



Prostate Cancer as a Public Health Issue in North Carolina

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Prostate cancer is a significant health problem for men in North Carolina, particularly for black men, who have one of the highest rates of prostate cancer mortality in the nation. Despite the magnitude of the problem, the value of prostate cancer screening is hotly contested among medical researchers, clinicians, and patient advocates. The Early Detection Subcommittee of the North Carolina Advisory Committee on Cancer Coordination and Control (NCACCCC) identified prostate cancer as one of four cancers for which early detection was a key issue, and set forth two goals: (1) develop a consensus regarding the public health message about prostate cancer screening, including the benefits and risks of early detection; and (2) develop research priorities for prostate cancer issues in North Carolina. Reaching these goals will require a clear understanding of the epidemiology of prostate cancer in the state, as well as the implications of screening and treatment for the disease. In this paper we do the following: (1) review prostate cancer epidemiology in North Carolina; (2) discuss the key controversial points related to screening; (3) briefly review prostate cancer research in the state; and (4) present the Advisory Committee's current recommendations on screening for prostate cancer.

Prostate Cancer in North Carolina

From 1991 to 1995, the age-adjusted incidence of prostate cancer in North Carolina was 133/100,000 and mortality was 31/100,000; the incidence rate was 123/100,000 among white men in contrast to a rate of 180/100,000 among black men.¹

Black men in North Carolina have one of the highest mortality rates of prostate cancer in the nation.² They have a slightly higher rate of regional spread at diagnosis (22% vs. 20% among white men), but over twice as many black men have distant metastases at diagnosis compared to white men (17% versus 7%). One potential explanation for this disparity relates to health-seeking behaviors regarding prostate cancer screening and treatment.

Data from the North Carolina Central Cancer Registry reveal that prostate cancer incidence rates for both blacks and whites increased between 1990 and 1995. There was a shift to diagnosis at earlier stages during this time, but blacks continued to present with significantly more regionally and distantly spread disease.

In 1980, 24 of every 100,000 white men died of prostate cancer, but this had decreased to 20/100,000 by 1997. In contrast, 56 of every 100,000 white men died of prostate cancer in 1980, but this had risen to 59/100,000 in 1997. The death rate for black and white men combined fell between 1980 and 1997 from 29/100,000 to 25/100,000 (despite the increased mortality rate for white men). Some observers have attributed the drop in mortality to the increased use of PSA screening, but others have noted that the drop in national prostate cancer mortality occurred too quickly to be caused by earlier detection of a relatively slowly progressive disease.⁴

Prostate Cancer Screening in North Carolina. The 1998 Behavioral Risk Factor Surveillance survey found that 40% of North Carolina men aged 40 and older reported having discussed prostate cancer with their doctor in the preceding year (see Table), and the percentage was greater for whites

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Table 1. Prostate cancer screening among North Carolina men aged 40 years or more

	n	Doctor discussed screening in past year ² (%)	Ever had digital exam (%)	Had digital rectal exam within past year (%)	Ever had prostate specific antigen test (%)	Had prostate specific antigen test within past year
Overall	567	40.2±5.2	68.8±5.3	41.9±5.1	45.8±5.7	30.8±4.7
Age						
40-49	190	23.9±6.9	58.7±8.7	28.8±7.6	25.5±8.1	18.6±6.6
50-64	193	41.8±9.6	68.9±10.0	43.6±9.1	47.6±10.2	33.2±8.8
65+	184	61.0±9.0	82.8±8.3	59.0±9.0	71.8±8.2	45.3±8.8
Race						
White	449	42.0±5.8	69.9±6.0	43.2±5.7	48.2±6.4	32.8±5.4
Black	100	35.6±11.8	66.7±12.0	40.7±12.3	38.6±13.4	24.2±10.8
Residence ³						
Urban	201	39.8±7.8	74.8±7.8	44.0±7.9	47.0±8.7	26.2±6.5
Rural	366	40.5±6.9	64.9±7.1	40.6±6.7	45.1±7.5	33.8±6.5
Household Income (\$/yr)						
< 15,000	74	28.2±13.9	61.3±20.1	33.1±14.3	40.9±18.3	26.0±12.7
15,000-24,999	106	38.3±11.2	59.2±12.0	39.2±11.5	34.3±11.6	25.5±10.3
25,000-49,999	179	42.4±8.5	72.3±8.0	45.9±8.5	44.8±8.8	33.7±8.0
50,000+	125	38.3±11.2	77.0±8.8	43.7±11.3	48.2±12.6	34.1±10.5
Education Level						
Less than HS	134	35.8±10.2	57.9±12.0	34.9±9.9	41.3±11.9	
Grad HS Grad/GED	163	37.2±9.9	63.2±10.8	40.2±9.6	40.7±11.0	28.0±9.2
Some College/Tech. School	128	39.9±9.9	78.9±7.8	45.0±10.0	48.5±10.4	33.0±9.2
College Graduate	140	47.4±10.9	75.5±8.8	47.0±10.5	53.4±11.7	39.9±10.2

CI = 95% for all data

¹Data have been weighted to reflect the age and race distribution of adult men in North Carolina.

²Doctor or other health professional talked with respondent within past 12 months about having any kind of screening test or exam to check for prostate cancer.

³Urban residence was defined as residence in a county whose population was at least 50% urban according to the 1990 census.

Source: 1998 Behavioral Risk Factor Surveillance System, Division of Community Health, NC DHHS, (919) 733-7081, 5/99.

(42%) than for blacks (36%). The likelihood of a doctor-patient dialogue about prostate cancer was significantly greater among men with more education and those with higher incomes.

Overall, 42% of men reported having had a digital rectal examination (DRE) in the preceding year (43% of white men and 41% of black men). Men with higher incomes and more education were more likely to report having had a recent DRE, and were more likely to have ever had a DRE. Approximately 31% of men surveyed reported having had a Prostate Specific Antigen (PSA) level measured in the past 12 months. Nearly 33% of white men reported having been tested, in contrast to 24% of black men; again, those with

higher incomes and more education were more likely to have been tested. These findings are consistent with data reported by Demark-Wahnefried et al³ who found that medical center screenings for prostate cancer attracted predominantly (84-89%) white married men, many of whom had undergone a prior prostate cancer screening.

To Screen or Not to Screen: The Controversy

To be effective, population-based screening for any disease must meet five criteria: (1) the disease must be an important health problem; (2) the screening program must identify the

disease in a localized, asymptomatic phase; (3) the screening tests should have adequate sensitivity, specificity, and predictability; (4) the possibility of curing early-stage disease must be significantly greater than of curing late-stage disease; and (5) the screening test must lead to improved outcomes (for example, that those screened live longer than those not screened). The controversy surrounding prostate cancer screening hinges on the extent to which current tests and treatments meet these criteria.

Two widespread prostate cancer screening tests are the DRE and the PSA blood test.⁵ In general, the DRE is less sensitive than the PSA, but the PSA itself has been criticized for lack of sensitivity and specificity.⁶ The PSA test sensitivity is 79% (meaning that the test will *fail* to detect cancer in 21% of men tested), and specificity is approximately 59% (meaning that in 41% of men with an elevated PSA value, prostate cancer is *not* present).⁷ It may be possible to improve specificity,⁶ but this is not yet proven. There are at least two schools of thought about the appropriateness of routine screening for prostate cancer and whether to pursue aggressive treatment when the disease is diagnosed.

The Case for Routine PSA Screening. The American Urological Association, the American College of Radiology, and—until recently—the American Cancer Society have endorsed screening for prostate cancer on the assumption that improved detection methods can identify prostate cancer in its early stages when it is still confined and can be more easily treated and, possibly, cured. The idea is that, in men who are not screened, the disease will be detected only when it is advanced and therefore incurable.⁶ Early detection through routine screening, the argument goes, may well mean the difference between life and death.⁷ These groups both recommend an annual DRE and a PSA test for men starting at age 50.

The Case Against Routine PSA Screening. Several professional groups—the US Preventative Services Task Force, the American Academy of Family Physicians, the American College of Physicians, and the National Cancer Institute—either recommend against or take no stand regarding routine PSA screening. Opponents of population-based prostate cancer screening cite several concerns. First is the lack of scientific evidence proving that PSA screening reduces disease-specific mortality.^{8,9} Trials to test this hypothesis are currently under way, but results will not be available for several years. Second, although the PSA test is the best way currently available to detect prostate cancer in its early stages, it lacks adequate specificity or sensitivity.¹⁰ Third, evidence suggests that not all cases of prostate cancer are life-threatening and some may not require treatment at all.¹⁰ The implication of the latter point is that routine screening would reveal cancers that, if they remained undetected, would never result in illness or death.¹¹ Indeed, the side effects from

treating these indolent cancers may outweigh the purported benefits of treatment.

Experts on both sides of the screening issue agree that screening should be avoided in men who are over 70 years of age or who have a life expectancy of less than 10 years because the disease is unlikely to shorten life expectancy in this population.¹² Opponents argue further, that PSA screening is not cost-effective and can lead to a reduced quality of life^{6,11} because both prostatectomy and radiation treatment can cause urinary incontinence and impotence.

It is likely that prostate cancers vary in aggressiveness, but to date there are no screening tests that can differentiate aggressive from non-aggressive cancers. Therefore, while it may be premature to recommend routine screening of *all* men, routine screening of targeted, high risk populations like black men and those with a family history of prostate cancer may be appropriate.^{11,13} Nevertheless, just as there are no results from controlled trials of generalized PSA screening, no empirical data support the strategy of screening high-risk individuals. In the past year, the American Cancer Society revised its earlier recommendation about general screening, and now urges men 50 and older (40 and older for black men) to consult their physician about the need for prostate cancer screening.

Prostate Cancer Research in North Carolina

A Research Roundtable convened by the Early Detection Subcommittee in May 1997 reviewed present knowledge about prostate cancer screening and treatment, the epidemiology of prostate cancer in North Carolina, and prostate cancer research currently under way in the state. Based on its review, the Roundtable identified two priorities: (1) further research using databases to collect and assess prostate cancer screening, diagnosis, and outcome, and (2) communication with and education of the lay and medical public about prostate cancer risk.

Database Assessment and Development. Database research has focused largely on explaining the racial differential of prostate cancer in North Carolina. Investigators have attempted to identify factors that might explain why black men experience higher incidence rates of prostate cancer; present with later-stage, more aggressive disease; and have higher mortality rates. Additional research has focused on reaching high-risk men for both prevention and treatment.

Several studies have explored reasons for racial differences in prostate cancer incidence and mortality. Paskett et al¹⁴ reviewed hospital-based tumor registries in 13 North Carolina hospitals, focusing on differences in treatment of black and white men. Black men were more likely to be diagnosed at later stages than white men, to be older at the time of diagnosis, and to be symptomatic. Furthermore,

black men got more conservative treatment (“watchful waiting”) whereas Caucasian men were more likely to be treated with radical prostatectomy. Differential treatment patterns were evident even after the data were adjusted for stage at diagnosis. This study highlighted the need for community efforts to get black men into the health care system before they become symptomatic, and to assure proper and timely treatment in order to reduce prostate cancer mortality.

The data of Paskett et al contrast to those of Demark-Wahnefried et al,¹⁵ who conducted telephone interviews with 231 men who were diagnosed with prostate cancer, evenly stratified with regard to localized and metastatic disease. The 117 white and 114 black participants were questioned about the various treatment options they had discussed with their doctors. This study found that the doctor was the primary factor influencing the patient’s treatment decision, and that black and white men received comparable treatment. The investigators concluded that screening, behavioral, and genetic factors—rather than differences in treatment—tended to explain racial differences in mortality. This study recruited participants statewide while Paskett et al used data from men diagnosed with prostate cancer in 13 hospitals. The differences in conclusions may be a result of selection bias in the Demark-Wahnefried et al study, or there might have been missing treatment information in the registries from which Paskett et al obtained information.

Aldrich et al¹ reviewed the North Carolina Central Cancer Registry database, focusing on the increased prostate cancer incidence and mortality rate among black men. They confirmed that advanced stage at diagnosis was associated with higher mortality, and that hospital size was related to stage at diagnosis. Smaller facilities reported a greater proportion of early-stage cancers; 24% of prostate cancers in North Carolina were diagnosed in hospitals with fewer than 150 beds as compared to the national average of 5.2%.

An examination by Conlisk et al¹⁶ of demographic and behavioral factors related to stage at diagnosis of prostate cancer demonstrated inverse associations between cancer stage and personal income, and between cancer stage and health insurance status in black men but not in white men. There were similar inverse associations between prostate cancer awareness, PSA screening, and stage at diagnosis among black men but not among white men. Knowledge of prostate cancer risk factors was not significantly associated with stage at diagnosis for either race, and less than one third of men—again, of either race—knew that black men were at increased risk for dying of prostate cancer.

In a survey study of over 1700 men attending prostate

cancer screening campaigns throughout North Carolina, Demark-Wahnefried et al³ found that mass screening programs primarily attracted white men who already were receiving regular cancer screening. These results underscore the need to improve screening opportunities for underserved populations.

Attempts to explain the striking differences in prostate cancer epidemiology between black and white men has led to research into prostate cancer etiology and risk factors. In a case control study, Bostick et al¹⁷ examined the association between biomarkers and diet and other prostate cancer risk factors, searching for potential causes to explain racial discrepancies in prostate cancer incidence. Three biomarkers—

cadmium exposure (measured as urine excretion of cadmium), markers of oxidative damage to cells (measured as DNA base damage), and drug metabolism genes (phenotypes and genotypes)—were studied in 112 cases and 258 race-matched controls. Preliminary analysis suggests that farm work, dietary factors (specifically, increased calorie intake and the consumption of red meat and well-cooked meat), and the NAT1*10 genotype are associated with increased risk for prostate cancer. Several other epidemiologic studies are currently under way in North Carolina to explore other gene-environment interactions and their potential contribution to this disease.

Risk Communication and Education.

Educating high-risk men about prostate cancer is central to improving screening practices. Paskett has proposed an education intervention for black men at high risk

that will do the following: (1) describe prostate cancer and its symptoms, (2) explain “risk,” (3) discuss options for screening and the interpretation of abnormal values, and (4) describe diagnostic and treatment options. If successful as a pilot study, this proposal will lead to a large-scale education program that will determine the effect of improved knowledge, attitudes and screening practices on prostate cancer mortality and morbidity in black men.

Current Recommendation for Prostate Cancer Screening

The Early Detection Subcommittee’s review of prostate cancer epidemiology, the screening controversy, and prostate cancer treatment side effects made it difficult to arrive at a consensus recommendation on prostate cancer screening. The high prostate cancer mortality among African-American men in North Carolina and the lack of randomized

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clinical trials clearly demonstrating the efficacy of screening fueled a debate among committee members on the appropriate language for communication to the public. The following recommendation was accepted by the NCACCC on April 28, 2000:

"All men should be made aware of the current state of knowledge on prostate cancer screening, and, starting at age 50, men should speak with their physician about whether prostate-specific antigen (PSA) screening and/or digital rectal examination (DRE) is appropriate for them. Men in high-risk groups such as African-Americans or those with a strong familial predisposition (i.e., one or more affected first-degree relatives), should discuss screening with their physician at a younger age (i.e. 40 years). It is possible that PSA screening of asymptomatic men detects prostate cancers at an earlier stage than prostate cancers diagnosed after symptoms occur. However, currently there is insufficient scientific evidence that periodic screening with PSA and/or DRE reduces prostate cancer mortality. Therefore at this time, the Advisory Committee supports collaborative physician-patient informed decision making rather than a general recommendation.

"The Advisory Committee recommends that all scientific data related to prostate cancer screening be re-examined again in five years (2004). If, however, evidence regarding the effects of screening on prostate

cancer mortality becomes available before that scheduled review, the Advisory Committee recommends immediate review of the current policy."

Efforts to disseminate the Advisory Committee recommendation on prostate cancer screening will focus on medical professionals as well as on the general public. This paper is a part of that effort. Educational offerings for medical personnel will explore the issues surrounding prostate cancer screening, diagnosis, and treatment to assist in management of individual patients.

Education for the general public will take the form of pamphlets encouraging men to speak with their doctors about prostate cancer screening. One pamphlet is included as a tear out sheet in this journal. It may be copied and given to patients or left in the office waiting area. Another set of pamphlets currently under development will be aimed at men at average risk and those at high risk. The education brochures will instruct men to speak with a doctor to determine whether or not to be screened. By providing complete information about prostate cancer screening, doctors and patients together can develop an individual screening plan that meets the physical and psychological needs of the patient until further research is available to clarify the question of who should be offered widespread prostate cancer screening.

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