Prostate Cancer Profile:
For the State of Nevada

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DoIT Web Development Team
LMDeSantis, March 2004

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Members Approved by Governor's Task Force

Members Approved by Nevada Comprehensive Cancer Council

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January 2003

STATE OF NEVADA DEPARTMENT OF HUMAN RESOURCES

NEVADA STATE HEALTH DIVISION

Prostate Cancer Profile

for the State of Nevada

Prostate Cancer Profile
for the State of Nevada

Governor's Task Force on Prostate Cancer
Nevada Cancer Council
American Cancer Society

Developed by:
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Bureau of Community Health

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PROSTATE CANCER PROFILE FOR NEVADA

Approved by the Governor's Task Force on Prostate Cancer on November 25, 2002

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PROSTATE CANCER PROFILE FOR NEVADA

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SECTION-I

Introduction

The Nevada State Health Division's Bureau of Community Health is pleased to present the first prostate cancer profile of its kind in Nevada. This profile is the result of collaboration between the Nevada State Health Division, the University of Nevada, Reno, the American Cancer Society and the Governor's Task Force on Prostate Cancer.

Target audiences for this profile are health planners at the state, local, and federal levels who have been trained in basic epidemiology and biostatistics. However, the final and broader intended audience includes cancer advocates and legislative staffers. This profile is designed to meet the educational needs of the public, health care providers, and policy makers, and to assist health professionals, volunteers, and staff of cancer control organizations, community groups, and others who are working to reduce the burden of cancer throughout Nevada and the nation.

The profile goals and objectives include:

1. Providing accurate and up-to-date information about prostate cancer in Nevada.

2. Providing a foundation for effective and productive discussion and advocacy for prostate cancer control.

3. Providing an adequate resource guide to the readers.

4. An important goal for this profile is to serve as a model, a guide, or an incentive to the whole medical/public health community in Nevada to create similar disease profiles that are strongly needed for many other prevalent disease entities including:

   - Cancer (breast, colorectal, skin and tobacco-related)

   - Chronic diseases (cardiovascular, chronic obstructive pulmonary disease, diabetes mellitus, morbid obesity, and osteoporosis)

   - Communicable diseases (HIV/AIDS, Tuberculosis, Syphilis, Gonorrhea and Chlamydia).

This profile focuses on:

1. **Education:** raising awareness and providing education about cancer incidence, mortality, risk factors, and potential benefits of early detection.

2. **Prevention**: helping the public understand the root causes of disease and decrease modifiable risk factors that may increase the chances to develop cancer and other chronic/communicable diseases.

3. **Early detection:** explaining the availability and reliability of current screening tests.

This prostate cancer profile describes the burden of cancer in Nevada and includes the most recent actual and projected numbers of new prostate cancer cases and deaths (incidence and mortality rates), stage of disease at time of diagnosis, and its relation to survival rates. It further characterizes the cancer burden in a standard format in order to assist in setting cancer control priorities at the state, county and local levels.

The profile has seven chapters. First chapter **(*Anatomy and Pathophysiology*)** describes the anatomical location of the prostate gland in the pelvic, illustrating its connection to other pelvic organs such as the urinary bladder and the rectum. This chapter explains the major functions and dysfunctions of the prostate gland. It is directed primarily to the general public in order to increase their general knowledge regarding the prostate gland as a pelvic organ.

The second chapter **(*Epidemiology*)** describes the burden of prostate cancer, analyzing incidence and mortality rates, and comparing disease trends in the nation and in Nevada. This chapter is very informative especially for policy makers who base their actions on data-driven decisions.

Health care providers and professionals who are interested in the early detection of prostate cancer and want to learn more about the effectiveness of screening tests and men who are interested in prostate cancer screening and want to make an informed decision, especially those who are at high risk to develop this cancer (men with positive family history and African American men), will benefit from reading the third chapter **(*Screening*)**.

The fourth and fifth chapters **(*Staging, Grading and Treatment*)** will be most useful for prostate cancer patients, their families, and treating physicians. Reading chapters four and five will help cancer survivors and their families understand the extent, significance, and prognosis of the disease, and may help both the patient and his provider chose the most appropriate treatment modalities and subsequent disease management options.

The last two chapters six and seven **(*Conclusion and Resources*)** are useful for a variety of audiences including advocacy groups, providers, policy makers, volunteers and those who are interested in reducing the prostate cancer burden in Nevada.

In order to assure that this document accurately reflected the state of the research on prostate cancer, several screening guidelines were listed and all available arguments for and against screening are presented.

It is our hope that this comprehensive profile would help patients and health care providers to be adequately prepared to discuss prostate cancer screening, diagnosis, and treatment, and empower patients to make informed decision for themselves.

Rationale

Data from the 2000 U.S. Census showed that Nevada has been, for approximately half a century and remains, the fastest growing state in the nation, especially among older age groups and retired persons.[10] The nature of this population growth increases the potential significance of prostate cancer for the male population in this state. Being a male; alive, and aging are the most important risk factors for developing prostate cancer.[11] One in three men will develop prostate cancer during their lifetime.[11]

In its 2001 spring session, the Nevada Legislature passed Senate Bill (SB318), which created the Nevada Governor's Task Force on Prostate Cancer. The Task Force mission is to help the Nevada State Health Division (NSHD) and its partner organizations educate the public and health care providers, provide outreach to populations at risk, and raise general awareness about the importance of controlling this disease.

In the absence of firm scientific evidence, and the lack of a solid medical community consensus regarding the effectiveness of prevention, screening, and early detection in reducing mortality and morbidity resulting from prostate cancer,[2] NSHD faces significant challenges. Utilizing the available evidence, the Task Force must be objective and courageous in assessing health care providers' interests in controlling the disease while fulfilling the public need for accurate information.

In addition to several other requirements, Senate Bill (SB318) directed the Nevada Governor's Task Force on Prostate Cancer and the NSHD to complete and submit a report on prostate cancer to the Legislature.

Responding to these legislative mandates and recognizing the importance of addressing the above challenges, in January 2002, NSHD started enhancing the Nevada-specific scientific database for prostate cancer. Furthermore, NSHD intensified its collaboration with several key state and national partners including the Nevada Medical Association, *UsToo!* International, the Family-to-Family Program, the Public Employees' Benefits Program, the American Cancer Society, and the National Cancer Institute, to accomplish the mission of developing a Nevada-specific profile for prostate cancer. This profile will be the first ever developed for any disease entity in Nevada. The profile will empower state health officials to make data-driven decisions and deliver appropriate and precise health messages that will enable health care providers, public health educators, the general public, and policy-makers to make informed decisions regarding prostate cancer screening, early detection, and control.

Epidemiology

Rates/Statistics

On average 209,900 new cases of prostate cancer are diagnosed each year and more than 41,800 deaths are attributed annually to this malignancy in the United States.[18] Prostate cancer is most common among men aged 65 years and older and about (80%) of all men with clinically diagnosed prostate cancer cases are part of this age group.[6] For unknown reasons, the incidence of prostate cancer among African American men is the highest known rate in the world.[4] At all ages, African American men with prostate cancer have a less favorable prognosis than their White counterparts. Five-year relative survival rate among African American men is lower than their White counterparts and among all racial/ethnic groups in the nation, African American men have the highest age-adjusted mortality rate.[4] African American men are usually diagnosed with prostate cancer at later stages.[5] This is mainly due to a lack of access to preventive medical care; especially the lack of access to screening and early detection services.[5]

Each year, since 1993, about 1,451 new cases of prostate cancer have been detected in Nevada, making this disease the most common form of cancer among Nevada men.[1, 17] Surpassed only by lung cancer, prostate cancer is the second leading cause of cancer death among men in Nevada and nationwide.[15] Recent projections of the American Cancer Society estimate that about 274 Nevada men will die from prostate cancer this year.[18]

Unfortunately, most significant risk factors for developing prostate cancer such as gender, age, race/ethnicity, and family history are not modifiable.[18] Because prostate cancer usually occurs at an age when other medical conditions and major causes of death, such as heart disease, stroke, and diabetes mellitus are very frequent, it is very hard to assess the actual number of prostate cancer patients who die as a result of the disease.[17]

Screening for prostate cancer has attracted considerable attention among health authorities at the federal and the local levels.[19] The purpose of the prostate cancer screening and control program is similar to any other population-based cancer screening program; to detect and treat early stage, sub-clinical, and asymptomatic disease in order to reduce cancer-related morbidity due to disease progression and to decrease disease specific mortality.[18] Surveillance Epidemiology End Result (SEER) National Cancer Registry recent data showed that:

- Survival with prostate cancer has steadily increased by more than 1% per year over the past two decades.[1]
- Men age 50 years or younger have the poorest five-year relative survival rates.[1]
- The clinical stage at time of diagnosis is the most important prognostic factor for prostate cancer survival.[1]
- The five-year relative survival rate of men with either localized (organ-defined) or regional stage cancer is over 99%, while men with distant metastasis have a relative survival rate of only about 38.8%. [1, 7]
- The ten-year relative survival rate is about 75% for organ-defined prostate cancer, but it drops to 55% for men with regional extension and to (15%) for men with distant metastasis.[1, 7]

Paralleling national trends, 76% of all prostate cancer cases diagnosed in Nevada is detected at the local stage while 14% are detected at the regional stage.[3, 17] Age-adjusted incidence rates of prostate cancer in Nevada, rose substantially since 1981, and peaked in 1992. Since 1993 the age-adjusted incidence rates of prostate cancer have declined by about 1(8%). [1, 7]

SEER data show that survival with prostate cancer has steadily increased by more than (1%) per year over the past two decades. Whether this increase reflects a lead-time bias resulting from the rising proportion of screening-detected localized cancers or from better treatment outcomes remains uncertain. Regardless, the five-year observed survival rate for men newly diagnosed with prostate cancer went up from 45.1% in 1973 to 66.9% in 1990.[18] The relative survival rate, defined as survival adjusted for other causes of death, has also improved, rising from 64% in 1973 to 92.9% in 1990. In the year 2000, the five-year relative survival rate of those patients whose tumors are discovered at the local and regional stage reached 100% with 67% of those surviving the cancer for ten years and 53% surviving fifteen years.[9]

Although the overall prognosis has improved, after controlling for the stage of disease, African-Americans still have a nearly fifteen percent lower five-year relative survival rate than non-Hispanic Whites.[18] Recent Nevada specific data show that the five-year relative survival rate for prostate cancer (all stages) in Hispanics, 78.8%, is comparable to that for non-Hispanic Whites, 82%. [1,17]

The clinical stage of disease at the time of diagnosis is the most important prognostic factor for prostate cancer survival. The five-year relative survival rate of men with either localized (organ-defined) or regional stage cancer is over 99%, while men with distant metastasis have a relative survival rate of only 38.8%. [8,18] By ten years, survival is still 75% for organ defined, but drops to 55% for men with regional extension and 15% for men with distant metastasis.[8, 1,18] Other factors affecting survival include the histological grade or the extent of cells' differentiation, age at diagnosis, and comorbidity.[8] Ten-year relative survival rate for both well-differentiated cancers and moderately differentiated cancers is 87%, but only 34% for poorly differentiated cancers. [1,8] Men age 50 years or younger have the poorest five-year relative survival, only 84.1%, compared to 96.8% for men in their seventies. Overall survival for older men, however, is low because their rate of cardiovascular mortality is high. [9]

Risk Factors

The strongest risk factors for developing prostate cancer are age, family history, and race. Prostate cancer is very uncommon in men younger than 50 years, but the incidence begins to increase with each subsequent decade. [11] Men with first-degree relatives diagnosed with prostate cancer have a two-fold increased risk, which increases to a five-fold risk if two or more relatives have prostate cancer.[18] African Americans are at increased risk for developing prostate cancer with a relative risk that is approximately twice that of non-Hispanic Whites. [5]

Dietary factors apparently influence the risk of prostate cancer. A high intake of dietary fat is associated with an increased risk, while a high-fiber, low fat diet, especially with increased consumption of fruits and vegetables may be protective. [18] Secondary analyses of randomized controlled trials have shown that supplements of the antioxidant vitamins, selenium and vitamin E (Alpha Tocopheryl Acetate), reduced the incidence of prostate cancer. However, preventing prostate cancer was not the primary end point in these studies, and the effectiveness of these antioxidant supplements still needs to be confirmed in prospective randomized trials. Cadmium exposure, alcohol, and smoking may slightly increase the risk for prostate cancer, but the

evidence is still not conclusive.[11] Whether vasectomy increases the risk for prostate cancer remains controversial. There is no evidence for increased prostate cancer risk among men with benign prostate cancer hyperplasia.[9]

We do not yet know exactly what causes prostate cancer, but we do know that certain risk factors are linked to the disease. A risk factor is anything that increases a person's chance of getting a disease. Different cancers have different risk factors. Some risk factors, such as smoking, can be controlled. Others, like a person's age or family history, can't be changed. But having a risk factor, or even several risks, doesn't mean that a person will get the disease. While all men are at risk for prostate cancer, the factors listed below can increase the chances of a man's developing the disease.

Non Modifiable Risk Factors

- **Age:** The chance of getting prostate cancer goes up, as a man gets older.[16]
- **Race:** The causes of higher rates of prostate cancer among African American males are largely unknown. A National Cancer Institute study found that even when we control for income and education, African Americans have much higher incidence and mortality rates than Whites.[5, 16]
- **Family History:** Men with close family members who have had prostate cancer are more likely to get it themselves.[18]

Risk Factors That Can Be Modified

- **Nationality:** Prostate cancer is most common in North America, Scandinavian countries and northwestern Europe. It is less common in Asia, Africa, Central America, and South America.[16, 20]
- **Diet:** A diet that is high in fat may play a part in causing prostate cancer.[9, 16]
- **Physical activity:** Regular physical activity and maintaining a healthy weight may help reduce prostate cancer risk. [9, 16]
- **Lifestyles and behaviors (habits):** Smoking and drinking may increase the risk of developing prostate cancer. [18]

There is evidence that the development of prostate cancer is linked to higher levels of certain hormones. High levels of male hormones (androgens) may contribute to prostate cancer risk in some men. [11] Also, researchers have noted that men with high levels of the hormone insulin-like growth factor are more likely to develop prostate cancer. [11]

Because the exact cause of prostate cancer is not known, we can't say if it is possible to prevent most cases of the disease. Since a high-fat diet may be linked to prostate cancer, a diet low in animal fat (especially from red meats) and high in vegetables, fruits, and grains is suggested. This nutritional advice provides an overall healthful approach to eating that may also help lowering the risk for some other types of cancers.[18] Tomatoes, grapefruit, and watermelon are rich in a substance (lycopenes) that helps prevent damage to DNA and may help lower prostate cancer risk.[9]

The role of vitamin supplements in reducing prostate cancer risk is not entirely certain, but some studies suggest that taking 500 milligrams of vitamin E daily can lower the risk by about one

third.[9] Although other studies found no benefit form talking vitamin E, reasonable doses have no significant side effects and are not expensive.[9] On the other hand, some studies suggest that taking vitamin A supplements might actually increase prostate cancer risk.[9, 16]

The SELECT (Selenium and Vitamin E Cancer Prevention Trial) is the largest-ever prostate cancer prevention trial. Previous studies suggest that selenium and vitamin E (alone or in combination) may reduce the risk of developing prostate cancer by 60 percent and 30 percent, respectively, but only a large clinical trial such as SELECT can confirm those initial findings. SELECT began enrolling patients on August 22, 2001, and hopes to enroll 32,400 men over a five-year period. In its first year of recruitment, SELECT enrolled 13,951 men, or 43 percent of the targeted goal. The study is open to men 55 and older. African-American men, 50 and over, are eligible to enroll because prostate cancer strikes African-American men earlier and more often than White men. There are 435 SELECT sites throughout the United States, Puerto Rico, and Canada. Coordinated by the Southwest Oncology Group (SWOG), a network of researchers, the study is sponsored by the National Cancer Institute (NCI).

Until now, vitamin D has been considered important primarily as a regulator of normal body levels (or 'homeostasis') of calcium. But, in addition to its role as a facilitator of calcium absorption, vitamin D now appears to have other profound effects. Independent of its effect on calcium absorption, moderate amounts of the vitamin may help slow the growth of prostate cancer.[20]

Intensive work is being done on the link between low vitamin D levels and prostate cancer. In fact, there is a possibility of even using the vitamin to treat the disease.[20] The 1,25-D form of the vitamin has induced several important responses in prostate cells, including growth inhibition. Recently, it was concluded that vitamin D is anti-proliferative, promotes cellular maturation, and is an important cellular modulator of growth and differentiation.[20] Vitamin D has the potential to initiate beneficial actions on various malignancies especially prostate cancer.[20] However, further investigations are clearly warranted. When human prostate cancer cells were implanted into so-called "nude" mice (which are bred to lack normal immune systems), vitamin D slowed malignant growth in the prostate and the colon. Several other studies lend credence to the idea that vitamin D protects against prostate cancer.[20] For example, in one study, serum levels of 1,25-D (the major circulating form of the vitamin) were significantly lower in 181 men who had been diagnosed with prostate cancer, compared to their age-matched controls. The study concluded that the levels of the vitamin could be used as an important way of predicting the risks for prostate tumors, and men with lower vitamin D blood levels could be at higher risk for developing prostate cancer.[20]

Recent research from the University of North Carolina found that men living in northern latitudes are at greater risk of developing prostate cancer.[20] Such men have less exposure to sunlight and ultraviolet radiation, the principal source of vitamin D in the body. This observation further supports the theory that having lower levels of vitamin D predisposes men to prostate cancer. This finding corresponded well with the fact that African American and Scandinavian men have the highest incidence rates of prostate cancer worldwide. Scandinavians receive less sunlight, on average, than individuals in temperate and tropical climates. African Americans have skin pigment that blocks sunlight.[20]

A growing body of research indicates that vitamin D will ultimately play an important role in treating and preventing cancer.[20] Further case-control studies are required to examine the impact of a wide variety of potential risk factors, including dietary and other lifestyle differences, occupational exposures, and hormonal and genetic differences.

It is still unclear whether the biological concept of race is sufficiently valid to explain the racial/ethnic disparity in prostate cancer development and progression. No genetic alterations were discovered so far among any racial/ethnic groups that could explain the large differences in prostate cancer incidence between African Americans and Caucasians. Maybe it is as important to look for genetic alterations or chromosomal mutations that predispose Caucasian men to have less prostate cancer as it is to look for alterations that predispose African American men to have more advanced disease.

Early Detection

Certain preventable risk factors for prostate cancer are unknown, and effective measures to prevent this disease are not available. Screening for and treating the disease at an early stage have been proposed by the American Cancer Society (ACS) to reduce the risk of dying of prostate cancer.[18] Currently, health practitioners cannot accurately determine which prostate cancer will progress to become clinically significant and which will not.

The National Centers for Disease Control and Prevention (CDC) does not recommend prostate cancer screening, but it does recommend that men be provided with up-to-date information about screening, including any potential harms and benefits.[15, 16] While waiting for the conclusion of the National Cancer Institute clinical trials that will end in 2007, several scientific and medical organizations are reluctant to recommend routine testing for prostate cancer. But, the American Cancer Society, along with the American Urological Association and the National Comprehensive Cancer Network, believe that available evidence supports the view that testing can save lives.[18, 19] Professional medical organizations are divided on the issue of screening for prostate cancer. The U. S. Preventive Services Task Force (USPSTF) recommends against routine screening but stresses the need for "informed decision making" acknowledging that patients who request screening should be given objective information about early detection and the potential benefits and risk of treatment.[2] Us Too! International recommends annual prostate specific antigen (PSA) blood tests and digital rectal examinations (DRE) for all men 45 years of age and older. For men at higher risk screening tests are recommended annually beginning at age 40. The ACS recommends that health care providers offer the prostate-specific antigen measurement annually, beginning at age fifty, to men who have at least a ten-year life expectancy and who choose to have early detection testing.[18]

To help patients make informed decisions about testing, providers should explain the potential benefits and risks of early detection and treatment. ACS also recommends that screening start at a younger age for men in higher risk groups, such as men with two or more affected first-degree relatives (e.g., father and a brother, two brothers) or African American men.[18]

The American Cancer Society offers the following guidelines for the early detection of prostate cancer.

- Beginning at age 50, all men who have at least a 10-year life expectancy should be offered both the Prostate Specific Antigen (PSA) blood test and a digital rectal exam annually.
- Men in high-risk groups (African Americans, men with close family members who have had prostate cancer) should begin testing at 45 years.
- Men should receive information regarding possible risks and benefits of finding and treating prostate cancer early. Men who ask their doctors to make the decision on their behalf should be tested. Men should not be discouraged from testing. Not offering the test to men is not appropriate.[18]

Two methods for detecting prostate cancer are commonly used by clinicians:

- **Digital rectal examination (DRE)** has been used for years as a screening test, but its ability to detect prostate cancer is limited. Tumors often form in areas of the prostate that cannot be reached by a DRE (See Figure 1).[13] Furthermore, clinicians, frequently, have difficulty distinguishing between benign abnormalities and prostate cancer.

- **Prostate-specific antigen (PSA)** measurement is a blood test that many clinicians use.[20] Recent Nevada physicians survey showed that more than (95%) of the health care providers recommend PSA on an annual basis.[17] PSA is an enzyme measured in the blood that can rise naturally as men age or if prostate abnormalities are present. However, the PSA test cannot distinguish prostate cancer from benign growth or other conditions, such as prostatitis (inflammation of the prostate). PSA testing also fails to detect some prostate cancers.[2]

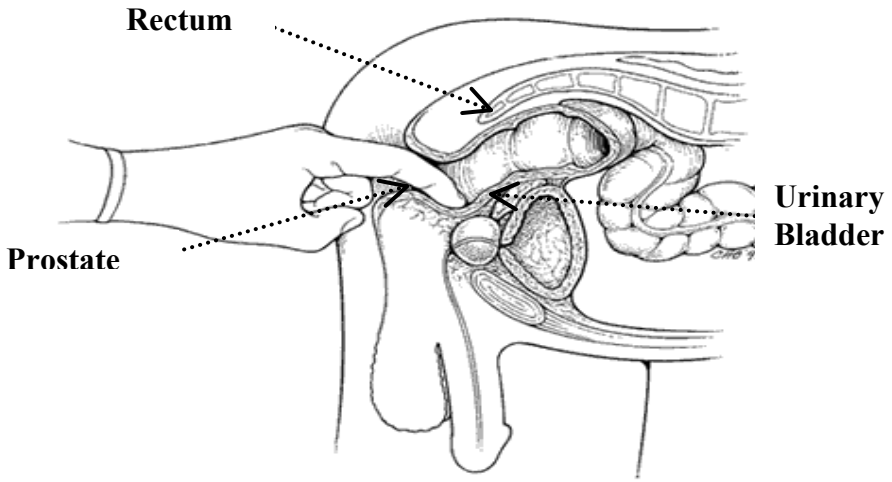


Figure 1: Digital Rectal Examination

SECTION-II

Methods

This profile was developed in close collaboration with the Governor's Task Force on Prostate Cancer and the faculty of the Masters in Public Health Program at the University of Reno with assistance of a small advisory group from the Nevada Comprehensive Cancer Council.

Nevada State Health Division staff from the Bureau of Community Health identified sources of epidemiological data, medical/oncological literature, and national or state agencies and other health authorities that are involved in recommending national guidelines for screening and prevention and are able to influence the medical practice and determine national health policies and procedures.

To design this profile, we met five times with the Prostate Cancer Task Force members, in groups and individually. We asked their input and assessed their understanding of the prostate cancer disease burden and their expectations regarding the State Profile on Prostate Cancer.

To accomplish this profile including the data collection, compilation, analysis, and report production, we reviewed huge amounts of epidemiological and medical information and we visited the web sites of many national research centers including the following:

1. Nevada Statewide Cancer Registry:

We reviewed the Statewide Cancer Registry to extract actual Nevada-specific data elements regarding prostate cancer including total numbers of newly diagnosed cases per year, stage of disease at time of diagnosis, and demographics including age at time of diagnosis, race, ethnicity, and place of diagnosis.

As of April 21, 2002, Nevada State Cancer Registry records regarding prostate cancer data were incomplete (please see Technical Note in Section III). The total number of reported Cancer Registry cases understates the actual number of new cancer cases among Nevada residents. Historically the numbers of the Nevada State Cancer Registry prostate cancer cases reported represented only about (50%) of estimates of the State Health Division and the SEER Registry. The Nevada Cancer Registry totals represent only cases of prostate cancer diagnosed and reported by hospitals. However, high percentages of prostate cancer cases are diagnosed and treated in physicians' offices without the need of hospital admissions. This fact helps to explain the low numbers of prostate cancer available at the State Cancer Registry. The lack of reliable prostate cancer case-count and data from the state cancer registry forced us to use surrogate, however, highly accurate data from the SEER national registry and the ACS to calculate age adjusted incidence rates per year and for racial ethnic groups.

Age-adjusted incidence rates were calculated year by year for each of the major racial/ethnic groups in the state using the indirect method of standardization,[17]

Nevada's latest (2001) population estimates,[10] and the U.S. 1970 Standard Population.[1]

2. Nevada State Bureau of Health Planning and Vital Statistics:

Data was collected from the Behavioral Risk Factors Surveillance Survey System (BRFSS) regarding the screening status for prostate cancer in order to identify:

a. Who gets prostate cancer screening (by age, race, insurance, education and other demographic variables)
b. The frequency of screening (annual, biennial or other).
c. Where men access screening.
d. Costs and coverage for screening.

Unfortunately, there was no database regarding prostate cancer screening status from the Nevada BRFSS system. The Bureau of Health Planning and Vital Statistics just started collecting prostate cancer screening data for the BRFSS of year 2002. However, screening practices' data among health care providers was available from a recent physicians' survey that evaluated the extent to which health care providers in Nevada prescribe prostate cancer screening tests.

To collect the actual numbers of prostate cancer deaths per year and by race/ethnicity, Vital Statistics and the Death Certificate records were reviewed. All the required elements to assess mortality data in Nevada were highly accurate and available, as the Vital Records met or exceeded all the national performance indicators.

The availability of actual mortality data from the records was extremely useful to calculate the age-adjusted mortality rate in Nevada by year and for each major racial/ ethnic group in the state using the 1970 U.S. Standard Population.[17]

There was no statistically significant difference between the SEER projected mortality rates for Nevada and the actual rates calculated based on Nevada-specific figures. This comparison may validate the reliability of the surrogate SEER data used in the profile to compute incidence rates (by year, by race/ethnicity and by stage of disease at time of diagnosis), and survival rate for all stages of prostate cancer by year.

3. U.S. Census 2000

To collect information regarding populations at risk to develop prostate cancer (all males) and to have the most recent population distribution by age groups and by race/ethnicity, U.S. Census estimates for the year 2001 were used to represent the denominator when calculating crude rates (age and race-specific).[10]

4. National Epidemiology Surveillance and End Results (SEER)

SEER National Cancer Registry data include actual facts, figures, projected numbers of prostate cancer cases and deaths, and rates that could be used to represent the actual picture of prostate cancer in many states and population subgroups that are part of the SEER cancer registry.[1] Unfortunately, Nevada is not one of the SEER states. However, we were able to use accurate, reliable and statistically valid estimates.

5. American Cancer Society (ACS) Facts and Figures Annual Report

ACS data were used to review annual estimates of prostate cancer cases and deaths expected to occur in Nevada, assess the prostate cancer disease burden in Nevada, and compare Nevada rates with national rates in regard to morbidity and mortality.[18]

In detail, we reviewed ACS recommendations and guidelines regarding screening and early detection of prostate cancer. ACS guidelines are widely adopted by the medical community in Nevada and nationwide. ACS screening, diagnostic and treatment guidelines are included in the profile.

6. Other national and international resources

Data reports, screening guidelines, and recommendations of several national and international research centers and organizations such as the Centers for Disease Control and Prevention (CDC), the National Cancer Institute (NCI), The National Institute of Health (NIH), the American Urological Association (AUA), the U.S. Preventive Services Task Force, the American College of Physicians, the Canadian Task Force, and many other organizations were thoroughly reviewed and frequently cited across the document.

SECTION-III

Nevada Profile on Prostate Cancer

CHAPTER ONE

Anatomy and Pathophysiology

Anatomy

The prostate gland is a gland found only in men and located at the base of the penis, bladder, and rectum, which surrounds the proximal urethra. Composed of smooth muscles, glands and fibrous and connective tissue, the prostate is divided into the

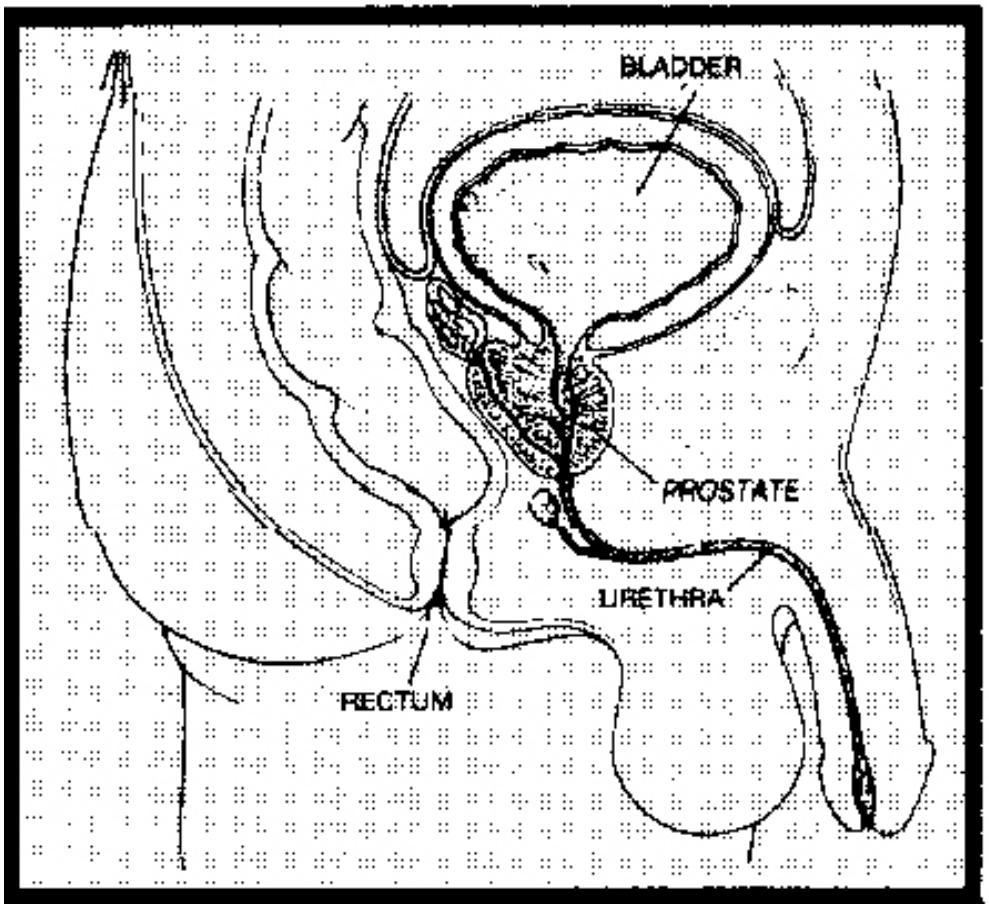


Figure 1: Prostate Gland

peripheral, central, and transition zones, and an anterior fibromuscular area. [1] A thin membranous capsule surrounds most of the prostate. The glandular tissue is largely found in the peripheral zone, and glandular secretions and fluids drain into the urethra.

Pathophysiology

Prostatic secretions, which form about 15% to 30% of a normal ejaculate, act to facilitate sperm nutrition and transportation and help in liquefying the seminal coagulum. Prostatic secretions also have antibacterial qualities and can protect against certain urinary tract infections. [1]

Microscopic changes such as the Benign Prostatic Hypertrophy (BPH) that generally develops in the peri-urethral transitional zone usually begin during the fourth decade of life. [2] Clinically detectable prostate cancers, usually arise in the peripheral glandular zone, and are most common in men age sixty-five and older. [1]

Over (95%) of all prostate cancers are Adenocarcinomas in nature; these glandular cancers usually grow slowly, with a doubling time ranging from months to years. [1] In most cases, prostate cancers grow peripherally, destroying and penetrating the prostatic capsule and invading neighboring tissues and organs such as the seminal vesicles, urinary bladder neck, and the peri-prostatic fat and urethral tissues. Regional lymph nodes are initially involved by lymphatic system invasion. Primary prostatic tumors can metastasize through the lymphatic system and the blood vasculature. Prostate cancer hamatomgenous spread has special affinity to bones, mainly to the lumber vertebrae, proximal femur, pelvic region and the thoracic vertebrae. Sites of visceral metastasis of prostate cancer may include the lungs, liver, and the genito-urinary tract, frequently leading to urine obstruction and retention, chronic abdominal pain, backache, bone pain, and spinal cord compression. [3]

CHAPTER TWO

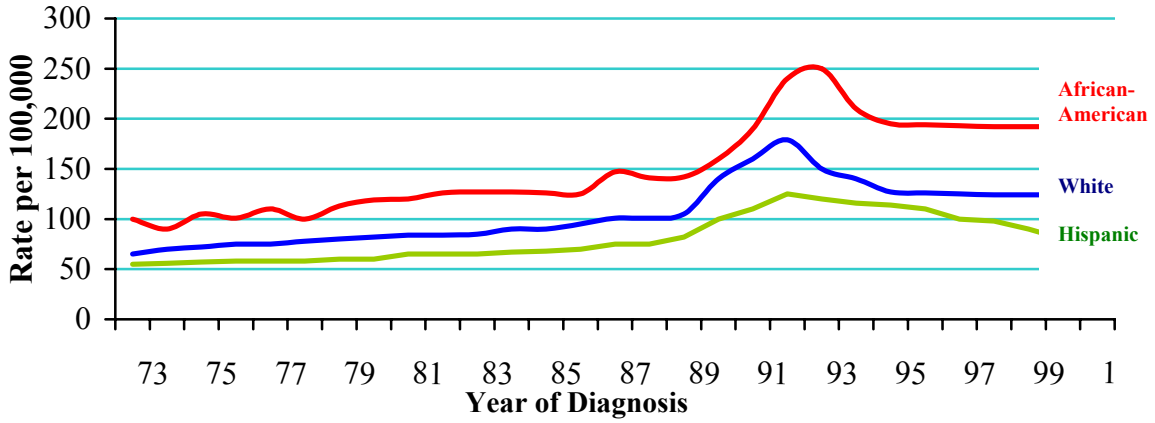
Epidemiology

Incidence and Mortality

Prostate cancer is the most frequently diagnosed visceral cancer in men and the second leading cause of cancer death in American men.[4] In 2002, the American Cancer Society (ACS) estimated that 209,900 new cases would be diagnosed and 41,800 men would die from prostate cancer.[9] Prostate cancers comprise 32% of all cancers diagnosed in men and account for 14% of cancer-related deaths.[9] The prevalence of histologic cancer in men age fifty years and older is estimated to be approximately 30%, which means that nearly ten million men, who are perceived as prostate cancer-free, could have latent prostate cancer.[5] However, the lifetime risk of being diagnosed with prostate cancer is between 10% and 20%, and only 3% of men will die from prostate cancer.[5]This disparity between incidence and mortality suggests that most cases of prostate cancer are not fatal. Nonetheless, there can be substantial morbidity associated with prostate cancer, including urinary tract obstruction, bone pain, and other serious complications of advanced cancer.[5]

The most comprehensive epidemiological data on prostate cancer come from the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) Program. Eleven SEER registries, which cover about (14%) of the total population of the United States, track data on cancer incidence, treatment, and survival. A recently published SEER monograph summarized the status of prostate cancer in the United States.[4] The most striking finding was the dramatic increase in the incidence of prostrate cancer from 1987 to 1992, particularly in men younger than 65 years (See Figures 2). During this period, the rate rose 108% in non-Hispanic Whites, reaching 179 per 100,000 men in 1991.[4] The incidence rate increased 102% in African-Americans, peaking at 250 cases per 100,000 men in 1993. Between 1993 and 1995, however, incidence rates began declining, dropping 20% for African-Americans and 30% for non-Hispanic Whites. Although the greatest decline occurred in men older than 75 years, prostate cancer remains a disease of older men. The average age at time of diagnosis is 70.6 years in non-Hispanic Whites and 68.7 years in African-Americans.[6]

Figure 2: Prostate Cancer, SEER Incidence Rates, 1997-2001

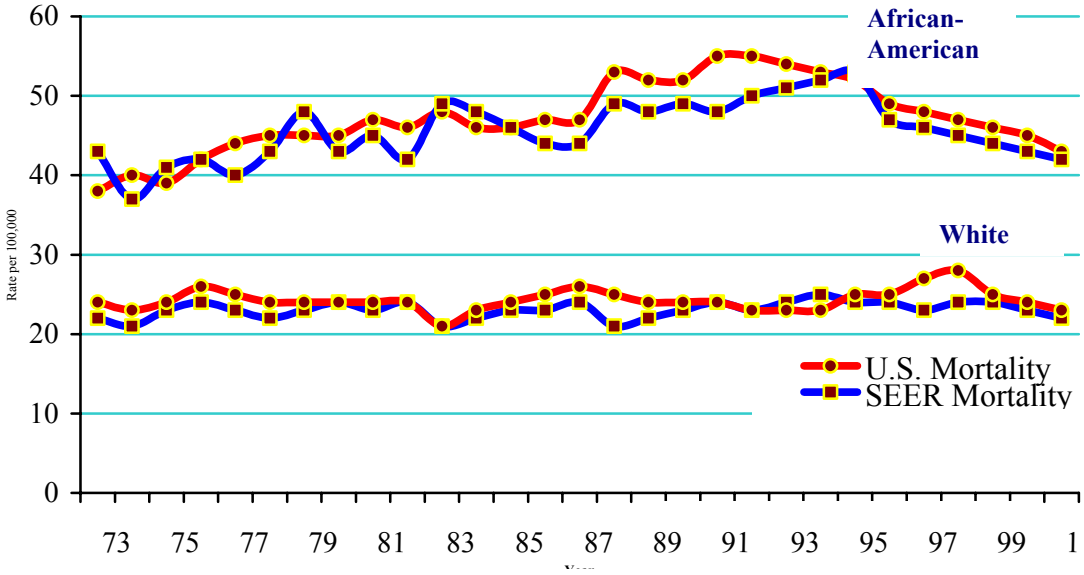


Note: Rates are age-adjusted to 1970 U.S. Standard Population

Most of the cases observed during the early 1990s reflected cancers detected with Prostate-Specific Antigen (PSA) screening tests.[1] Accordingly SEER data shows a steep increase in the incidence rate of localized cancers (confined to the prostate), while the rate for metastatic cancer fell by 56% from 1985 to 1995. In 1995 National Cancer Institute (NCI) and American Cancer Society (ACS) data indicated that 54% to 59% of cancers were localized to the prostate; 14% to 18% had regional spread (invading into the seminal vesicles, urinary bladder, or peri-prostatic tissue), and 10% to 18% were metastatic at the time of diagnosis. Despite the shift towards earlier stage disease, the majority of diagnosed cancers were considered clinically significant.[1]

Age-adjusted mortality from prostate cancer increased by over 20% from 1973 to 1991. However, the lifetime risk of dying from prostate cancer is only 3%. The relatively low risk of death from prostate cancer is primarily due to the fact that most men with prostate cancer die from complications of an associated heart disease, stroke, diabetes, osteoporosis, or lung cancer.[1,9] Death rates peaked at 24.7 per 100,000 for non-Hispanic Whites in 1991 and at 56.2 per 100,000 for African-Americans in 1993 (See Figure 3 & 4: Mortality). Mortality has subsequently declined by 7.3% in non-Hispanic Whites and 4.8% in African-Americans; the absolute number of prostate cancer deaths began dropping in 1995.[1,9]

Figure 3: Prostate Cancer Mortality Rates, 1997-2001



Note: Rates are age-adjusted to 1970 U.S. Standard Population.

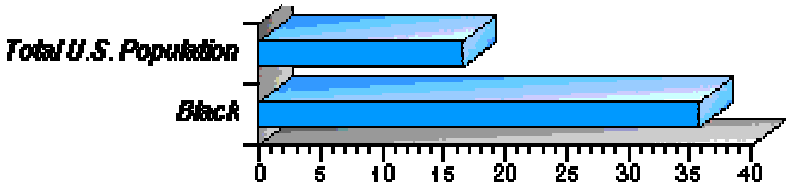


Figure 4: Prostate Cancer Mortality Rates - United States 1973-2001

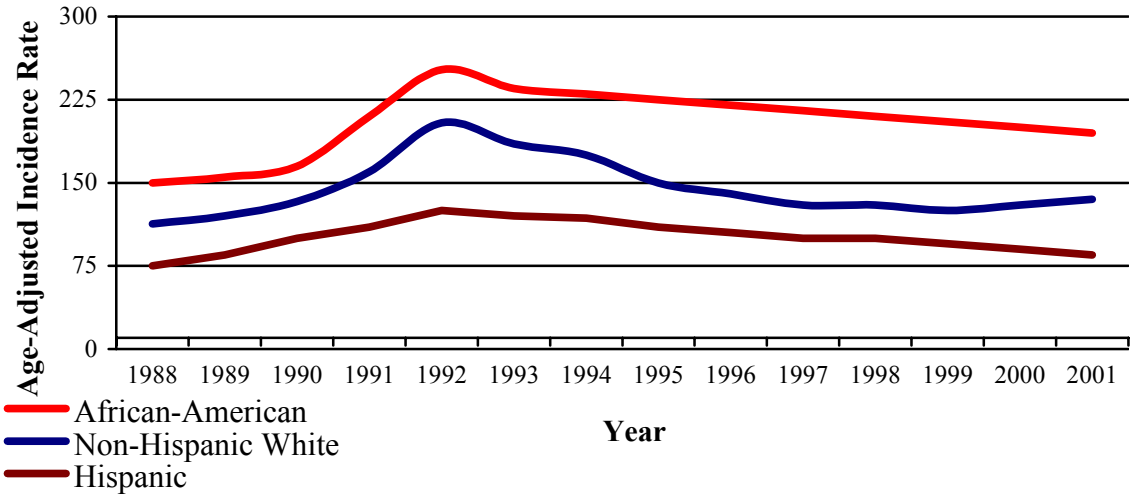
Nevada Data

Paralleling national trends, the age adjusted incidence rates rose substantially in Nevada men from 1989 to 1992, according to data from the SEER/Nevada Tumor Registry (See Figure 5). Increased rates were observed in non-Hispanic Whites (77%), Hispanics (50%), and African Americans (27%). Rates peaked in 1992 for non-Hispanic Whites (203 per 100,000), Hispanics (124.8 per 100,000) and African Americans (252 per 100,000). By 1993, the incidence rates had dropped by 22% in non-Hispanic Whites (largely due to decreased rates in men age 65 and older), and by 4.7% in Hispanics and 5% in African Americans.[4] Even though the overall incidence rates have been dropping, the projected number of prostate cancer cases in Nevada is increasing,[1,9] due to the rapid increase in the state's older aged population groups.[16]

From 1969 to 1991, incidence rates increased for local stage of disease by 87.3% and regional stage of disease by 28.3%, but decreased by approximately16% for distant stage cancers. Concomitantly, the proportion of early stage cancers increased from 77.5 % to 87.8% while the

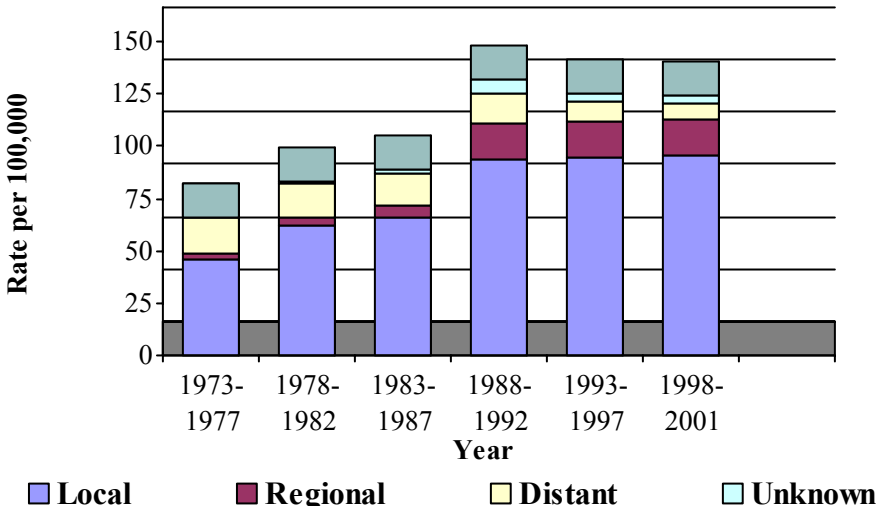
proportion of distant stage cancers decreased from 21.2% to 0.8% (See Figure 6). These findings are consistent with a trend towards earlier detection. [1,8]

Figure-5 Trends in Prostate Cancer Incidence by Race Ethnicity in Nevada



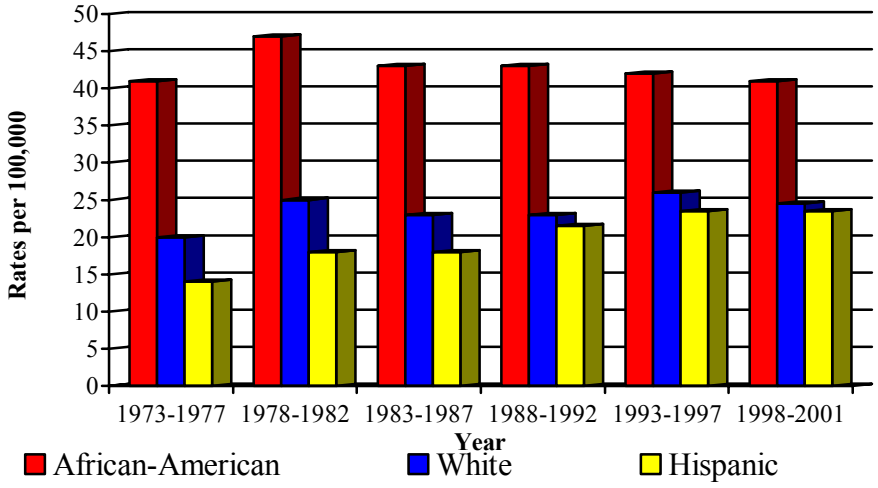
Between 1993 and 2001, there were 1,878 deaths from prostate cancer in Nevada.[8] From 1992 through 1996, prostate cancer mortality rates declined significantly.[1, 8] Although mortality rates are declining among White and Black men, rates in Black men remain more than twice as high as rates in White men (See Figure 7). This finding is attributable to nearly a quarter of prostate cancers being detected at an advanced stage among the African Americans (twice the rate of non-Hispanic Whites). [1,8,9]

Figure 6: Prostate Cancer Age-Adjusted Rates for Local, Regional, and Distant Stage at Time of Diagnosis in Nevada men 1973-2001



Note: Rates are age-adjusted to 1970 U.S. Standard

Figure 7: Prostate Cancer Mortality Rates in Nevada Men 1973-2001



Note: Rates are age-adjusted to 1970 U.S. Standard Population.

Risk Factors

The strongest risk factors for developing prostate cancer are age, family history, and race. [6] Prostate cancer is very uncommon in men younger than 50 years, but the incidence begins to increase with each subsequent decade. [9] Men with first-degree relatives diagnosed with prostate cancer have a two-fold increased risk, which increases to a five-fold risk if two or more relatives have prostate cancer. [10] African Americans are at increased risk for developing prostate cancer with a relative risk that is approximately twice that of non-Hispanic Whites. [6]

Dietary factors apparently influence the risk for prostate cancer. A high intake of dietary fat is associated with an increased risk, while a high-fiber, low fat diet, especially with increased consumption of fruits and vegetables may be protective. [9] Secondary analyses of randomized controlled trials have shown that supplements of the antioxidant vitamin selenium, and vitamin E (Alpha Tocopheryl Acetate) reduced the incidence of prostate cancer. However, preventing prostate cancer was not the primary end in these studies and the effectiveness of these antioxidant supplements still needs to be confirmed in prospective randomized trials. [10] Cadmium exposure, alcohol, and smoking may slightly increase the risk for prostate cancer, but the evidence is still not conclusive. [11] Whether vasectomy increases the risk for prostate cancer remains controversial, but there is no evidence for increased risk with benign prostate cancer hyperplasia. [9]

Survival

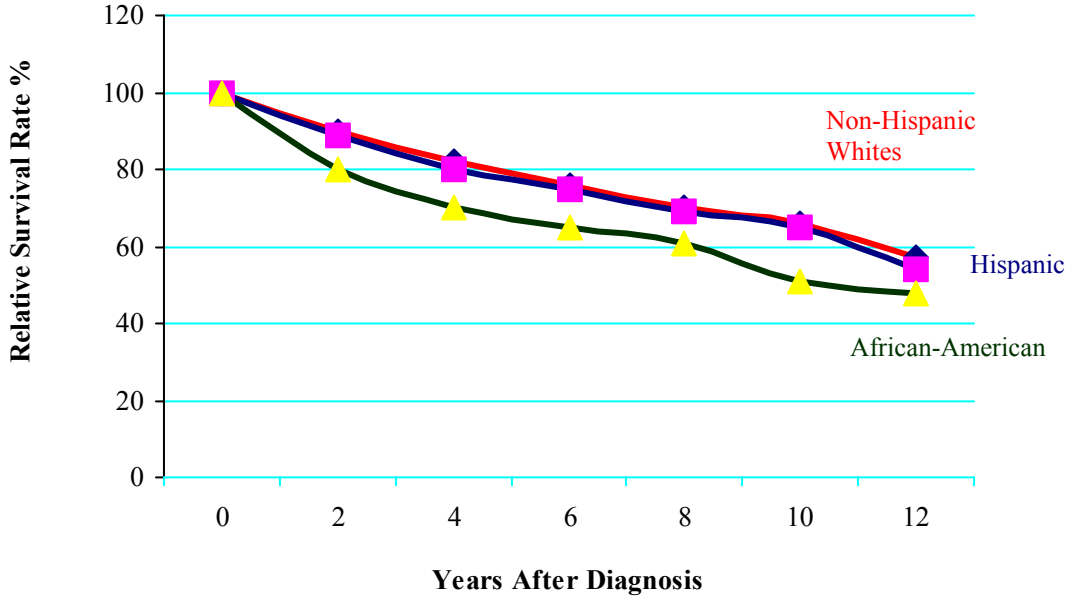
SEER data show that survival with prostate cancer has steadily increased by more than 1% per year over the past two decades. Whether this increase reflects a lead-time bias resulting from the rising proportion of screening-detected localized cancers or from better treatment outcomes remains uncertain. Regardless, the five-year observed survival for men newly diagnosed with prostate cancer went from 45.1% in 1973 to 66.9% in 1990. [4,5] The relative survival rate, defined as survival adjusted for other causes of death, has also improved, rising from 64% in 1973 to

92.9% in 1990.[4] In the year 2000 the five-year relative survival rate of those patients whose tumors are discovered at the local and regional stage reached 100% with 67% of those surviving the cancer for ten years and 53% surviving fifteen years.[9]

Although the overall prognosis has improved, after controlling for the stage of disease, African-Americans still have a nearly fifteen percent lower five-year relative survival rate than non-Hispanic Whites. Recent Nevada data show that the five-year relative survival rate for prostate cancer (all stages) in Hispanics, 78.8%, is comparable to that for non-Hispanic Whites, 82% (See Figure 8).

The clinical stage at the time of diagnosis is the most important prognostic factor for prostate cancer survival. The five-year relative survival rate of men with either localized (organ-defined) or regional stage cancer is over 99%, while men with distant metastasis have a relative survival rate of only 38.8%. By ten years, survival is still 75% for organ defined, but drops to 55% for men with regional extension and 15% for men with distant metastasis. Other factors affecting survival include the histologic grade, age at diagnosis, and co-morbidity. Ten-year relative survival rates for both well-differentiated cancers and moderately differentiated cancers are 87%, but only 34% for poorly differentiated cancers.[6] Men age 50 years or younger have the poorest five-year relative survival rate at 84.1%, compared to 96.8% for men in their seventies.[6] The overall survival for older men, however, is low because their rate of cardiovascular mortality is high.[9]

Figure 8: Prostate Cancer Survival Rates, All Stages, Nevada Men, 1973-2001



CHAPTER THREE

Screening

Unfortunately, the most important risk factors such as family history, age, gender, and race are not modifiable. Because prognosis is much more favorable with early stage disease, screening for prostate cancer has attracted considerable attention. [10] The purpose of cancer screening programs is to early detect and timely treat early stage, asymptomatic cancers in order to reduce morbidity from disease progression and to reduce disease-specific mortality. Screening for prostate cancer, however, has not been proven to reduce the overall or disease-specific mortality rate or to improve the health-related quality of life for men with prostate cancer. [9]

Digital Rectal Exam (DRE)

Until recently, the only screening test for prostate cancer was the digital rectal exam (DRE). The DRE has a detection rate of about 2%, meaning that two cancers are detected for every 100 examinations. The **Sensitivity** of DRE (the proportion of cancer patients having an abnormal exam) has been estimated to range between 45% and 89% with **Specificity** (the proportion of men without cancer having a normal exam) of 84.5% to 98%. The **Positive Predictive Value** (PPV) for DRE, or the probability that a man with an abnormal screening DRE will have cancer, is shown in Table 1. Although as many as 70% of prostate cancers detected by DRE are clinically localized (clinical staging), over half of the tumors are upstaged during lymph nodes dissection or radical prostatectomy (surgical staging). Therefore, only about one third of cancers detected by DRE are actually pathologically organ-defined and are considered potentially curable. [10,11] The digital rectal examination is inexpensive, relatively noninvasive, and has no morbidity associated with performing it. However, there are considerable inter-observer variations. The examination is more sensitive for detecting cancers in the peripheral zone versus the deeper transitional and central zones, and the accuracy of the exam performed by primary care providers has never been evaluated. [3]

Table 1: Positive Predictive Values (PPV) for combinations of Digital Rectal Examination (DRE), Prostate Specific Antigen (PSA), and Transrectal Ultrasound (TRUS) findings

DRE	PSA	TRUS	PPV%
Normal	≥ 4.0	Normal	20.7
Normal	≥ 4.0	Abnormal	29.8
Abnormal	≥ 4.0	Normal	41.3
Abnormal	≥ 4.0	Abnormal	54.7
Abnormal	< 4.0	Normal	6.9
Abnormal	< 4.0	Abnormal	13.8

Catalonia WJ, et al Urol 1999; 151: 1283-97

Prostate Specific Antigen (PSA)

In the late 1980s, prostate–specific antigen (PSA) assays were introduced and initially approved to detect recurrence of disease following curative treatments. Soon after PSA became a widely

utilized screening test. [1,2,5] PSA, produced by the epithelial cells, is a serine protease that helps in liquefying the seminal coagulum. A level greater than 4.0 ng/ml is considered abnormal in most assays. [1,2,5] Levels are usually increased with prostate cancer, but also with a number of benign conditions including benign prostatic hyperplasia (BPH), prostatitis, prostatic infarction, urinary retention, and transrectal needle biopsy. A digital rectal examination does not significantly increase PSA levels; median increases range from only 0.26 to 0.4 ng/ml. Finasteride, the 5 alpha-reductase inhibitor widely used to treat BPH, reduces PSA levels by approximately 50% after six months of use. Another herbal therapy, the saw palmetto plant extract, *Serenoa repens*, widely used to treat BPH does not appear to significantly affect PSA levels. [11,12] Both Finasteride and saw palmetto are ineffective in treating prostate cancer. [2]

Testing with PSA alone leads to a cancer detection rate of 2% to 3% while the combination of PSA and DRE has a rate of approximately 4% to 6%. PSA testing detects early-stage cancers more efficiently than DRE, and most of the cancers detected by PSA are considered to be clinically significant because they have moderately or poorly differentiated cells and large volumes (> 0.5 cc). However, these features are only suggestive of aggressive disease. There is no way to accurately predict which newly diagnosed cancers will progress. [10,12]

The diagnostic accuracy of PSA for detecting prostate cancer in screening populations is uncertain. [10] Although the sensitivity of PSA has been reported to range from 57% to 89% and the specificity from 59% to 97%, these numbers are difficult to interpret. [10] To calculate sensitivity and specificity, a study would have to biopsy all men undergoing PSA testing. However, most of the major screening trials biopsied only men with elevated PSA levels and/or abnormal prostate exams. The data on PSA levels less than 4.0 ng/ml are biased because they generally came from patients referred for a prostate biopsy. [12,14]

Table 1 shows the positive predictive value for PSA according to DRE and ultrasound findings. The overall positive predictive value (PPV) for PSA level above 4.0 ng/ml ranges from (28% to 43%), which means that about two-thirds of men referred for biopsy will not have prostate cancer. [3] While, the PPV for PSA levels above 10 ng/ml is about 50% to 60%, it is only 20% to 25% when the PSA levels are between 4.0 and 10.0 ng/ml. However, up to 75% of cancers detected in men with PSA levels between 4.0 and 10 ng/ml are organ-confined and potentially curable. [5] Although men with PSA levels above 10 ng/ml are more likely to have cancer detected, over half of these cancers are extraprostatic and incurable. [5]

Strategies to Improve the Accuracy of PSA

Investigators have developed a number of modifications in measuring PSA levels to improve the specificity of testing, particularly in older men with benign prostate hyperplasia. [3] These strategies, which can potentially reduce the number of unnecessary prostate biopsies, include age-specific reference range (stratified by race), PSA velocity, PSA density, and free-to-total PSA ratios. [5,10]

Age and Race-Specific Ranges

The age-specific reference ranges are based on population data showing that PSA increases with age. Table 2 shows PSA thresholds for recommending biopsy stratified by race and age. [5] The thresholds are higher in older men, to reduce unnecessary biopsies, and lower in younger men, to improve the chance of detecting cancers. The utility of using these reference ranges, however,

has not been validated in prospective studies and other investigators have raised concerns about decreased sensitivity in older men. [1,3]

Table 2: Age-specific PSA reference ranges (ng/ml)

Age (Years)	White	African American
> 70	6.5	5.5
60-69	4.5	4.5
50-50	3.5	4.0
40-49	2.5	2.0

Catalonia WJ, et al Urol 1999; 151: 1283-97

PSA Velocity

The PSA velocity is the rate of change in the PSA level over time. Because the growth rate of prostate cancer tissue is significantly faster than benign tissue, patients with more rapidly increasing PSA levels may be more likely to have prostate cancer. [10] A retrospective study from Johns Hopkins University found that a PSA velocity greater than 0.75 ng/ml/year better differentiated between prostate cancer and BPH than PSA alone. However, PSA levels have substantial intra-patient and inter-assay variation. Consequently, PSA velocity results are considered clinically important only when several PSA levels have been measured with the same laboratory assay over at least 18 months. No prospective studies have shown that measuring PSA velocity reduces the number of unnecessary biopsies arising from primary care screening. [14]

PSA Density

The PSA density is derived by dividing the PSA serum levels by the volume of the prostate gland determined by transrectal ultrasonography. [15] Because prostate cancer tissues produce at least ten times more PSA on a volume-for-volume basis than benign tissues, elevated PSA densities are more likely to indicate a malignancy. Studies suggested that a PSA density above 0.15 better differentiated men with and without prostate cancer than PSA alone. [15] However, a large, multi-cancer screening study showed that the 0.15 PSA density cut-off would miss half of the tumors in men without normal digital rectal examinations and PSA levels between 4.1 and 9.9 ng/ml. [14] Difficulties in accurately measuring prostate volume and the added costs for ultrasound have limited the use of PSA density for primary care screening. [10]

Free PSA

Recent studies suggest that the free-to-total PSA ratio is a more specific measure than the total PSA level.[3] Most circulating PSA is combined (bound) to serum proteins alpha-1-antichemotripsin and alpha-2-Mac globulin. For largely unknown reasons, men with prostate cancer have less circulating uncombined (free) level PSA and a lower free-to-total PSA ratio. [14] Therefore, for men with non-specific PSA levels between 4.0 and 10.0 ng/ml, some investigators suggest measuring the free PSA to determine whether a patient should undergo biopsy. A large multi-center trial found that performing biopsy only on men with free-to-total PSA ratio less than 25% would detect 95% of cancers while avoiding 20% of unnecessary biopsies. Although this strategy is promising, the optimal cutoff has not been rigorously determined and the potential reduction in unnecessary biopsies is uncertain.

None of the above strategies has been proven in prospective studies to be more effective than PSA alone. The most specific strategy is to combine PSA screening with digital rectal examination, which increases the positive predictive value from about 21% up to 42% if both are abnormal (Table 1). This strategy, though, significantly reduces sensitivity and most physicians will refer patients to urologists if the results of either test are abnormal.[5]

Transrectal Ultrasound

Transrectal Ultrasound has been evaluated as an initial screening test, but data suggests that it has poor sensitivity and specificity. Furthermore, the positive predictive value of transrectal ultrasound is only 6% when both PSA levels and the DRE are normal.[5] Currently, the transrectal ultrasound is reserved for the diagnostic work-up of patients with an elevated PSA level or an abnormal digital rectal examination.[5]

Referral to Urology

Men with abnormal digital rectal examinations including those with nodules, asymmetry, and/or induration, should be referred to urologists.[10] Men who manifest genital/urinary symptoms (listed below) that can be associated with prostate cancer, benign prostatic hypertrophy or prostatitis must be also referred to urologists, even if their PSA levels are less than 4.

Symptoms that can be associated with prostate cancer:

- Delayed or slowed start of urinary stream
- Urinary dribbling, especially immediately after urinating
- Urinary retention
- Pain with urination
- Pain with ejaculation
- Lower back pain
- Pain (pelvic, lower abdominal and/or back pain) with bowel movement

Additional symptoms that may be associated with prostate cancer:

- Excessive urination at night
- Incontinence
- Bone pain or tenderness
- Hematuria (blood in the urine)
- Abdominal pain
- Anemia
- Weight loss
- Lethargy

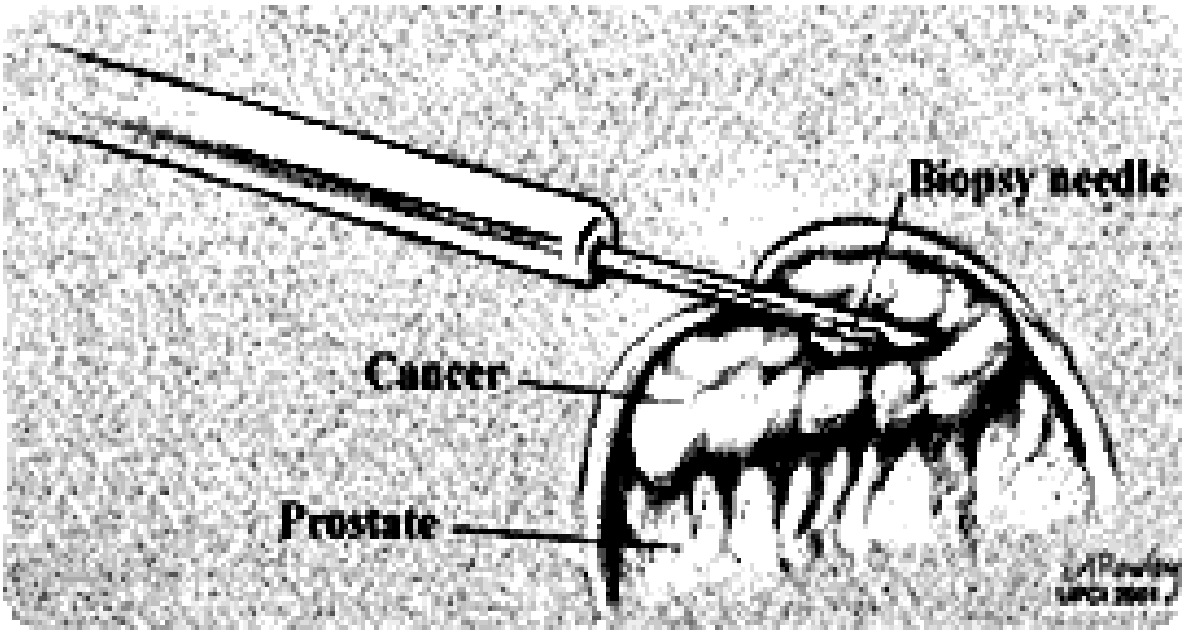
PSA levels that are equal to, or greater than 4.0 ng/ml are considered abnormal, though different cutoffs may be used if the provider is relying on age-specific levels. Men with PSA results between 4.0 and 10.0 ng/ml are most likely to have clinically localized tumors, and would potentially benefit from aggressive treatment. Urologists evaluate the prostate with a digital rectal examination and transrectal ultrasound, obtaining multiple transrectal biopsies using a

biopsy gun.[14] Urologists can systematically sample the entire prostate gland, as well as biopsy abnormities detected by ultrasound, by the digital rectal examination or using both screening tests.[15]

Although transrectal needle biopsy is the gold standard for prostate cancer screening and diagnostic tests, biopsies have an imperfect sensitivity.[5] Studies have shown that the false negative rate for ultrasound-guided transrectal needle biopsies can reach 20%.[11] Based on this relatively high sampling error rate, some experts recommend that men with persistently elevated serum PSA levels or pre-malignant lesions (prostatic intra-epithelial neoplasm) routinely undergo a repeat biopsy.[9] The specificity of transrectal needle biopsy is also imperfect because systematic transrectal biopsies can detect low volume tumors that are neither responsible for elevating the PSA, nor likely to become clinically significant. The proportion of such tumors has been estimated to range from 4% to 32%.[15]

Trans-rectal needle biopsy procedure (Figure 9 & 10) takes about 15-20 minutes and is usually performed in the urologist's office in conjunction with transrectal ultrasound TRUS. Usually, no anesthetic is required. With the help of TRUS, a doctor guides a hand-held (*biopsy gun*) device with a spring-loaded, slender needle through the thin rectal wall into the area of the prostate gland that appears abnormal (Figure 9 & 10).

Figure 9: Biopsy Procedure



When activated, the needle can remove a slender cylinder of tissue (about 1/2" by 1/16"), called a *core*, in a fraction of a second. Biopsy needles are very precise and tiny (about 1.2 millimeters in diameter and less than 1/2" long). A sliding sheath opens once the needle enters the prostate, closes onto a sample of tissue and the needle is withdrawn. The chances to detect smaller size cancer are increased with the increased number of biopsies taken. Usually, six, nine or twelve cores are taken from the prostate.

Figure 10: Biopsy Gun & Needle

A *sextant* (six-part) biopsy is the most common prostate biopsy procedure. An average of six cores are taken from the prostate (top, middle and bottom; right and left sides) to get a representative sample of the prostate gland and determine the extent of any cancer. The results of the biopsies are not available immediately following the procedure. A pathologist must examine the tissue samples and then generates a report of the findings.

Transrectal needle biopsies are generally well-tolerated, but minor complications such as hematuria, rectal bleeding, or local infection may occur. However, less than 1% of all men undergoing transrectal prostate needle biopsy need to be hospitalized for complications. [14]

CHAPTER FOUR

Prostate Cancer Staging and Grading

When prostate cancers are diagnosed, they are staged using either the Whitmore-Jewett or the Tumor Node Metastasis (TNM) systems. The Whitmore-Jewett staging system classifies cancers with stages A through D.[9] Stage A cancers are non-palpable tumors, detected either by needle biopsy or tissue specimens obtained from transurethral resections of the prostate. Stage B cancers are palpable and confined to either one or both lobs of the prostate. Cancer invading locally through the prostate capsule, either into the seminal vesicles, bladder, or peri-prostatic tissue, is stage C. Cancer spreading into regional or distant lymph nodes and/or metastasizing through the body is Stage D.[9]

The primary tumor (T) classification of the TNM system is comparable to the Whitmore-Jewett system, but the overall TNM staging uses more precise stratifications. The letter (N) is for regional lymph nodes, and (M) for distant Metastasis (M) (Table 3). Clinical staging can be based on digital rectal examination, PSA levels, plain films, isotopes bone scans, magnetic resonance imaging (MRI), and computerized tomography (CT Scan). Patients who subsequently undergo lymph nodes dissection or radical prostatectomy will also be given a pathologic stage.[9]

To determine the potential level of cancer aggressiveness or its tendency toward invasiveness, prostate cancers are histologically graded using the Gleason System, which is obtained by summing the degree of cellular differentiation found on the two most predominant patterns in a pathologic specimen.[15] Differentiation in each pattern is rated from one (well-differentiated) to five (poorly-differentiated). An overall Gleason grade of two to four represents a well-differentiated tumor, five to seven is moderately differentiated, and eight to ten is poorly differentiated.[15] Tumors with low Gleason grades tend to have small volume with low metastatic potential, while tumors with high Gleason grades are more likely to be of large volume and metastatic. Gleason grades from biopsies need to be interpreted cautiously because prostate cancer can be multifocal, and even multiple systematic biopsies may underestimate the histologic grading ultimately determined with radical prostatectomy.[15]

Table 3: TNM Classification of Cancer [9]

Primary Tumor (T)

TX: Cannot be assessed
T0: No evidence of primary tumor
T1: Clinically unapparent, not palpable or visible by imaging
- **T1a:** Incidental histologic finding in (5%) or less of resected tissue
- **T1b:** Incidental histologic finding in more than (5%) of resected tissue
- **T1c:** Identified by needle biopsy (e.g. because of elevated PSA)

T2: Confined within the prostate
- **T2a:** Involves one lobe
- **T2b:** Involves both lobes

T3: Extends though the prostatic capsule
- **T3a:** Unilateral or bilateral extra capsular extension
- **T3b:** Invades seminal vesicle(s)

T4: Fixed to or invades adjacent structures other than seminal vesicle(s), e.g. bladder neck, levator muscles, external sphincter, rectum, and/or pelvic wall.

Regional lymph nodes (N)

NX: cannot be assessed
N0: No evidence of regional lymph node metastasis
N1: Metastasis in regional lymph nodes(s)

Distant Metastasis (M)

MX: Cannot be assessed
M0: No evidence of distant metastasis
M1: Distant metastasis

M1a: Non-regional lymph node(s)
M1b: Bone(s)
M1c: Other sites(s)

CHAPTER FIVE

Treatment

When prostate cancer is diagnosed, the treatment options depend upon the clinical stage and the Gleason grade. Men with clinically localized disease can be offered curative treatment with radical prostatectomy or radiation therapy. Another option is to offer these men expectant management (watchful waiting).[10] Cryotherapy or freeze therapy is a newer modality that is being used in some centers to treat initial or recurrent prostate cancer. Long-term results are not yet available, but this new treatment may prove promising. It is one of the few potentially curative treatments that can be given for local prostate cancer recurrence after radiation therapy. It may be offered as an alternative to brachytherapy, in patients who have urinary obstructive symptoms, as it may help reopening the urinary channel over time. With cryotherapy pain is minimal, but it may take some time for the damaged tissue to be eliminated and allow for normal voiding. Some patients require catheterization for several weeks to several months or occasionally trans-urethral surgery to remove the damaged tissue. Impotence occurs in virtually 100% of patients treated with cryotherapy as the nerves for erection lie on the surface of the prostate and are frozen as well. However as the technique develops, "nerve sparing" cryotherapy may become a reality. Incontinence, (loss of urinary control), may occur after cryotherapy, but is not common.

Despite the increasing use of curative therapies, particularly in older men, there are no published randomized clinical trials providing that treatment reduces the death rate from clinically localized prostate cancer.[15]

Data are available, however, on the estimated survival rates for various treatment strategies. For clinically localized prostate cancers, the ten-year disease-specific survival rates typically are above 90% for radical prostatectomy, about 85% for expectant management, and 75% for radiation therapy. Those survival rates are comparable to the age-matched general population.[9,17] However, because survival data was obtained from uncontrolled, observational studies, comparison between treatments is confounded by important selection biases.

Investigators in the above-mentioned uncontrolled, observational studies carefully selected prostate cancer cases for appropriate management. Those who manifested aggressive forms of cancer were always referred for surgery while only patients with subclinical and non-progressive prostate cancer forms were selected for the expectant management. It would be irresponsible to consider the conclusions and the results of the above studies as the design, implementation, and investigators were neither double blind nor properly randomized.[17]

Data show that survival with any treatment modality will depend upon tumor grade, stage, age, and co-morbidity.[9] Subjects in the various treatment studies have very different clinical characteristics. Expectant management studies reported on older men with early stage and low-grade disease who were more likely to die from cardiovascular disease than prostate cancer.[9] Additionally, these studies contained essentially no data on the prognosis for tumors detected by PSA testing.[17] Radical prostatectomy was usually reserved for younger patients in relatively good

health .[9,17] A substantial number of surgical patients also received adjuvant radiation or hormonal treatment. While external beam radiation was offered to patients with locally invasive disease, implantation of radioactive isotopes (brachy therapy) was usually reserved for men with organ-confined disease, low Gleason grade, and low PSA levels.[14]

Results from randomized controlled trials are needed to guide patients in selecting an appropriate treatment option. The Prostate Cancer Intervention Versus Observation Trials (PIVOT) are randomly assigning 2,000 U. S. veterans, less than 75 years old, with clinically localized prostate cancer to receive either radical prostatectomy or expectant management (watchful waiting). [17] The expectant management group will receive no initial therapy, but palliative therapy will be offered for symptomatic or metastatic disease progression. The primary study endpoint will be all-cause mortality. Secondary endpoints include cancer and treatment-specific morbidity and mortality. Subjects will be followed for a minimum of 12 years. Data from this trial will not be available until the end of this decade. [17] Randomized European trials are looking at the efficacy of radical prostatectomy and radiation therapy, but results will also be unavailable for many years. [9]

Curative treatments for prostate cancer carry significant risks for complications as shown in Table 4.

Table 4: Reported Incidence of Treatment Complications [3,15]

Complication	Radical Prostatectomy	External Bream Radiation	Brachytherapy
Impotence	10-85%	40-67%	8-30%
Urinary Incontinence	1-30%	<1-7%	5%
Urethral Stricture	10-25%	4%	12-14.5%
Rectal Injury	0.1-7%	2-23%	12%
Thromboembolism	1-30%		
Wound Infection	0.4-16%		
Pri and Intra-operative Death	0.1-2		
Chronic Proctitis		2%	
Chronic Cystitis		8%	
Chronic Enteritis		3%	
Chronic Diarrhea		<1%	
Chronic Edema		<1%	
Death		<0.1-0.5	

Although offered as curative treatments, radical prostatectomy and radiation therapy are not completely effective. [15] About 50% of men undergoing radical prostatectomy are found to have pathologic evidence of extra-capsular extension, indicating both a poorer prognosis and an increased likelihood of requiring adjuvant therapy. [15] Within four years of undergoing radical prostatectomy, nearly thirty percent of men will require additional cancer treatment. [15] Radiation therapies cannot consistently eradicate all cancer cells in the treatment fields, and at least 20% of men will require additional cancer treatments within three years of their initial therapy. [15]

Patients with locally advanced disease generally are not considered curable because most of those already have occult metastases.[15] Treatment options include radiation therapy and

expectant management. [14] Some men are also offered radical prostatectomy with or without preoperative hormone therapy. Patients with disseminated disease can be offered hormonal therapy, orchiectomy, gonadotrophin-releasing hormone agonists, non-steroidal anti-androgens, or other hormonal agents. Aside from psychological effects, complications from hormone therapy can include loss of libido, impotence, hot flashes and osteoporosis. [14]

Investigators have shown that overall health-related quality of life measures are similar for men undergoing surgery, radiation, and expectant management. Nonetheless, prostate-specific measures targeting sexual and urinary functions show poorer outcomes in men undergoing surgery than either radiation therapy or expectant management. [17]

CHAPTER SIX

Standards of Practice

Even though PSA testing has been widely utilized for more than a decade, screening for prostate cancer remains controversial.[18] The potential benefit of screening programs is that early detection may save lives and avert complications of tumor progression.[9] While PSA testing can detect early stage prostate cancers and allow men to be offered curative treatment, there is no conclusive data on whether screening reduces the morbidity and mortality of prostate cancer. Randomized controlled trials are needed to address this issue and two large screening trials are currently underway. The National Cancer Institute's Prostate, Lung, Colorectal, and Ovarian (PLCO) trial is enrolling 74,000 men, ages 60 to 74 years, who will be randomly assigned to either annual PSA or digital rectal examination for four years or "usual care". The primary objective is to determine whether screening can decrease mortality rates from prostate cancer. The study, which began enrolling subjects in late 1993, is designed to have 16 years of patient follow-up.[17] A similar study of 180,000 European men is expected to be completed by the year 2007.[17]

Without data from randomized screening trials, no conclusions can be drawn about whether the potential benefits of screening overweigh the risks of having to conduct unnecessary aggressive diagnostic procedures.[19] However, there are reasons to be cautious about screening programs as one out of five prostate biopsies conducted in the U. S. turns out to be cancer and the other four reveal benign conditions of the prostate.[10,19] Although no definitive trial data has been published, the potential costs, and risks of screening and treatment have been delineated.

Economic (cost-effectiveness) analyses suggest that the estimated cost for the first years of a national screening effort, potentially targeting more than 23 million American men ages 50 to 74 years, would be $14 billion to $32 billion. Subsequent years of screening might cost $4 to $5 billion annually.[10] Costs would derive from the screening tests, evaluating suspicious findings with transrectal ultrasound and needle biopsies, clinically staging men with cancers, treating prostate cancers, and providing therapy for complications of prostate cancer treatment.[10] Decision analyses, factoring in quality-adjusted life years, have suggested that screening for prostate cancer may result in poorer outcomes and higher health care costs.[10] Furthermore, curative treatment for localized disease is probably most effective in younger men, especially those with moderately and poorly differentiated cancers. Invasive treatments for men aged 75 years and older generally appeared to be harmful compared with a strategy of watchful waiting.[14,3]

Urologists, who argued that the decision analysis models used incorrect probability and utility values and that the models failed to fully account for the high costs of treating advanced disease and men dying from prostate cancer, challenged some of these conclusions.[1] Nevertheless, most experts agree that further data, particularly from randomized clinical trials, is needed to better assess the cost-effectiveness of screening and treatment.[18]

Recommendations of professional organizations reflect the lack of consensus over prostate cancer screening. The American Urological Association (AUA) recommends offering annual screening with both PSA and DRE beginning at age 50 years for men of average risk and at age

40 years for high-risk men such as African Americans and those with positive family history. The AUA also recommends against screening men with less than a 10-year life expectancy.[19] The prostate cancer guidelines and recommendations for early detection of prostate cancer, approved by the American Cancer Society, are to offer screening and to provide patients with information regarding potential risks and benefits of intervention.[9] *US Too!* International recommends annual prostate specific antigen (PSA) blood tests and digital rectal examinations (DRE) for all men 45 years of age and older. For men at higher risk prostate screening tests are recommended annually beginning at age 40. However, organizations such as the U.S. Preventive Services Task Force, the American College of Physicians, and the Canadian Task Force on Periodic Health Examination are against routine screening.[10]

Despite the uncertainty over screening, ordering PSA tests and performing digital rectal examinations is becoming the standard of practice. Figures 11 and 12 show results of a 1996 survey of Nevada primary care physicians. While only 47% of family practice (FP) and internal medicine (IM) physicians reported following the American Urological Association guidelines for annual digital examination and PSA testing, more than 95% recommended some prostate cancer screening.[8]

Perhaps the best approach to prostate cancer screening is to provide complete information about the potential benefits and let the patient know the risks of screening with false positive results, diagnosis, and treatment to all men eligible for screening.[20] Table 5 presents specific points to discuss when counseling patients, based on recommendations from the American College of Family Physicians Clinical Guidelines on prostate cancer screening.[5] A patient's fear about cancer, his concerns about the effects of treatment on quality of life, and questions about whether testing and treatment are likely to increase life expectancy should be addressed before deciding on testing. Additionally, the patient should understand what further evaluations would follow an abnormal screening test and the treatment options if cancer was diagnosed. Men with life expectancy less than ten years should be advised that screening and aggressive treatment may not improve survival and could worsen the quality of their lives.[20] Only when the patient is fully informed and aware of these issues, will he be likely to make an informed decision about screening.

Figure 11: Percentage of Primary Care Physicians recommending Prostate Cancer PSA Screening for Men Ages 50-69 Years by Frequency and by Physician Specialty

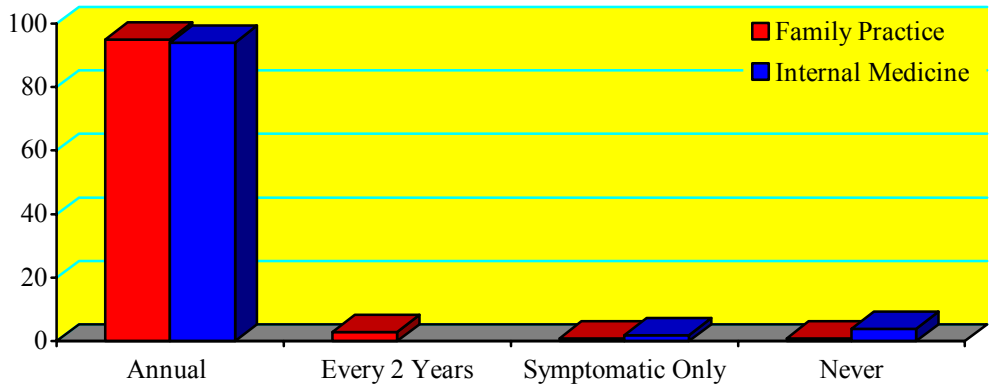


Figure 12: Percentage of Primary Care Physicians recommending Prostate Cancer DRE Screening for Men Ages 50-69 Years by Frequency and by Physician Specialty

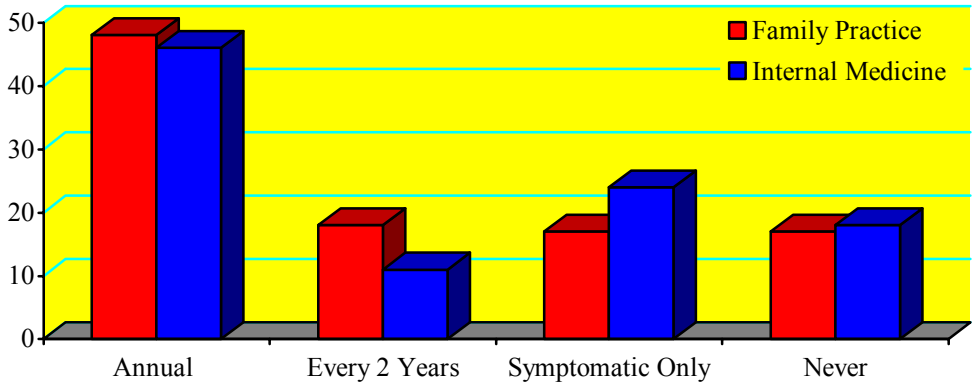


Table 5: Counseling Patients about Prostate Cancer Screening and Treatment

1. Prostate cancer is an important public health problem. However, while up to 20% of men will eventually be diagnosed with prostate cancer, only 3% will die from the disease. Higher percentages of prostate cancer patients usually die from other diseases (e.g. cardiovascular disease).

2. Men with progressive prostate cancer may suffer substantial morbidity including bone pain, urinary tract obstruction, and/or other complications of advanced cancer.

3. African Americans and men with positive family histories for prostate cancer are at increased risk for developing prostate cancer.

4. Digital rectal examination and PSA measurements should be combined to optimize the chances for detecting prostate cancer at an early stage.

5. Currently there are no methods to identify which early-stage cancers are likely to advance, be symptomatic, or fatal, and thus, need to be treated.

6. Digital rectal examination and PSA measurements can have false positive and false negative results, leading either to unnecessary invasive evaluations or missed diagnoses of early stage cancer.

7. There is a relatively high probability that further invasive evaluation, including transrectal ultrasound and transrectal needle biopsy, will be required following either digital rectal examination or PSA testing.

8. Men with PSA values between 4.0 and 10.0 ng/ml have only about a 21% probability of having prostate cancer, however, most of these tumors are organ-confined.

9. Aggressive therapy, either radical prostatectomy or radiation therapy, are necessary to realize any benefits from discovering a clinically localized tumor.

10. A small but finite risk of early death and a significant risk of chronic morbidity are associated with these aggressive therapies.

11. The risks of treatment are likely to outweigh the benefits of screening in men with life expectancy of less than ten years or with significant co-morbidity such as heart disease or diabetes.

12. There is no consensus among professional organizations about offering routine screening or for aggressively treating early stage cancers. Clinical trials are underway to determine the risks and benefits of screening and treatment.

Adapted from: American College of Physicians.
Screening for prostate cancer. *Ann Intern Med 1999; 126:480-4.*

CHAPTER SEVEN

Resources for Information & Referral

Support Groups and Health Care Information Services for Men with Prostate Cancer

Health care providers and patients have learned the value of mutual support among men with cancer. When someone with a serious illness feels frightened or depressed, it is often helpful to discuss these feelings with another person who has been through the same or a similar experience. [9] In addition, many organizations offer practical advice on accessing health care information, cancer rehabilitation, family counseling, and diet and exercise information for men with prostate cancer. Resources include:

- **The American Cancer Society (ACS)**

Telephone: (702) 798-6877
Web site: http:///www.cancer.org
Address: 305 East Harmon Avenue,
Las Vegas, Nevada 89119

The American Cancer Society (ACS) is a nonprofit organization that supports research, conducts educational programs, and offers a variety of services to people with cancer and to their families. ACS helps people with cancer through various patient services and support groups.

Patient Services include: ***Road to Recovery***, through which volunteers transport patients to and from treatment and help with housing for out-of-town patients.

Visiting and Support Groups include: ***I Can Cope***, an educational program for patients, loved ones, and family.

RIG (Resource, Information and Guidance) is a community clearinghouse offering resources, information, and guidance to anyone contacting ACS with questions about cancer.

Man-to-Man News is a newsletter containing prostate cancer news and information from the American Cancer Society's ***Man-to-Man Program***. Further information is also available from the American Cancer Society.

The ACS has field staff in different counties throughout the state, although not all programs are supported at all offices.

- ***US Too!* International Inc.**

Telephone: 1-800-808-7866
Web site: www.ustoo.com
Address: 930 N. York Road, Suite 50
Hinsdale, IL 60521-2993

US Too! International is the world's largest, independent, charitable network of education and support groups for men with prostate cancer and their families.

US Too! International has hundreds of local *US Too!* affiliated support group chapters that offer trustworthy education, publications, fellowship, peer counseling, information about treatment options, and discussion of medical alternatives without bias.

US Too! International chapter in Las Vegas is one of the ten largest in the United States.

US Too! International goals (listed below) include education, advocacy, patient & family support and public awareness of prostate cancer and prostate disease.

***Us Too!* International Goals:**

1. Provide patients, their families and others interested/involved in prostate cancer with valuable, meaningful, and diverse learning opportunities.
2. Provide highly valued advocacy and patient/spouse/family support resources while exceeding the service expectations of prostate cancer patients and men at risk and their families, clinicians, and other individuals, organizations and agencies involved/ interested in prostate cancer.
3. Increase, retain, and diversify our service population base/constituencies to include patients and other men at risk and their families, clinicians, and other individuals, organizations and agencies involved/interested in prostate cancer.
4. Focus public awareness on the danger and threat of prostate cancer, the importance of greater support for basic and applied research into the disease and the need for men to seek more effective screening opportunities to assure early detection, diagnosis and treatment.
5. Enhance the financial and organization effectiveness to enable the successful achievement of *US Too*! Goals.

- **Nevada State Health Division, Cancer Prevention, Screening, Early Detection, and Control Programs**

Telephone: 775-684-5900 or Toll Free 1-888-4-NEV-WHC
Web site: http://www.nshd.gov
Address**:** 505 East King Street,
Carson City, Nevada 89701

The Nevada State Health Division, Cancer Prevention, Screening, Early Detection and Control Programs, provide public and professional education, research support, prostate cancer survivors support programs, risk reduction programs, and a quarterly newsletter *Hook Into Health.*

- **National Prostate Cancer Coalition**

Telephone: (202) 463-9455
Web site: www.4npcc.org
Address: 1158 15th St., N.W.
Washington, DC 20005

- **Family-to-Family Program**

Telephone: 775-684-5901
Web site: http://www.pcafamily.org
Address: 405 East College Parkway,
Carson City, Nevada 89706

The family of a prostate cancer survivor in Carson City founded the Family-to-Family Prostate Cancer Program of Nevada to educate and encourage men diagnosed with prostate cancer. Information available assists men and their families in making informed decisions regarding their treatment choices and case management. The membership provides support to men and their families to help them cope with prostate cancer through personal contact. Services and resources include:

Bimonthly Peer Support Group meetings for survivors, families, and friends.

One-on-one contact with a survivor through a phone call or in person.

Speakers Bureau consisting of survivors, and survivor and partner teams, available to speak publicly on their experiences and on prostate cancer in general.

Outreach Training Teams available to travel statewide to assist in setting up prostate cancer support groups and train volunteers to facilitate those groups.

Family-to-Family Newsletter, regular publication.

Health Educational Services related to prostate cancer are offered to professionals and the public.

Community Outreach delivers brochures, exhibits, and accessibility to screening services.

Additional National and State Resources

Health care providers may require more information for themselves, their patients, and their patient's families. Additional information is available from the Internet, local libraries (UNR, UNLV and State Libraries), bookstores (UNR, UNLV, Barnes & Noble, and Borders, Sundance), and support groups. The services listed below will help obtain needed materials. Resources include:

- **American Foundation For Urologic Disease (AFUD)**

Telephone: 1-800-828-2866
Fax: (410) 528-0550
E-mail: afud@afud.org
Web site: http://www.access.digex.net/~afud
Address: 300 West Pratt Street, Suite 401, Baltimore, MD, 21201

The AFUD is a national, nonprofit, patient-based organization that supports prostate cancer research and education and publishes the Prostate Cancer Resource Guide, an index of organizations, publications, and references relevant to prostate cancer patients, their families, and health care providers.

- **The Centers for Disease Control and Prevention (CDC)** and the **National Cancer Institute (NCI)**

Support the following services: the Cancer Information Services (CIS), CancerFax, Physician Data Query and Cancer Net.
CDC Web site: http://www.cdc.gov/cancer
NCI Web site: http://www.icic.nci.nih.gov/

- **Physician Data Query (PDQ)**

The PDQ is a computer database that contains cancer information statements, listings of research studies (clinical trials), and directories of physicians and organizations involved in cancer care. PDQ was developed by the NCI and contains information statements on state-of-the-art cancer treatment, screening and prevention, supportive care for patients, and under investigation or approved chemotherapies.

There are several ways people can obtain information from the PDQ. The general public, cancer patients, and their families can call the Cancer Information Service (CIS) at 1-800-4-CANCER. CIS Information Specialists use PDQ information to answer callers' questions.

Physicians and other health care professionals can obtain customized PDQ information through PDQ Search Service (Tel: 1-800-345-3300, Fax: 1-800-380-1575). The e-mail address is pdqsearch@icic.nci.nih.gov. The Nevada State Health Division and the University of Nevada

have PDQ access. Selected PDQ materials are also available on the NCI's World Wide Web site: http://www.icic.nci.nih.gov/.

- **Cancer Information Services (CIS)**

  Telephone: 1-800-4-CANCER

The CIS provides a nationwide telephone service for cancer patients and their families, the public, and health care professionals. CIS can provide specific information in understandable language about any particular type of cancer as well as information on state-of-the-art care and the availability of clinical trials. The CIS also coordinates the state and regional outreach and cancer education efforts of the National Cancer Institute.

Callers' questions are answered by Certified Information Specialists trained by NCI cancer management experts. Bi/multi-lingual information specialists are available in Spanish, Russian and Chinese. When translators are not available for additional languages, CIS specialists use *AT&T 24 hours Translation Line*. CIS offices are regional and can be reached anywhere in the nation by dialing 1-800-422-6237, Monday through Friday, 9:00 a.m. to 4:30 p.m. local time. Persons with TTY equipment can call 1-800-332-8615 for cancer information.

- **CancerNet**

  E-mail: Cancernet@icic.nci.nih.gov

CancerNet is a way to obtain PDQ information summaries and other NCI information via Internet and selected electronic information services. To use CancerNet, send a message to the address above, Enter the word "HELP" as the text of the message to receive materials in English. To receive materials in Spanish use the following email Cancernet@icic.nci.nih.gov/Spanish

- **CancerFax**

  Telephone: 1-301-402-58-74

The NCI's CancerFax service provides up-to-date cancer treatment information including palliative treatment and supportive care information summaries from the Physician Data Query (PDQ) database. CancerFax is available in English and Spanish and is operated 24 hours a day, seven days a week. When you call the number above, the information you requested will be send to you via fax machine.

The following organizations and Web sites are available to health care professionals and the public in search of professional and public education materials, the most recent practice guidelines and recommendations, the most recent epidemiological data, and educational resources for the general public and for patients with special needs.

Organization	Phone	Web Site
American Medical Association	1-312-464-5000	http://www.ama-assn.org
American Cancer Society	1-800-227-2345	http://www.cancer.org
Centers for Disease Control & Prevention	1-888-842-6355	http://www.cdc.gov/cancer
Surveillance Epidemiology & End Results	1-301-496-8510	http://www.seer.cancer.gov
American Academy of Family Physicians	1-816-333-9700	http://www.aafp.org
American Association of Retired Persons	1-703-550-9708	http://info-ren.pitt.edu/universal-service/reply-comments/html/aarp.html
American College of Physicians	1-215-351-2400	http://www.acponline.org
Cancer Information Service	1-800-422-6237	http://web.kcr.uky.edu/cis/cis.html
CancerSearch (National Coalition for Cancer Survivorship)		http://www.access.digex.net/~mkragen/index.html
Coalition of Hispanic Health & Human Service Organizations	1-202-387-5000	http://www.cossmho.org/
Food & Drug Administration	1-800-383-7715	http://www.fda.gov/
National Cancer Institute	1-800-422-6237	http://cancernet.nci.nhi.gov/
National Health Information Center	1-800-336-4797	http://nhic-nt.health.org/
Office of Minority Health Resource Center	1-800-444-6472	http://www.omhrc.gov/
OncoLink		http://oncolink.upenn.edu/

SECTION-IV

Technical Note

New cancer cases among Nevada residents are reported to the Nevada Cancer Registry that is part of the State Health Division. Up until the year 2000, Nevada hospitals were the sole source of new cases reported to the Cancer Registry. As a result, the total number of reported Cancer Registry cases understates the actual number of new cancer cases among Nevada residents.

Another source of cancer case estimates that is used across the nation is a report by the American Cancer Society (ACS) entitled Cancer Facts and Figures. The report, which is published annually, uses estimates of new cases based on incidence rates from the National Cancer Institute's (NCI) Surveillance Epidemiology and End Results (SEER) National Cancer Registry.

Historically the numbers of Nevada Cancer Registry prostate cancer reported through the SEER represented only about (50%) of estimates of the State Health Division and the SEER Registry. The Nevada Cancer Registry totals represent only cases of prostate cancer diagnosed and reported by hospitals. However, high percentages of prostate cancer cases are diagnosed and treated in physicians' offices without the need of hospital admissions. This fact helps to explain the low numbers of prostate cancer available at the State Cancer Registry.

The Surveillance, Epidemiology, and End Result (SEER) Program of the National Cancer Institute is the most authoritative source of information on cancer incidence, mortality, and survival in the United States. Data collection of SEER began on January 1, 1973, in the states of Connecticut, Iowa, New Mexico, Utah, and Hawaii, and the metropolitan areas of Detroit and San Francisco-Oakland. In 1974 the metropolitan area of Atlanta and the 13-county Seattle-Puget Sound area were added. In 1978 ten predominantly Black rural counties in Georgia were added, followed in 1980 by the addition of the American Indians residing in Arizona. In addition to adequately covering the African American, Asian, and Native American populations, in 1992 the SEER program expanded the coverage of minority populations, especially Hispanics, by adding Los Angeles County and four counties in San Jose-Monterey area south of San Francisco.

Geographic areas across the country were selected for inclusion in the SEER Registry, based on their goal to operate and maintain a high quality national and state-by-state population-based cancer reporting system and for their epidemiologically significant population subgroups. The population covered by the SEER is comparable to the general population clusters in each state across the nation with regard to race/ethnicity, and other measures of poverty and education. In all observational and descriptive cancer epidemiological data, SEER figures are used to produce highly accurate population based projections for individual counties, states, and nationwide.

Goals of the SEER are to assemble and report, on a regular basis, estimates of cancer incidence, five-year survival rates, stage of disease at time of diagnosis and mortality rates in each of the states.

The SEER Program is considered as the standard for quality among cancer registries around the world. Every year, studies are conducted in the SEER area to evaluate the quality and completeness of data being reported (SEER standard for case ascertainment is 98%).

SECTION-V

Conclusion

Prostate cancer is the most common cancer among men in almost all race/ethnic groups in Nevada and nationwide. The number of prostate cancers diagnosed each year rose dramatically in the early 1990s when the prostate-specific antigen (PSA) test began to be widely used to detect this cancer.[1, 2]

Prostate cancer is the second leading cancer killer of American men, exceeded only by lung cancer.[2] Even though prostate cancer is responsible for about 42,000 deaths among American men each year, screening programs are still controversial.[2] Unlike breast cancer, clinical trials for prostate cancer have not clearly demonstrated a decrease in mortality following screening, and many uncertainties remain surrounding the impact of early detection.[2]

Unlike many other cancers, prostate cancer often grows very slowly and because of this, many undiagnosed prostate cancers never become life threatening. Although early diagnosis and treatment may help some men live longer, it may have no impact on the life span of other men.[16] Since testing for prostate cancer became common around 1990, the prostate cancer death rate has dropped, but it has not been conclusively proven that this is a direct result of screening.[16] According to the Centers for Disease Control and Prevention (CDC), scientific evidence is insufficient at this time to determine if widespread screening reduces the number of men who die of the disease.[1] In addition, there are unanswered questions about whether or not treatment for early stage prostate cancer – either surgery or radiation – prolongs a man's life.[3,11]

The lack of conclusive results has lead to a lack of consensus regarding prostate cancer screening among professional medical and health organizations.[18] Several randomized controlled trials and clinical studies are underway in the United States and Europe, which may resolve this issue.[8] In short, scientific evidence that early detection or even treatment decreases morbidity and mortality is lacking.[2, 3]

As common as prostate cancer is, medical science still has much to learn about effective screening, diagnosis, and treatment. Worldwide, African men and Black males in America have the highest incidence and death rates from prostate cancer among all racial or ethnic groups.[4] In the United States, the disease strikes fifty percent more often among Black males than among their White counterparts.[5] However, for all males regardless of race, the risk of developing prostate cancer increases with age, especially among men age fifty years and older.[6] Some research indicates that high-fat diet, complex hormonal factors, and heredity are probably closely related to prostate cancer and are additional risk factors for the disease.[7] While men at risk should consult with their physicians about the potential benefits of screening, when the illness is detected, it is essential for the patient and his family to discuss all treatment options with the treating physician.[9]

Nevada Prostate Cancer Profile Strengths

The profile is easy to use and easy to understand and it provides valuable information for health professionals and the public.

- The profile uses easy terms to describe the anatomy and pathophysiology of the state gland.
- Defines the most frequent signs and symptoms of prostate cancer.
- Explains modifiable and non-modifiable prostate cancer risk factors and identifies men at high risk for prostate cancer according to age, family history, and race.

Provides valuable information for health professionals.

- This profile offers health care professionals thorough analysis of the validity and reliability of prostate cancer screening tests, and provides the positive predictive value (PPV) for each single test and for all possible combinations of prostate cancer screening tests.
- The profile describes the two most frequently utilized tumor-staging systems, and explains the value of the Gleason Tumor Grading System.

Discusses prostate cancer treatment

This profile provides up-to-date treatment options and modalities in relation to prostate cancer stage of disease at time of diagnosis and grade of cell differentiation. Furthermore, the profile describes potential complication of each treatment modality.

Describes available screening and referral resources

Chapter seven in this profile provides detailed listing of the major resources for cancer screening, information and referral in Nevada and nationwide.

Discusses patient/client counseling:

- This profile discusses ways to counsel individual patients about prostate cancer screening tests' reliability.
- It provides the clinician with precious knowledge to counsel patients screened with abnormal findings. Furthermore, it helps counseling patients and their families to empower them in selecting the most appropriate treatment modality.

Nevada Prostate Cancer Profile Challenges:

Difficulties in data collection:

Collecting incidence data was difficult due to several gaps in prostate cancer reporting system and data collection. The actual numbers of prostate cancer cases was not available to use in this profile.

Difficulties in assessing the prostate cancer disease burden in Nevada:

Due to the lack of information from the Nevada BRFSS regarding screening status, demographics and the lack of prostate cancer point or period prevalence figures (number of prostate cancer survivors in Nevada), it was very difficult to assess and discuss, in depth who pays for prostate cancer screening and the disease burden in Nevada.

Difficulties in data presentation:

- We have some concerns that target audiences may misunderstand profile information.

- There were some difficulties in presenting some technical terms and data charts in a simple and friendly format to ensure that intended audience who are less sophisticated in health statistics do not misinterpret the profile information.

- We encountered some challenges to choose between decision supports graphics that depend on multivariate data visualization and presentation graphics that should be kept simple and focused.

- Preparing the data in a summary format suitable for presentation to the public, providers and policy makers.

Difficulties in reflecting screening recommendations:

It was not an easy task to accurately reflect conflicting recommendations and guidelines regarding prostate cancer screening. The profile listed several recommendations and guidelines of the different national agencies and health authorities.

Difficulties in explaining prostate cancer screening risks:

Due to the lack of conclusive data generated from randomized controlled clinical trials, and the lack of consensus over prostate cancer screening, it was difficult to explain potential harms or benefits of prostate cancer screening.

Diverse experiences and perspectives among the members of the Prostate Cancer Task Force:

Frequently, the Prostate Cancer Task Force members had conflicting opinions regarding the focus, goals and objectives of the profile.

SECTION-VI

Data Limitations

1. Cancer Registry data is incomplete. In place of using Nevada actual prostate cancer case numbers, some estimated numbers were used in this profile.

2. Incidence rates were calculated from the SEER National Cancer Registry case estimates.

3. Nevada point or period prevalence is not available to include in this profile.

4. Nevada-specific figures and data available were inadequate to conduct meaningful cost-effectiveness analysis for population-based prostate cancer screening.

5. The profile does not include percentages of men screened for prostate cancer in Nevada. It is expected that Nevada's actual rates for prostate cancer screening, and demographics of the populations who access prostate cancer screening will be available from the Behavioral Risk Factors Surveillance Survey (BRFSS) in November 2002.

Prostate Cancer Rate Estimates

A source of cancer cases estimates that is used across the nation is a report by the American Cancer Society (ACS) entitled Cancer Facts and Figures. The report, which is published annually, uses estimates of new cases based on incidence rates from the National Cancer Institute's (NCI) Surveillance Epidemiology and End Results (SEER) National Cancer Registry.[18]

New cancer cases among Nevada residents are reported to the Nevada Cancer Registry (NCR). Until the year 2000 Nevada hospitals were the sole source of new cases reported to the Cancer Registry. However, high percentages of prostate cancer cases are diagnosed and treated in physicians' offices without the need of hospital admission.[17] This fact helps to explain the low number of prostate cancer cases available at the State Cancer Registry. Historically, the NCR prostate cancer case numbers represented only about 50% of estimates of the State Health Division and the American Cancer Society.

As the actual (observed) numbers of prostate cancer cases were inaccurate, new cancer cases number was calculated by estimating the number of cancer cases expected for populations that are very similar and/or demographically comparable to the Nevada populations by age distribution, race/ethnicity, insurance, income, education, marital status, employment, location, housing, and access to health care and other variables.[17] The estimated cases are calculated using the cancer incidence rates from the selected regions of the United States included in the SEER National Registry. Demographics and population estimates are calculated using data collected by the US Bureau of the Census.

SECTION-VII

Recommendations

Accurate population-based data on prostate cancer are needed to develop appropriate public health strategies. Cancer surveillance is the foundation for a state comprehensive strategy to reduce illness and death from cancer. Data collection and analysis must be enhanced and utilized to improve cancer reporting and surveillance activities. In order to improve cancer reporting the following steps are needed:

1. **Enhancing the Nevada Statewide Cancer Registry (NCR):**

   NCR must be enhanced in order to become capable to regularly assess the completeness of prostate cancer reporting. Methods for improving case reporting can be identified and tested.

   Improving prostate cancer data quality especially on incidence, stage of diagnosis, quality of care, and race and ethnicity would enable the Nevada State Health Division to design more effective public health programs and to address the disease burden. Moreover, complete, valid and reliable NCR data would enhance the evaluation of differences in the burden of prostate cancer in rural/frontier medically underserved areas of Nevada and the general public.

2. **Enhancing the Behavioral Risk Factor Surveillance System (BRFSS):**

   In order to improve the data quality, reliability and validity and to assess the screening status and the cost-effectiveness of prostate cancer screening adequately, questions on prostate cancer screening have been added to the Nevada 2001 BRFSS core questionnaire. These questions will help to determine what proportion of men aged 40 years and older have received prostate cancer screening and whether there is an association between screening, race, a family history of prostate cancer, and patient's age.

3. Developing collaborative partnerships with public and private partners including insurance companies, private providers, and health management organizations. This may result in reporting improvement.

4. Providing incentives to medical offices, laboratories and hospitals to improve the completeness and accuracy of cancer reporting.

5. Encouraging collaborative professional education and training projects with hospital-based cancer registries.

6. Increasing cancer-related policy development in a variety of settings (education, prevention, early detection, screening, diagnostic, follow-up and treatment).

7. Identifying and creating funding opportunities to enhance cancer data collection activities in the state.

8. Exploring additional sources of information and the need to collect further data particularly from randomized clinical trials.

SECTION-VIII

References

1. American Foundation for Urologic Disease. Prostate cancer resource guide. 1999 ed. Baltimore, Maryland: American Foundation for Urologic Disease Inc., 1999.

2. Garraway WM, Collins GN, Lee RJ. High Prevalence of benign prostatic hypertrophy in the community. Lancet. 2001; 338;469-71.

3. Thompson IM, Zeidman EJ. Current urological practice: routine urological examination and early detection of carcinoma of the prostate. J Urol. 1998; 148:326-30.

4. Surveillance, Epidemiology and End Results (SEER) Program public use CD-ROM 1973-2001, National Cancer Institute, DCPC, Surveillance Program, Cancer Statistics Branch, Released May 2000, Based on the January 2002 submission.

5. American College of Physicians, Clinical Guidelines: Part III. Screening for prostate cancer. *Ann Intern Med* 1999; 126: 394-406.

6. Demers RY, Swanson GM, Weiss LK, Kau TY. Increasing incidence of cancer of the prostate: the experience of Black and White men in the Detroit metropolitan area. Arch Intern Med. 1999; 154:1211-6.

7. Baquet CR, Horm JW, Gibbs T, Greenwald P. Socioeconomic factors and cancer incidence among Blacks and Whites. J Natl. Cancer Inst. 2001; 83:551-7.

8. Bureau of Health Planning and Vital Statistics. 1990-2000. Carson City, Nevada: Nevada State Health Division 2001.

9. American Cancer Society. Nevada cancer facts & figures: a sourcebook for planning and implementing programs for cancer prevention and control, 2000. Las Vegas, Nevada: American Cancer Society, 2000.

10. U.S. Preventive Services Task Force. Guide to Clinical Preventive Services 3rd Ed. Baltimore: William & Wilkins, 1999.

11. Coley CM, Barry MJ, Fleming C, et al, Early detection of prostate cancer. Part II: Estimating the risks, benefits, and costs. Ann Intern of Med. 1999; 126: 468-479.

12. Potosky AL, Miller BA, Albertsen PC, Kramer BS. The role of increasing detection in the rising incidence of prostate cancer. JAMA 1999; 273:548-52.

13. Mettlin C, Jones G, Averette H, Gusberg SB, Murphy GP. Defining and updating the American Cancer Society guidelines for the cancer-related checkup: prostate and endometrial cancers. CA Cancer J Clin. 1998; 43:42-6.

14. Wasson JH, Cushman CC, Bruskewitz RC, Littenberg B, Mulley AG Jr., Wennberg JE. A structured literature review of treatment for localized prostate cancer. Prostate Disease Patient Outcome Research Team. Arch Fam Med. 1999; 2:487-93.

15. Fleming C, Wasson JH, Albertsen PC, Barry MJ, Wennberg JE. A decision analysis of alternative treatment strategies for clinically localized prostate cancer. Prostate Patient Outcomes Research Team. JAMA. 1998; 269:2650-8.

16. U. S. Bureau of the Census. (2001, November). United States Population, State by State. Washington DC: U.S. Government Printing Office.

17. Physician Data Query [computer database]. Prostate Cancer Screening State-of-the-Art Statement. Bethesda, MD: national Cancer Institute; 2002.

18. Gohagan JK, Prorok PC, Kramer BS, Cornett JE. Prostate cancer screening in the prostate, lung, colorectal, and ovarian cancer screening trial of the National Cancer Institute. J Urol. 1999; 152(5 Pt 2): 1905-19.

19. Potosky AL, Miller BA, Albertsen PC, Kramer BS. The role of increasing detection in the rising incidence of prostate cancer. JAMA 1999; 273:548-52.

20. David G. Bostwick, MD Gregory T. MacLennan, MD, and Hayne R. Larson, MD. Prostate Cancer: What Every Man- and His Family-Needs to Know. New York: American Cancer Society/Villard Books, 1999

21. Surveillance, Epidemiology and End Results (SEER) Program public use CD-ROM 1973-2001, National Cancer Institute, DCPC, Surveillance Program, Cancer Statistics Branch, Released May 2000, Based on the January 2002 submission.

22. U.S. Preventive Services Task Force. Guide to Clinical Preventive Services 3rd Ed. Baltimore: William & Wilkins, 1999.

23. Coley CM, Barry MJ, Fleming C, et al, Early detection of prostate cancer. Part II: Estimating the risks, benefits, and costs. Ann Intern of Med. 1999; 126: 468-479.

24. Demers RY, Swanson GM, Weiss LK, Kau TY. Increasing incidence of cancer of the prostate: the experience of Black and White men in the Detroit metropolitan area. Arch Intern Med. 1999; 154:1211-6.

25. Baquet CR, Horm JW, Gibbs T, Greenwald P. Socioeconomic factors and cancer incidence among Blacks and Whites. J Natl. Cancer Inst. 2001; 83:551-7.

26. Potosky AL, Miller BA, Albertsen PC, Kramer BS. The role of increasing detection in the rising incidence of prostate cancer. JAMA 1999; 273:548-52.

27. Mettlin C, Jones G, Averette H, Gusberg SB, Murphy GP. Defining and updating the American Cancer Society guidelines for the cancer-related checkup: prostate and endometrial cancers. CA Cancer J Clin. 1998; 43:42-6.

28. Wasson JH, Cushman CC, Bruskewitz RC, Littenberg B, Mulley AG Jr., Wennberg JE. A structured literature review of treatment for localized prostate cancer. Prostate Disease Patient Outcome Research Team. Arch Fam Med. 1999; 2:487-93.

29. Fleming C, Wasson JH, Albertsen PC, Barry MJ, Wennberg JE. A decision analysis of alternative treatment strategies for clinically localized prostate cancer. Prostate Patient Outcomes Research Team. JAMA. 1998; 269:2650-8.

30. U. S. Bureau of the Census. (2001, November). United States Population, State by State. Washington DC: U.S. Government Printing Office.

31. Physician Data Query [computer database]. Prostate Cancer Screening State-of-the-Art Statement. Bethesda, MD: National Cancer Institute; 2002.

32. Gohagan JK, Prorok PC, Kramer BS, Cornett JE. Prostate cancer screening in the prostate, lung, colorectal, and ovarian cancer screening trial of the National Cancer Institute. J Urol. 1999; 152(5 Pt 2): 1905-19.

33. American Foundation for Urologic Disease. Prostate cancer resource guide. 1999 ed. Baltimore, Maryland: American Foundation for Urologic Disease Inc., 1999.

34. Garraway WM, Collins GN, Lee RJ. High Prevalence of benign prostatic hypertrophy in the community. Lancet. 2001; 338;469-71.

35. Thompson IM, Zeidman EJ. Current urological practice: routine urological examination and early detection of carcinoma of the prostate. J Urol. 1998; 148:326-30.

36. American College of Physicians, Clinical Guidelines: Part III. Screening for prostate cancer. *Ann Intern Med* 1999; 126: 394-406.

37. Bureau of Health Planning and Vital Statistics. 1990-2000. Carson City, Nevada: Nevada State Health Division 2001.

38. American Cancer Society. Nevada cancer facts & figures: a sourcebook for planning and implementing programs for cancer prevention and control, 2000. Las Vegas, Nevada: American Cancer Society, 2000.

39. Potosky AL, Miller BA, Albertsen PC, Kramer BS. The role of increasing detection in the rising incidence of prostate cancer. JAMA 1999; 273:548-52.

40. Corder, EH, et al., Cancer Epidemiol Biomarkers Prev 2002;4:655-659.