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Data for the Texas Health Care Information Council was analyzed to identify the patterns of surgical procedures among men admitted to 114 Texas hospitals with a diagnosis of prostate cancer in 1999; and to determine whether these patterns varied by race and age. In all 4,608 cases were compared for differences between age, race and type of surgical procedure using Pearson's chi-square test. Frequencies were tabulated for age, race, length of stay, type of surgery, and type of insurance. Radical prostatectomy and transurethral resection of the prostate are the most common procedures performed. Black and Hispanic men less than 45 years old were more likely to receive radical prostatectomy than whites. Transurethral resection of the prostate (TURP) is most commonly performed in men 75 years and older with higher proportions among black and Hispanic men. Younger men (age < 45 years) who received TURP were more likely to be white. White men between the ages of 45 and 84 were more likely to receive perineal prostatectomy. These findings identified patterns of treatment with defined differences between age and race.

PATTERNS OF PRIMARY SURGICAL PROCEDURES AMONG MEN
ADMITTED TO TEXAS HOSPITALS WITH A DIAGNOSIS
OF PROSTATE CANCER

Rosemary Galdiano, B.S.N.

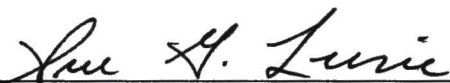
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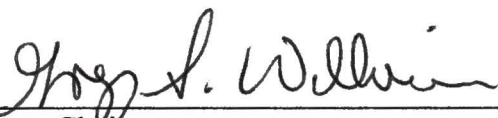
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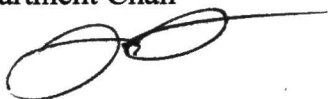
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PATTERNS OF PRIMARY SURGICAL PROCEDURES AMONG MEN
ADMITTED TO TEXAS HOSPITALS WITH A DIAGNOSIS OF PROSTATE
CANCER

THESIS

Presented to the School of Public Health
University of North Texas Health Science Center at Fort Worth
in Partial Fulfillment of the Requirements

For the Degree of

Master of Public Health

By

Rosemary Galdiano, B.S.N.

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INTRODUCTION

Prostate cancer is the most common non-cutaneous male malignancy and ranks as the second cause of cancer-related mortality among men in the United States.¹ The total cost of prostate cancer treatment in the United States has been estimated to be \$4.5 billion.² Clearly, prostate cancer is a major health problem among U.S. males. The prostate specific antigen (PSA) test has revolutionized the detection and management of prostate cancer since its approval by the U.S. Food and Drug Administration in 1986.³ However, the management of localized prostate cancer remains controversial due to the long natural history of the disease and lack of scientific evidence of a survival advantage for any available method of treatment.⁴ The high costs of health care and treatment of prostate cancer are also influenced by the morbidity of the disease in advanced stages. Patients with locally advanced disease are at increased risk of developing urologic complications requiring treatments, such as transurethral resection of the prostate and procedures for upper urinary tract obstruction.²

The advent of prostate specific antigen (PSA) testing as a diagnostic tool has dramatically improved the early detection of prostate cancer and is a factor in the recent downward trends in mortality.^{5,6} Early detection and improvements in therapy have resulted in five-year survival rates of 93% in the United States with most (80%)

diagnosed in the early stages of the disease.⁷ PSA- based screening have resulted in radical changes in the management of prostate cancer. Over the last ten years, prostate cancer is being detected more frequently, often in younger men resulting in stage migration, a shift toward earlier disease presentation.^{19,21} The primary method of diagnosis has shifted from incidental findings during transurethral resection to transrectal ultrasound biopsy.^{8,20} The goal of therapy has transitioned from survival only to survival and improved quality of life.⁸

The treatment options for early stage prostate cancer are surveillance therapy, radiation therapy (including brachytherapy) and radical prostatectomy.⁹ There are differing opinions among surgical, medical and radiation oncologists regarding the appropriate treatment and timing of the available treatment modalities for localized prostate cancer, American Joint Committee stages T1-4 N0-3 M0.⁴ The controversy surrounding the management of localized prostate cancer is due to the indolent nature of the disease and the lack of randomized, controlled trials regarding the efficacy of the various treatment modalities.¹⁰ Without this "Gold Standard" of evidence for the management of prostate cancer, decisions for optimal therapy are based on the stage of disease and factors such as age, general health, and expected survival.¹¹ Surveillance therapy, also known as observation or watchful waiting is a conservative non-curative approach that is offered to elderly men with low-grade low tumor volume and a life expectancy of less than 10 years.^{9,10} The goal of surveillance therapy is to maximize the patient's quality of life by avoiding the potential complications of localized therapy.⁹ The morbidity of advanced disease which may require treatment (30% of patients) in

the last 12- 18 months of life as well as psychosocial issues, such as the burden of knowing that cancer is present and that the chance for cure is diminished or lost are the primary disadvantages of surveillance therapy.⁹

Refined patient selection through increased efforts in the early detection of prostate cancer by PSA- based screening has resulted in the increased diagnosis and treatment of clinically organ confined tumors.^{6,21} Radiation therapy and radical prostatectomy are the primary treatment options in localized prostate cancer.³ Stage migration and the increase in the incidence rate of prostate cancer have resulted in an increase in the number of radical prostatectomy procedures for the treatment of localized prostate cancer.²¹ Pathologically detected non-organ-confined disease is found in approximately 50% of those treated with radical prostatectomy, and 30% to 40% will experience disease progression.²¹ Consequently, neoadjuvant and combined adjuvant therapies, such as chemotherapy and combined radiotherapy-hormonal therapy for localized disease has increased. However, a survival benefit of adjuvant therapy after surgery for localized therapy is yet to be determined.²¹ Perineal prostatectomy is a procedure that is less traumatic to the body and is associated with a faster recovery and decreased pain. Factors that are involved in the decision for this procedure are obesity, and the probability of negative lymph nodes.¹¹ The development of new strategies and improved evidence based therapies are needed in the management of localized prostate cancer.²¹

Development of effective strategies to improve diagnosis, reform treatment planning and improve local therapy requires an understanding of current demographics

and treatment patterns. Data from the Texas Health Care Information Council was analyzed to identify patterns of primary inpatient surgical procedures among men admitted to Texas hospitals with a diagnosis of prostate cancer in 1999, and to determine whether these patterns varied by race and age.

METHODS

Data Sources

Surgical procedures were identified from hospital discharge data in the Public Use Data File (PUDF) compiled by the Texas Health Care Information Council (THCIC). The THCIC was created by the 74th Texas Legislature in 1995 and is governed by the Texas Health and Human Services Commission. The THCIC collects data from hospitals using the UB92 patient billing form, an administrative form used to submit hospital charges to third party payers. The PUDF contains patient discharge information collected from 411 Texas hospitals and currently represents discharges during 1999. The patient information contained in the PUDF ranges from patient demographics to charges for hospital procedures and includes patient diagnosis. All individual patient identities are protected in the PUDF.¹²

Study Sample

Identification of prostate cancer patients was based on the presence of International Classification of Disease version 9 Clinical Modification diagnostic code (ICD-9 CM) 185.0 and age thirty-five years or older.¹³ To ensure that all patients included for analysis were treated for the management of prostate cancer, only patients with a principle ICD-9 CM diagnostic code of 185.0 as the primary reason for admission were included. Prostate cancer patients admitted for hospitalizations due to co-morbidity, an external injury, such as injury during biopsy or whose record was

missing a designation of race or ethnicity were excluded. Overall, this study included 4,608 cases with surgical procedures of the prostate from the Texas Health Care Information Council PUDF collected in 1999.

Definition of variables

The THCIC codes diagnostic and surgical procedures in the PUDF using the ICD-9 CM classification system. The surgical procedures, which were classified as the principal ICD-9 surgery code in the PUDF were used to identify the primary surgical procedure. The surgical procedures coded as ICD -9 CM classification 60.21 and 60.29 are subcategories for transurethral resection of the prostate and were categorized as one single category for transurethral resection of the prostate. Additionally, the surgical procedures coded as ICD-9 CM classification 60.3 and 60.4 are subcategories (suprapubic and retropubic) for prostatectomy and were categorized as one category for prostatectomy. For the purpose of categorical analysis the characteristics for age and race were categorized. Age was classified into 6 categories, 35-44, 45-54, 55-64, 65-74, 75-84, and 85+.

The PUDF classifies race and ethnicity as separate variables. Racial categories include white, black, American Indian, Asian/Pacific Islander and other. Ethnicity is categorized as Hispanic or non-Hispanic. For the purposes of this study, race and ethnicity were classified into one variable defined as white non-Hispanic, black non-Hispanic, Hispanic (i.e., white Hispanic and black Hispanic), and other. Due to the small numbers of American Indians and Asian/Pacific Islanders, these individuals were

classified as other. The length of hospital stay was calculated as the date of discharge minus the admission date (start of care date) and was classified into 4 categories, 1-7, 8-14, 15-21, and 22+ days.

Statistical Analysis

Frequencies were tabulated for age, race, length of hospital stay, surgical procedure and type of insurance. Comparisons between age, race and surgical procedure were performed using Pearson's chi-square test. The null hypothesis (an equal distribution of the tested variables between different series) was rejected for $p < 0.05$. Measures of association were performed using Cramer's V coefficient in all comparisons.

RESULTS

Demographic Data

A total of 4,608 patients with a diagnosis of prostate cancer were identified in the 1999 Public Use Data File of the Texas Health Care Information Council. Table 1 illustrates the demographic characteristics of the study population. Approximately 50% of the study population was 65 years of age or older. The majority of the men admitted for surgical treatment of prostate cancer were white (76%), followed by Hispanics (10.4%), blacks (9.2%) and other (4.1%). Ninety-seven percent of cases were in the hospital for less than a week. Of the 4,608 patients, 132 (2.9%) had a length of stay (LOS) between 8 and 14 days and only 26 were hospitalized greater than 14 days (Table 2). The majority of the patients had either commercial insurance coverage (51.9%) or Medicare (42.0%). Smaller percentages had Medicaid coverage (0.5%) or other (5.6%) which included self-pay, workman's compensation, or military coverage.

Patterns of Surgical Procedures

The six most common surgical procedures identified as the principle surgical procedure for the hospitalization are listed in Table 3. Radical prostatectomy was the most common (79.2%) followed by transurethral prostatectomy (18.9%). As demonstrated in Figure 1, the percentage of men treated with transurethral resection, prostatectomy, radical prostatectomy and perineal prostatectomy changes as a function of age ($p = 0.000$). Men under 45 years of age are more likely to be treated with

radical prostatectomy (91.9 %) and transurethral resection (8.1%). Transurethral resection is the primary treatment for men 75 years of age and older (87%). The highest proportions of men receiving radical prostatectomy are between the ages of 55 and 64 (42.1%) and 65-74 years of age (40.4%).

Racial differences in the patterns of surgical treatment, as measured by percent of cases receiving each type of treatment are demonstrated in Figures 2 and 3 and are significant ($p = 0.000$). Radical prostatectomy is the most common surgical procedure among whites (79.6%), blacks (79%) and Hispanics (75.7%). Blacks (2.4%) and Hispanics (1.7%) are more likely to receive radical prostatectomy at younger ages (35-44 years) compared to whites (0.7%). Transurethral resection of the prostate is the second most common surgical treatment among whites (18.6%), blacks (19.3%) and Hispanics (21.6%). The percentages of men receiving transurethral resection of the prostate between ages 55 and 64 is higher in black men (14.6%) compared to whites (9.5%) and Hispanics (12.6%). White men (13.6%) were the only racial group who received transurethral resection of the prostate among men younger than 45 years of age. Hispanics (2.1%) were more likely to be treated with prostatectomy compared to whites (1.5%) or blacks (1.7%). Black men (0.0%) were the least likely to receive perineal prostatectomy compared to whites (0.3%) and Hispanics (0.6%). Of those who did receive perineal prostatectomy, the procedure was performed on white men (age 45-84 years) across a broader age range compared to Hispanics (age 55-64 years). Overall, the differences between age, race and type of surgical procedure are significant ($p = 0.000$).

DISCUSSION

In 2001, it is estimated that 198,100 new prostate cancer cases will be diagnosed and 31,500 men will die of the disease in the United States. In Texas, it is estimated that 12,500 men will be diagnosed and 2,000 will die of prostate cancer in 2001.¹ The incidence rate of prostate cancer in Texas is lower (126.0 per 100,000) than the national rate (139.3 per 100,000).^{6,7} Incidence rates for black men in Texas (222.9 per 100,000) are similar to those found at the national level. Texas black men are also observed to have a higher (71.1 per 100,000) incidence of prostate cancer compared to whites (56.6 per 100,000) and Hispanics (36.9 per 100,000).^{14,15} Recently, a declining trend in prostate cancer mortality can be seen. Mortality declined between 1994 and 1997 at an annual rate of 4.5% in white men and 2.3% in black men.⁷ The mortality rate in Texas (24.1 per 100,000) is also declining but remains higher than the rate for the United States (23.7 per 100,000).^{14,15} Five-year survival for men in the United States who are diagnosed with distant metastatic disease remains poor at 32.6%.⁷

The two major risk factors for prostate cancer are age and race. In the United States, the median age at diagnosis has decreased from the period prior to PSA- based screening (1980-1985) by 1.7 years in whites and 1.3 years in blacks.¹⁶ The median age at diagnosis is now 71 years for whites and 69 years for blacks.¹⁶ Black men have a poorer distribution of stage of disease and survival compared to white men.⁷ The median age at death from prostate cancer is 78 years for whites and 76 years for blacks

.¹⁶ The mortality rate for black men (52.1 per 100,000) is more than twice as high as the rate for white men (21.7 per 100,000).¹⁷

With the introduction of serum PSA testing, improvements in surgical technique and safer anesthesia there has been a dramatic increase in the frequency of radical prostatectomy.^{6,18} Radical prostatectomy is associated with long-term disease free survival (90% - 94% at 10 years). The majority of men hospitalized for surgical treatment of prostate cancer in Texas undergoes radical prostatectomy and is more likely to be 65-74 years old. In keeping with national trends of a shift toward younger ages, a significant proportion is between 55 and 64 (42.1%).¹⁶ Men of all races are being treated aggressively with radical prostatectomy. In Texas, racial differences in surgical treatment patterns are evident among men undergoing radical prostatectomy at ages younger than 45 and among those receiving transurethral prostatectomy for the treatment of prostate cancer. Black and Hispanic men younger than 45 years old are more likely to receive radical prostatectomy than white men are. Although, transurethral resection of the prostate for the treatment of prostate cancer has declined over the past 14 years, today most men who undergo this procedure are 75 years old and older.¹⁹ Rates for transurethral resection of the prostate for cancer are higher among black men than white men.¹⁹ In Texas, the pattern of treatment with transurethral resection of the prostate reflects these trends. Men receiving transurethral prostatectomy were 75 years old and older and are most likely to be black or Hispanic. However, this study identified a significant difference in the proportion of men receiving transurethral prostatectomy under the age of 45 (13.1%). Men receiving this therapy within this age

group were also more likely to be white. Perineal prostatectomy was more likely to be performed on white men between the ages of 45 and 84. The lack of clinical and pathological data to clearly determine staging of disease was a limiting factor in this study. However, the analysis of this data set has identified patterns of surgical procedures and defined differences between age and race. In the face of a lack of evidence regarding the efficacy of current therapies, further research of this data set over time is needed to study the effects of current trends in prostate cancer therapy.

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APPENDIX A

TABLES

Table 1. Patients Admitted for Prostate Cancer Surgery by Selected Characteristics

Characteristic	N	Percentage
Age		
35-44	37	0.8
45-54	552	12.0
55-64	1669	36.2
65-74	1785	38.7
75-84	434	9.4
85+	131	2.8
Race		
White, Non-Hispanic	3517	76.3
Black, Non-Hispanic	424	9.2
Hispanic	477	10.4
Other	190	4.1
Insurance		
Commercial	2387	51.9
Medicare	1933	42.0
Medicaid	25	.5
Other	257	5.6

Table 2. Distribution of Length of Stay

	N	Percent
Length of Stay, Days		
1 - 7	4450	96.6
8 - 14	132	2.9
15 - 21	19	0.4
22+	7	0.2
Total	4608	100.0

Table 3. Distribution by Type of Surgical Procedure

Procedure	ICD-9 Principle Surgical Procedure Code	N	Percentage
Transurethral prostatectomy	60.21	16	.3
Other transurethral prostatectomy	60.29	856	18.6
Suprapubic prostatectomy	60.3	13	.3
Retropubic prostatectomy	60.4	58	1.3
Radical prostatectomy	60.5	3648	79.2
Perineal prostatectomy	60.62	17	.4
Total		4608	100.0

APPENDIX B

FIGURES

Figure 1: Surgical Procedure by Age

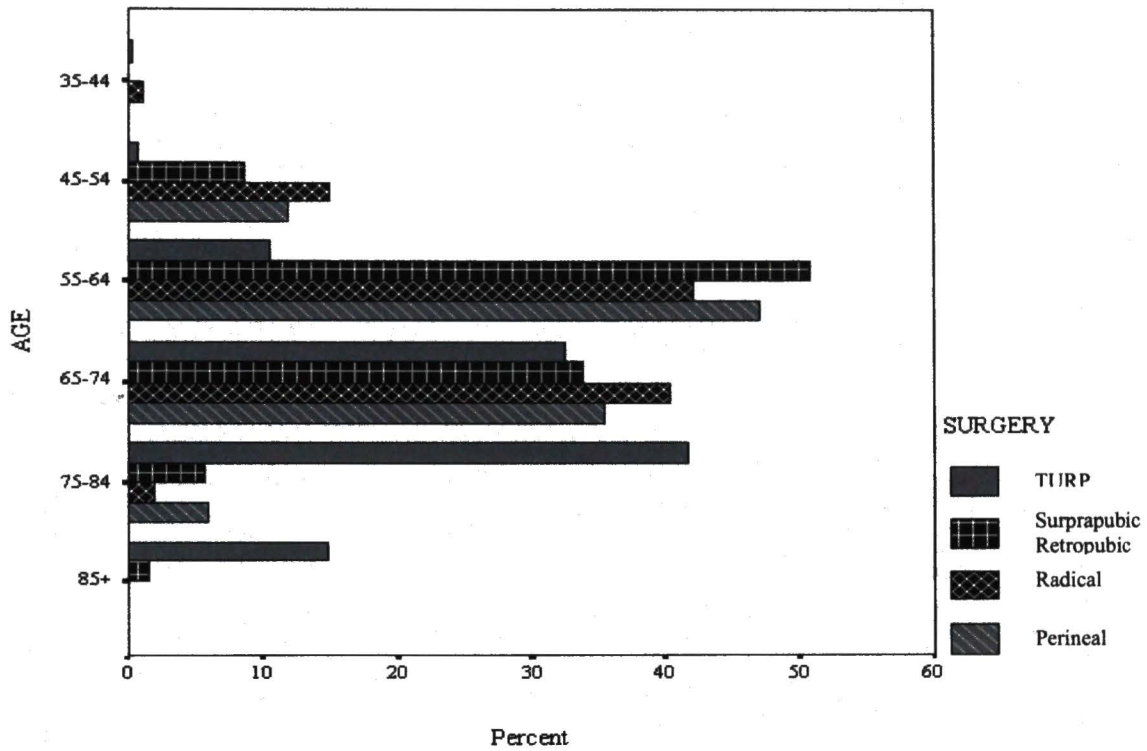
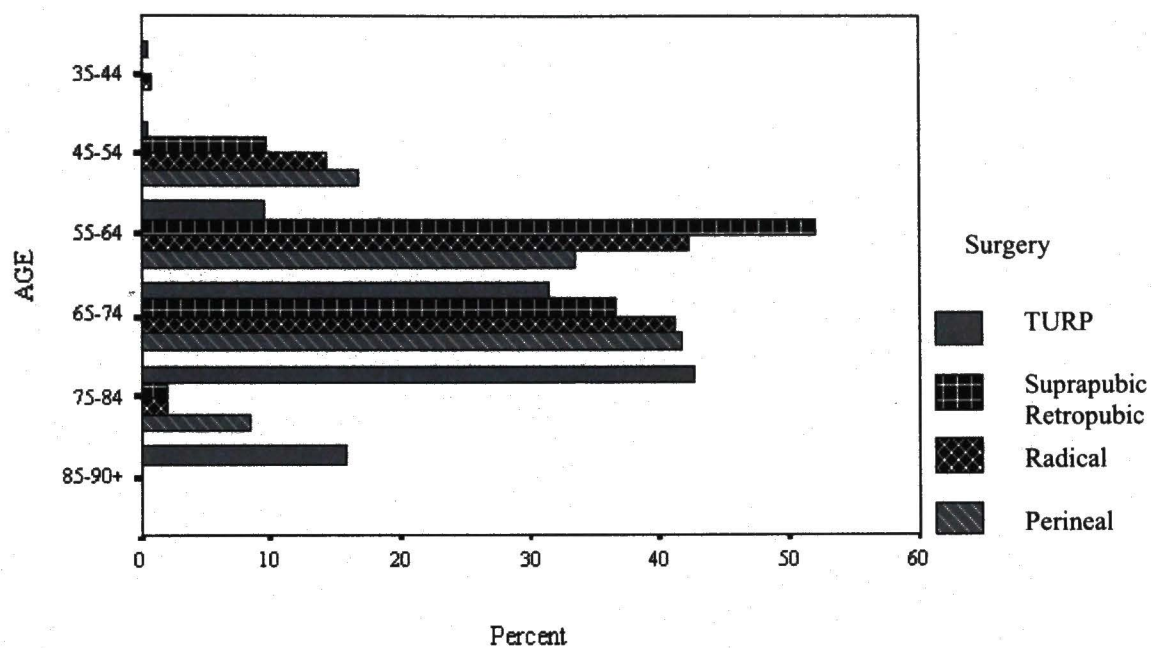


Figure 2: Surgical Procedure by Age and Race

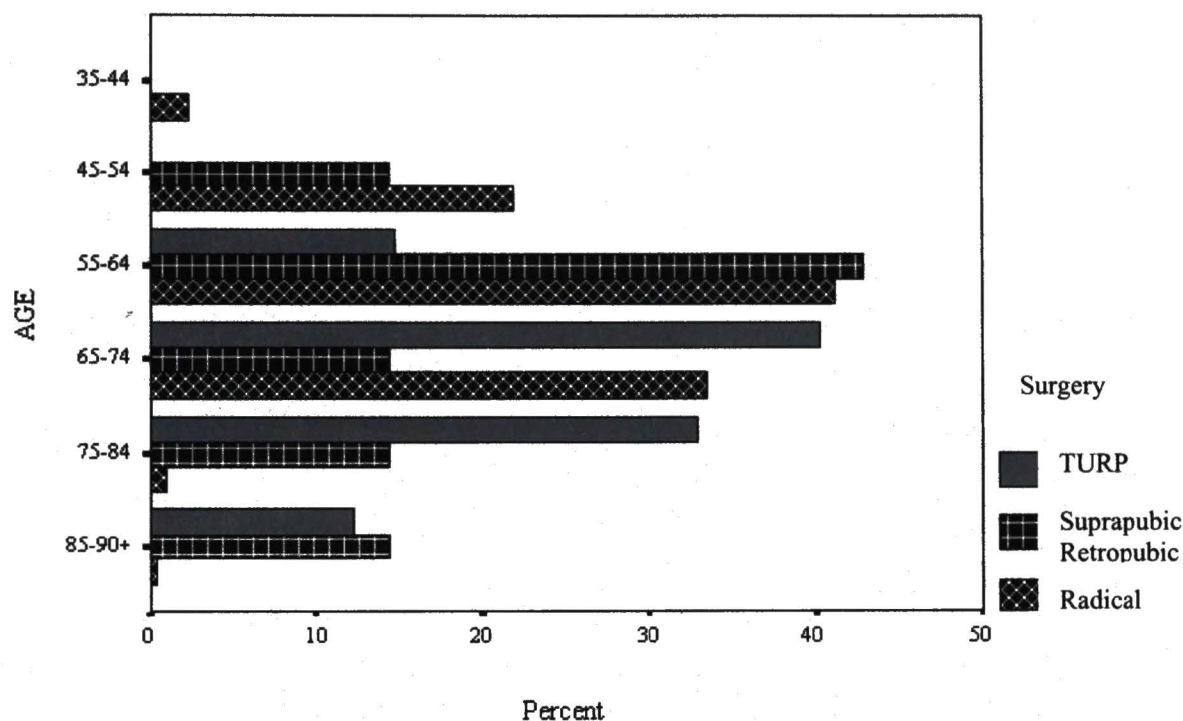
White



Pearson's Chi Square = 1629.556 (15, $n = 3,517$), $p = 0.000$
 Cramer's V = 0.393, $p = 0.000$

Figure 3: Surgical Procedure by Age and Race

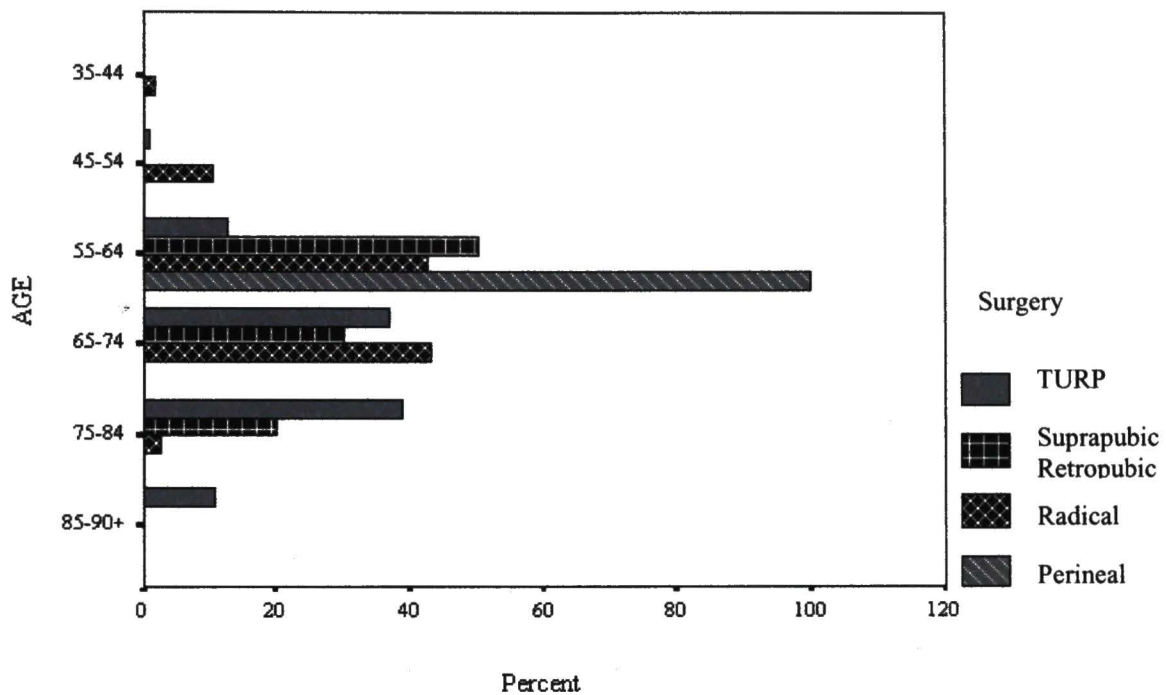
Black



Pearson's Chi Square = 163.944 (10, $n = 424$), $p = 0.000$
Cramer's V = 0.440, $p = 0.000$

Figure 4: Surgical Procedure by Age and Race

Hispanic



Pearson's Chi Square = 177.653 (15, $n = 477$), $p = 0.000$
 Cramer's V = 0.352, $p = 0.000$

APPENDIX C

MANUSCRIPT STYLE OF THE NEWSMAGAZINE, TEXAS MEDICINE

JOURNAL ABSTRACT

LETTER TO THE EDITOR

MANUSCRIPT STYLE, TEXAS MEDICINE

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JOURNAL ABSTRACT

Galdiano, R, Rene A., Mains, D., Lurie, S., Patterns of primary surgical procedures among men admitted to Texas hospitals with a diagnosis of prostate cancer. University of North Texas Health Science Center, School of Public Health (Epidemiology), December 2001, 25 pp., 3 tables, 4 illustrations, references, 21 titles.

Data for the Texas Health Care Information Council was analyzed to identify the patterns of surgical procedures among men admitted to 114 Texas hospitals with a diagnosis of prostate cancer in 1999; and to determine whether these patterns varied by race and age. In all 4,608 cases were compared for differences between age, race and type of surgical procedure using Pearson's chi-square test. Frequencies were tabulated for age, race, length of stay, type of surgery, and type of insurance. Radical prostatectomy and transurethral resection of the prostate are the most common procedures performed. Black and Hispanic men less than 45 years old were more likely to receive radical prostatectomy than whites. Transurethral resection of the prostate (TURP) is most commonly performed in men 75 years and older with higher proportions among black and Hispanic men. Younger men (age < 45 years) who received TURP were more likely to be white. White men between the ages of 45 and 84 were more likely to receive perineal prostatectomy. These findings identified patterns of treatment with defined differences between age and race.

Editor
Texas Medicine
401 W 15th St
Austin, TX 78701

Dear Sir/Madam:

Enclosed please find three copies of a manuscript entitled "*Patterns of primary surgical procedures among men admitted to Texas hospitals with a diagnosis of prostate cancer*" for review and possible publication in Texas Medicine.

Authors include: Rosemary Galdiano, RN MPH, Antonio A. René, PhD MPH, Douglas Mains, DrPH, and Sue Lurie, PhD

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If you have any questions, comments or concerns about this manuscript, please do not hesitate to contact me.

I hope this manuscript meets the expectations of your journal.

Sincerely,

A handwritten signature in black ink that reads "Rosemary Galdiano". The signature is written in a cursive, flowing style.

Rosemary Galdiano, RN, MPH
Cancer Prevention and Early Detection
Harris Methodist Fort Worth Hospital

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