months of PSA Listed by PSA Level and Sex and Type of Health Care Provider**

	Total No.	No. (%) With DRE
Any PSA	588	276 (46.9)
PSA $< 4.0$ ng/mL	519	243 (46.8)
PSA 1.0-4.0 ng/mL	283	135 (47.7)
Female provider	243	134 (55.1)*
Male provider	344	142 (41.3)
MD provider	378	147 (38.9)
PA provider	60	36 (60.0)†
NP provider	150	94 (62.7)†

Abbreviations: DRE, digital rectal examination; MD, doctor of medicine; NP, nurse practitioner; PA, physician assistant; PSA, prostate-specific antigen.

\* $P = .001$  compared with male providers.

† $P < .001$  compared with MD providers.

and from 33% to 83% in men with PSA levels greater than 3.0 to 9.9 ng/mL. In one study, DRE alone allowed detection of 264 (55.8%) of 473 cancers; 82 (17.3%) of the 473 cancers would have remained undetected by PSA-based screening alone.<sup>19</sup>

In our medical center, we have observed that serum PSA testing is commonly performed but DREs appear inconsistent. To better define suspected underutilization of DRE, we decided to study the frequency of combining DRE with PSA testing when screening for prostate cancer.

The study was approved by the institutional review board of Stratton VA Medical Center, Albany, NY. We collected a list of veteran outpatients who had PSA testing performed between June 1, 1998, and September 30, 1998, from our computerized database. We reviewed their records for documentation by any health care provider of age, race, urinary symptoms, family history of prostate cancer, DRE, and professional training and sex of the health care provider. Patients followed by the Division of Urology and patients who had a history of prostate cancer were excluded from the study. If DRE was performed, then the timing of DRE in relation to PSA testing was recorded.

We considered DRE to have been performed if it was done within 6 months of performing the PSA test. A 6-month period was allowed in the study because some health care providers may not perform DRE and PSA testing at the same visit. The 6-month period allowed for reasonable time for a provider to perform a DRE in addition to PSA testing. We considered DRE to have been performed irrespective of who had performed it (eg, a PSA test might have been ordered by a primary care provider, but the DRE was done by a gastroenterologist for another reason). If there was no documentation of patients having urinary symptoms or family history of prostate cancer, then they were considered to be absent.

Prevalence of DRE was determined for each major provider group (physician assistants [PAs], nurse practitioners [NPs], and doctors of medicine [MDs]) and for sex of the provider. In statistical analysis, proportions of specific groups where DRE was performed were analyzed for significant differences using  $\chi^2$  analysis ( $P < .05$  was considered to indicate a significant difference).

## RESULTS

Study participant data for patients who had undergone PSA testing is given below.

Characteristic	No. of Patients
Total patients	1093
Prior diagnosis of prostate cancer	263
Unavailable records/data	242
Total excluded	505
Total evaluated	588
Age, 50-74 y	335

Number of patients between ages 50 and 74 years is given because this age group is screened most for prostate cancer.

**Table 1** gives the patient demographics and the number of patients who had DRE performed within 6 months of PSA testing (for all patients,  $n = 276$  [46.9]). The mean age of African Americans was significantly younger compared with the rest of the study group. Also, there was disproportionately less representation of African Americans for screening for prostate cancer.

**Table 2** gives the number of patients who had undergone DRE within 6 months of PSA testing as grouped by the sex of the health care provider and by whether the provider was a physician or a physician extender. Physician extenders performed DREs significantly more often than physicians. Among all health care providers, female providers performed DREs significantly more often than their male counterparts. The number of asymptomatic patients younger than 50 years and older than 74 years

who had PSA testing performed was 161 (27.4% of the total).

## COMMENT

While screening for prostate cancer remains controversial, in the present study, the decision had already been made to screen (as demonstrated by the PSA test). Since screening is already occurring, it should be done in a manner that current evidence suggests will maximize its usefulness. Our study clearly shows that DRE is underutilized in our medical center when screening for prostate cancer. If one were to accept that screening for prostate cancer is indicated, then the implications of not performing DRE are many. Digital rectal examination is most important in those with a "normal" PSA level because individuals with an elevated PSA level receive, presumably, further examination. Prostate cancer is diagnosed in 3% to 5% of the screened population by combining DRE, PSA test, and TRUS.<sup>19</sup>

According to the 2000 census, there are 28.5 million men between the ages of 50 and 74 years in the United States (<http://www.census.gov>). Assuming that 10% of these men would not be eligible for prostate cancer screening due to comorbidities, approximately 25 million are eligible for screening. Assuming a 3% detection rate for prostate cancer by DRE and PSA testing, an estimated 750 000 would be diagnosed by these tests. According to one study, 17% of the prostate cancers diagnosed were by DRE alone when the PSA level was less than 4.0 ng/mL.<sup>10</sup> Assuming that only 10% of the cancers are detected by DRE alone, 10% of 750 000 (75 000) cancers of the prostate would be diagnosed by performing DRE alone. As in our study, if DRE is not performed in 50% of those screened, then about 37 500 cancers would not be diagnosed in the United States. Another way to look at the numbers would be if all 25 million eligible men are screened, about 80% (ie, 20 million) would be expected to have a PSA value less than 4.0 ng/mL. Assuming a cancer detection rate of 3% by combining DRE and PSA testing, 600 000 cancers would be detected. Assuming a 10% detection rate by DRE alone, then 60 000 cancers would be diagnosed by DRE alone. As in our study, if 50% of DREs are not performed, then 30 000 cancers would miss detection. We believe that the number of undiagnosed cancers is even higher, since many eligible individuals are not screened.

The omission rate for DRE screening for prostate cancer was highest among MDs (61.1%) compared with PAs (40%) and NPs (37.3%). There was no difference between PAs and NPs. Female health care providers, regardless of their professional status, performed significantly better than their male counterparts. Besides the risk that some prostate cancers may go undetected, omission of DRE eliminates an opportunity to examine the stool for occult blood. Some possible reasons for omission of DRE are lack of realization that both DRE and PSA testing are recommended when screening for prostate cancer, the perception that PSA testing is superior, and the belief that DRE will not add further to PSA testing. Also, it is easier and quicker to order a blood test than to perform DRE. We can only speculate as to why

physician extenders outperform physicians. Physician extenders are allotted more time to evaluate each patient—the lower one is in provider hierarchy, the more diligent one is in adhering to the recommendations. Physicians presumably are more aware of the value of each test and are less likely to perform it if they perceive that DRE does not add much to PSA testing.

Although neither the American Cancer Society nor the American Urology Association sets an upper age limit when screening should stop, screening for prostate cancer is generally done for men between ages 50 and 74 years. Earlier screening is recommended for high-risk groups such as African American men and men with a family history of prostate cancer.<sup>17</sup> Screening is recommended for anyone who has a life expectancy of at least 10 years.<sup>17</sup> The value of testing outside published age and risk range recommendations is not clear. Our study reveals that PSA testing is often performed in asymptomatic individuals without any risk factors beyond being in the age group it is recommended for. Due to the nature of our veteran population, the number of patients younger than 50 years was small. Screening for prostate cancer in people outside the published age range recommendation is not uncommon, as reflected in a study in which urologists and family practitioners were surveyed: the mean age of screening initiation was 45±7 years by urologists and 43±7 years by family physicians.<sup>20</sup>

Cancers of the prostate detected by DRE alone for which the PSA level is "normal" are usually small and confined. But treatment of early cancer of the prostate is evolving, and there are new treatment modalities available now. Also, there has been some encouraging news about the declining mortality and declining incidence of distant-stage disease from prostate cancer, although it is unlikely that the entire decline is due to early detection by screening for prostate cancer. However, the decline seen in the incidence of distant-stage disease holds the promise that testing for early prostate cancer will lead to decline in prostate cancer mortality. Also, there are newer tests for detecting prostate cancer early, which may facilitate working toward this goal.<sup>21</sup> Digital rectal examination is relatively noninvasive, nonmorbidity, and inexpensive. Its effectiveness is dependent on the skill and experience of the examiner.

We conclude that prostate cancer screening guidelines of combining DRE with PSA testing are often not followed by primary care providers. This leads to non-detection of some prostate cancers. Although the DRE rate was poor among all health care providers, female providers and physician extenders outperformed male providers and physicians, respectively. Whether screening for prostate cancer by routine DRE reduces mortality remains to be determined.

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## Correction

**Error in Figure.** In the Original Investigation by McDavid et al titled “Cancer Survival in Kentucky and Health Insurance Coverage,” published in the October 13 issue of the ARCHIVES (2003;163:2135-2144), an error occurred in the Figure on page 2142. Figure part B should have been labeled C, and Figure part C should have been labeled B. The journal regrets the error.