Hospitalization for Prostate Cancer Among the Older Men in the Longitudinal Study on Aging, 1984–1991

Fredric D. Wolinsky, Julie Krygiel, and Kathleen W. Wyrwich

School of Public Health, Saint Louis University, Missouri.

Background. Factors associated with being hospitalized with indications of prostate cancer were examined. A secondary analysis of the older men in the Longitudinal Study on Aging (LSOA) used baseline (1984) interview data and Medicare hospital claims for 1984 through 1991.

Methods. The analytic sample consisted of 2254 men who were 70 to 95 years old (mean 75.8 years) at baseline and who were self-respondents to the LSOA. Case-identification involved primary prostate cancer (ICD9-CM code 185) and personal history of prostate cancer (ICD9-CM code V10.46) hospital discharge diagnoses. Multivariable logistic regression techniques were used.

Results. There were 154 cases (6.8%) of prostate cancer, including 109 identified by active diagnostic codes only, 15 identified by personal history codes only, and 30 identified by both. No associations with age, race, or ethnicity were observed. Being hospitalized with indications of prostate cancer was more likely in the presence of a history of cancer at any site, urinary control problems, greater body mass, maximum social interaction, or living in core Standard Metropolitan Statistical Area counties. Men who regularly attended religious services, had not seen a physician for 2 years, and did not feel in control of their health were less likely to have been hospitalized with indications of prostate cancer.

Conclusions. These data suggest that the traditional associations between prostate cancer and age, race, and ethnicity do not apply to being hospitalized with indications of the disease among older men. However, body mass, history and symptoms, personal beliefs, access, and geographic practice patterns are associated with being hospitalized with indications of prostate cancer.

In the United States, prostate cancer is the most common form of cancer among men (excluding nonmelanoma skin cancers) (1). It is estimated that this year 198,100 new cases will be detected and that 31,500 men will die from the disease (2). The incidence of prostate cancer has risen dramatically in the past two decades, whereas the death rate from it has grown much more slowly, suggesting that the substantially increased incidence is primarily a function of improved detection (3). Despite considerable advances in the ability to detect and diagnose prostate cancer at early stages (2–10), the etiology of the disease is not well understood, and no leading causative agents have been identified (2,4,6,11–13).

The best available epidemiologic evidence focuses on four major risk factors: age, race and ethnicity, diet and dietary factors, and family history (2,4,6,13). Most prostate cancer is detected in men 55 years old and older, and the average age at diagnosis is about 70 years old (14–18). African Americans have about twice the risk of prostate cancer compared with whites, and Asian Americans have lower rates than whites (14–18). Men with high-fat diets (especially saturated fat) have elevated risks for prostate cancer (14–18). Finally, men whose fathers or brothers have had prostate cancer have twice the risk for contracting the disease compared with men with no family history of prostate cancer, and that risk increases substantially with the number of affected relatives (14–18).

The available epidemiologic evidence, however, has been obtained primarily from case-control studies of hospitalized patients and from prospective studies of geographically limited or otherwise selective cohorts and has focused on men younger than 74 years old (14). As a result, the epidemiologic associations involving various factors and prostate cancer among older men are not well established, and further investigation is warranted. This study examines factors associated with having been hospitalized and having a discharge diagnosis for prostate cancer among older men in the Longitudinal Study on Aging (LSOA). The LSOA was selected because it provides a large nationally representative sample of older men, a number of factors potentially associated with the disease, and enough hospital episodes containing prostate cancer discharge diagnoses to facilitate multivariable analyses.

METHODS

Sample

To statistically monitor national trends in health and health services use, the National Center for Health Statistics designed the National Health Interview Survey (NHIS) to be fully representative of the noninstitutionalized civilian population. As part of the 1984 NHIS, a half sample of participants aged 55 to 64 years old and all of those aged 65 years old or older also received the Supplement on Aging (SOA) interview shortly after their regular NHIS interview (19). This supplementary interview focused on func-
tional status, basic activities of daily living (ADL) and instrumental activities of daily living (IADL), and the use of community and long-term care services. The LSOA consists of the 7527 SOA men and women who were aged 70 years old or older at baseline.

In this study the focus is on the 2860 LSOA men. Of these, 361 men were excluded from the analyses because their interviews could not be linked to Medicare claims files. An additional 245 men for whom proxies completed the supplemental interview were excluded from the analyses because data on some factors thought to be associated with prostate cancer were obtained only from self-respondents. Thus, the analytic sample is restricted to the 2254 men who were self-respondents and whose interview data could be linked to their Medicare claims data (79% of all LSOA men). Vital status and date of death were determined using the National Death Index.

Case Identification

Of the 2254 men in the analytic sample, 1688 (74.9%) had one or more hospital episodes during the 8-year observation period (1984–1991). The NCHS provides only a limited extract of information from these hospital episodes, which includes the first five ICD9-CM discharge diagnosis codes but no admission diagnosis codes and no treatment information. The discharge diagnosis codes were used to identify men who had primary prostate cancer (i.e., ICD9-CM code 185), secondary prostate cancer (i.e., ICD9-CM code 198.82), or a personal history of prostate cancer (i.e., ICD9-CM code V10.46) associated with any of their hospital episodes. All available hospital episodes for each of these men were then examined.

Using this information, primary prostate cancer codes in any of the five available hospital discharge diagnosis fields were accepted as prima facie evidence for case identification. This decision was made on the basis of previous work suggesting that discharge diagnoses alone would yield an average sensitivity of about 74% for the observation period (using incidence data from the Surveillance Epidemiology and End Results system as the benchmark) (20–22). Hospital episode histories for men who had secondary but no primary prostate cancer codes were then examined. In the three instances where this occurred, there was compelling supportive evidence that the prostate cancer was secondary to previously diagnosed cancers at other sites. Therefore, men having only secondary prostate cancer codes were not identified as cases.

Finally, all hospital episodes for men having a personal history of prostate cancer were examined. Of these, 65% also had prima facie evidence of primary prostate cancer during the observation period. In 87% of those cases, the hospital episode with the prima facie evidence preceded the hospital episode with the indication of a personal history of prostate cancer. Moreover, for 65% of the men with a personal history but no prima facie evidence of prostate cancer, the personal history code appeared on their first hospital episode during the observation period. On the basis of these findings, men with a personal history of prostate cancer were considered cases as well. As an added safeguard, however, the analysis was also performed with these cases treated as controls.

Factor Selection

Three groups of factors were considered. The first includes indicators of the major risk factors associated with prostate cancer that are available in the LSOA. Age was measured in years. Because the functional form of the relationship between age and prostate cancer among older men is unknown, alternative specifications were also explored, including the square of age, the natural logarithm, 5- and 10-year age groupings, and binary threshold markers for ages 75 and older and 80 and older. Race and ethnicity were assessed using a set of dummy variables that contrasted Native Americans, Asian Americans, African Americans, and Hispanic Americans with non-Hispanic white Americans. Although no dietary information is contained in the LSOA, self-reported height and weight were used to calculate the body mass index (BMI) as a reasonable proxy (23). Because the functional form of the relationship between dietary factors and prostate cancer is also unknown, alternative specifications were explored, including the square of BMI and binary threshold markers for obesity (BMI ≥ 30) and being underweight (BMI ≤ 20) (24). Unfortunately, the LSOA does not contain any information on family history of prostate cancer.

The second group of factors includes indicators of what have previously been inconsistently reported in the literature as factors associated with prostate cancer. These included physical activity, symptoms, comorbid conditions, socioeconomic status, and sexual activity. Physical activity was addressed using both performance and disability measures. The performance measures included binary indicators of walking a mile or more at least once a week, having a regular exercise routine, getting as much exercise as needed, having a lower physical activity level compared with peers, and having a lower physical activity level compared with 1 year ago. The disability measures included having difficulty performing any of seven ADL (bathing, dressing, eating, getting in or out of bed, walking, getting outside, or using the toilet), any of six IADL (preparing meals, shopping, money management, using the telephone, and light or heavy housework), or any of six lower body functional motions (walking a quarter mile, climbing steps, standing, stooping, and carrying 10 or 25 lb). Symptoms were measured using binary indicators of difficulties controlling urination or bowel movements. Comorbidity was addressed using binary indicators for having a history of any type of cancer or diabetes. Socioeconomic status was measured using a binary indicator of working for pay, a set of dummy variables that contrasted being below the poverty level or not reporting income with being above the poverty level, and both continuous (years) and binary (less than fifth grade, and less than eighth grade) measures of education. A binary indicator of being currently married was used as a proxy for sexual activity (25).

The third group of factors includes a number of health attitudes or subjective assessments, indicators of social support and social interaction, access and practice pattern markers, and health services utilization measures that are either plausibly associated with prostate cancer or are known to be predictors of hospitalization (on which the method of case identification depends). Indicators of health attitudes
and subjective assessments include binary markers of having health worries, no sense of health control, serious vision or hearing problems, poor current self-rated health, declines in self-rated health compared with 1 year ago, or an excellent ability for self-care. Binary markers for not having someone to care for you if you were sick, regular attendance at religious services, living alone, and living in multigenerational households measured social support. Social interaction was measured by a set of binary markers for each of five specific forms (i.e., face-to-face and telephone contacts with friends or relatives and going to movies or sporting events), as well as a marker for participating in all five. Access and practice pattern measures included binary markers for not having Medicare coverage, not having private health insurance, living in the core county of a Standard Metropolitan Statistical Area (SMSA), and a set of dummy variables contrasting living in the northeast, southern, or western census regions with living in the north-central region. Health services utilization indicators included binary markers for ever having resided in a nursing home, having been hospitalized in the year prior to baseline, and not having seen a physician at least once in the 2 years prior to baseline.

Analytic Strategy and Methods

Multivariable logistic regression is used to predict having a hospital episode with a discharge diagnosis of prostate cancer (26). This approach ignores the timing information contained in the discharge date because of concerns over whether Medicare claims data from a limited observation period can be used to identify incident hospital episodes (20). A review of the data for men with multiple hospital episodes having primary prostate cancer ICD9-CM codes reflects this left-censoring problem (i.e., no hospital episodes available prior to 1984), which is even more complicated for those cases identified as having only a personal history of prostate cancer. The left-censoring problem notwithstanding, the natural history of the disease, its detection, and its treatment make it unlikely that any claims-based method (especially one that relies only on inpatient claims) could identify all prostate cancer cases (2,4,6,8–12). Thus, the reader is reminded that the analyses reported here are limited to identifying factors associated with having a hospital episode containing a discharge diagnosis of prostate cancer.

Because the list of factors to be considered was large, a multiple step process was used to assemble the final model. First, all crude odds ratios (OR) were examined (results not shown but available on request). Second, any factor whose crude OR had an associated p value ≤ .10 was taken into a series of model-building procedures including forced entry of all such factors and both forward and backward selection. Finally, any factor whose adjusted OR from any of the preceding steps was statistically significant (p ≤ .05) was taken into a trimmed, forced-entry model. All models were then compared for consistency.

In addition, three sensitivity analyses were conducted. The first repeated the second through final steps but considered as cases only those men who had hospital episodes containing primary prostate cancer ICD9-CM codes. The second analysis repeated these same steps but added both a binary marker for whether the respondent died and a measure of the number of months during the observation period that the respondent was alive to adjust for differential opportunities for case identification. The third analysis re-estimated the final model after excluding any men who had a baseline history of cancer at any site to identify potential artifacts associated with the left censoring problem. All statistical analyses were performed using the SPSS software system, version 10.0.1 (27). Standard methods for the assessment of the statistical assumptions of the multivariable models were employed (26,28).

Results

Descriptive Data

The 2254 men in the analytic sample accrued a total of 5620 hospital episodes during the observation period. Primary prostate cancer codes were found in 230 hospital episodes (4.1%), accounting for 139 men (6.2%). The distribution of the 230 primary prostate cancer codes by first- through fifth-listed discharge diagnosis fields was 129, 38, 28, 19, and 16, respectively. Of the 139 men with primary prostate cancer codes, 80 had only one such episode, 32 had two, 12 had three, 5 had four, and 5 had five. Personal history codes for prostate cancer were found in 62 hospital episodes (1.1%), accounting for 45 men (2.0%). The distribution of the 62 personal history codes by first- through fifth-listed discharge diagnosis fields was 0, 8, 17, 16, and 21, respectively. Of the 45 men with personal history codes, 35 had only one such episode, 6 had two, 2 had three, 1 had four, and 1 had five. Both primary prostate cancer and personal history codes were found for 30 men, yielding a total of 154 men (6.8%) who were classified as cases for the present study, with the 2100 men having neither a primary diagnosis nor a personal history code classified as controls.

Crude Associations

Notably, none of the measures of age or race and ethnicity were associated with having hospitalizations indicating prostate cancer. This is reflected in Table 1, which shows the number of men in each age or race and ethnicity group

Table 1. Percentage of the 2254 Men in the Longitudinal Study on Aging Hospitalized With Indications of Prostate Cancer During 1984–1991 by Age and by Race and Ethnicity

<table>
<thead>
<tr>
<th>Age and Race and Ethnicity Groups</th>
<th>Number of Men</th>
<th>Percent Hospitalized for Prostate Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70–74 y</td>
<td>1079</td>
<td>7.1</td>
</tr>
<tr>
<td>75–79 y</td>
<td>716</td>
<td>6.4</td>
</tr>
<tr>
<td>80–84 y</td>
<td>304</td>
<td>6.9</td>
</tr>
<tr>
<td>85–89 y</td>
<td>121</td>
<td>7.4</td>
</tr>
<tr>
<td>90 y or older</td>
<td>34</td>
<td>2.9</td>
</tr>
<tr>
<td>Race and ethnicity group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native Americans</td>
<td>11</td>
<td>0.0</td>
</tr>
<tr>
<td>Asian Americans</td>
<td>11</td>
<td>9.1</td>
</tr>
<tr>
<td>Hispanic Americans</td>
<td>62</td>
<td>6.5</td>
</tr>
<tr>
<td>African Americans</td>
<td>138</td>
<td>8.0</td>
</tr>
<tr>
<td>White Americans</td>
<td>2019</td>
<td>6.8</td>
</tr>
<tr>
<td>Total</td>
<td>2254</td>
<td>6.8</td>
</tr>
</tbody>
</table>
as well as the percentage of men hospitalized with indications of prostate cancer. With the exception of the very small groups (i.e., men 90 years old or older, Native Americans, or Asian Americans), the percentages hospitalized with indications of prostate cancer are very similar. Indeed, even the percentage of African Americans hospitalized with indications of prostate cancer is only 1.2% greater than that for non-Hispanic white Americans (OR = 1.189, p = .596).

Table 2 contains the means, standard deviations, OR, and p values for all factors whose crude association with having been hospitalized with indications of prostate cancer met the initial screening criterion (p ≤ .10). As shown in Table 2, men with greater BMIs, whose activity levels had declined over the year prior to baseline, who had urinary control problems, a history of cancer at any site, went out to public events, participated in all five forms of social interaction, or live in a core SMSA county are more likely to have been hospitalized with indications of prostate cancer. Men whose family income was below the poverty level or whose income was unknown, who had less educational attainment, who felt an absence of control over their health, who regularly attended religious services, or who did not have private health insurance were less likely to have been hospitalized with indications of prostate cancer.

**Independent Associations**

With one exception, when the variables shown in Table 2 were taken into forward and backward stepwise model-building procedures, the same factors had independent associations with having been hospitalized with indications of prostate cancer. The exception was that the forward procedure selected the square of the BMI, whereas the backward procedure selected the base term for the BMI. No additional factors were significant in the forced-entry model that included all 16 variables shown in Table 2. When both the base and squared BMIs were forced into the same model with the other factors identified in the forward and backward procedures, neither achieved statistical significance. Moreover, the increment in model fit compared with having only one of the BMIs was trivial (the χ² improvement for adding the squared term was 0.020, 1 df, p = .886). Thus, given its more straightforward interpretation, Table 3 contains the adjusted OR, p values, and summary statistics for the multivariable logistic regression model using the base BMI term.

As shown in Table 3, eight factors are independently associated with having been hospitalized with indications of prostate cancer. The overall model chi-square statistic is highly significant, and the nonsignificant Hosmer-Lemeshow statistic indicates a good fit to the data. Men who at baseline have greater BMIs, report urinary control problems, participate in all five forms of social interaction, or live in a core SMSA county are more likely to have been hospitalized with indications of prostate cancer. Men who at baseline do not feel in control of their health, regularly attend religious services, and have not seen a physician in 2 years are less likely to have been hospitalized with indications of prostate cancer.

**Sensitivity Analyses**

To increase confidence in the results shown in Table 3, several sensitivity analyses were conducted (data not shown). First, the model-building process was repeated using as cases only men hospitalized with primary prostate cancer.
cancer ICD9-CM codes. Those results were very similar. The main difference was that reporting urinary control problems at baseline was not selected in either the forward or backward procedures, although the adjusted OR was comparable, reflecting decreased statistical power. In addition, the backward procedure retained reports of decreased activity levels over the year prior to baseline as well as low educational attainment, although neither was significant \((p > .05)\). Second, inclusion of the binary marker for whether the respondent died during the observation period and the continuous measure of the number of months lived during this time did not meaningfully alter the results reported in Table 3. Third, restriction of the analysis to men with no prior history of cancer at any site at baseline yielded adjusted ORs quite comparable to those shown in Table 3, although the substantial reduction in power \((117 \text{ vs } 154 \text{ hospitalized cases})\) resulted in larger confidence intervals that included the null for several factors.

**Discussion**

Factors associated with being hospitalized with indications of prostate cancer were examined among self-respondents to the 1984 baseline LSOA interview whose survey data could be linked to Medicare claims files. Case identification was based on hospital episodes for 1984 through 1991 that contained either a primary prostate cancer ICD9-CM code or a personal history of prostate cancer ICD9-CM code in one of the first five discharge diagnosis fields. Of the 2254 men in the analytic sample, 154 (6.8\%) had one or more hospital episodes indicating prostate cancer. Factors consistently associated with prostate cancer in the literature, other factors for which the evidence is more equivocal, and known correlates of hospitalization were considered in multiple logistic regression analyses.

Two aspects of the results are most interesting. The first involves nonfindings. Although age and race and ethnicity are consistently reported as two of the four major risk factors for prostate cancer \((2,4,6,8,13,14)\), no crude or independent associations were found for either with having been hospitalized with indications of prostate cancer. On the one hand, the former may indicate that the age-related risk of the disease itself plateaus at age 70, which happens to be the minimum age for inclusion in the LSOA and the average age at diagnosis. Similar age-related plateaus or marked declines in age-related risks of hospitalization have been reported for some other chronic conditions in the LSOA \((29,30)\). On the other hand, it may be that, with less than 10 years of life expectancy for the majority of LSOA men at baseline \((24)\) \(\text{(in fact, } 44\% \text{ of the LSOA men died before } 1992)\), detection efforts are less aggressive \((2,4,6,8)\), and when prostate cancer is detected, there is a reluctance to proceed with hospital-based treatments \((2,4,6,11)\).

The nonfindings for race and ethnicity are also surprising. Although power to detect differences is quite limited for Native Americans and Asian Americans, this is much less the case for Hispanic Americans and African Americans. Moreover, the crude OR for Hispanic Americans \((947; p = .917)\) and African Americans \((1.189; p = .596)\) approximate unity. For African Americans this may reflect the mortality (and associated morbidity) convergence known to occur during the sixth decade as well as the traditionally lower hospitalization and treatment and procedure rates \((31)\). In any event, further research on hospitalization rates for prostate cancer using larger samples of older minority men are needed to corroborate these nonfindings.

The second interesting aspect of the results involves the factors that were associated with having been hospitalized with indications of prostate cancer. Increased risks associated with greater body mass, urinary control problems, and prior cancers at any site have been previously reported in the literature and need no further discussion \((2,4,6,13,14)\). The increased risks of being hospitalized with indications of prostate cancer associated with living in the central county of an SMSA or having seen a physician at least once during the 2 years prior to baseline were also expected, inasmuch as they reflect practice pattern and access issues \((2,4,6,12,32,33)\). That is, the dissemination of new screening guidelines and the adoption of innovative detection methods occur more quickly in proximity to major medical centers where the training function exerts upward pressure on hospitalization rates. The likelihood of screening, detection, and treatment \((including hospitalization)\) also increases with physician contact.

The associations involving regular attendance at religious services and not feeling in control of one’s health require further discussion. Cross-sectional and longitudinal analyses of data from the New Haven, Connecticut site of the Established Populations for the Epidemiologic Study of the Elderly (EPESE) have shown that regular attendance at religious services is independently associated with lower levels of functional disability and lower levels of cognitive dysfunction, even after controlling for social engagement, family ties, and activity level \((34–36)\). Moreover, those same EPESE studies demonstrate that it is attendance at religious services rather than religious self-identity or subjective religiosity that is important for older adults. The hypothesized etiologic mechanism is that by participating in collective worship, older adults, especially those with health problems, develop a more religious outlook \((37)\) on life in which physical limitations and frailties are no longer that important and are easier to deal with effectively without relying on intensive medical care interventions \((35,38)\).

Similarly, it has long been reported that older adults are more likely to view health problems and functional limitations as an expected part of the normal aging process \((39–41)\). As a result, they may be slower and/or less likely to seek care for many common signs and symptoms that they associate with normal aging. In more extreme manifestations, this may lead to a global sense of having no control over one’s health, which might translate into reduced bodily monitoring, a resistance to routine care, and a reluctance to pursue intensive medical care interventions. In the context of this study, the effect of both regular attendance at religious services and not having a sense of control over one’s health would result in a reduced risk of hospitalization for prostate cancer through a diminished likelihood of case identification and/or intensive treatment.

The increased risk of being hospitalized with indications of prostate cancer associated with participating in all five
forms of social interaction also requires further discussion. Men who regularly talk with their friends and relatives on the phone, visit with their friends and relatives in person, and attend public events have greater opportunities to discuss health-related matters within several broad reference groups (29,40,41). As a result of those discussions, these men may be more likely to be exposed to health information facilitating pattern recognition of the signs and symptoms associated with prostate cancer on the one hand and encouraging routine screening on the other (41). Moreover, if prostate cancer is detected in these men, the greater levels of social support that they receive from their extensive social interaction networks may increase their willingness to pursue medical interventions (4). As a result, they are more likely to be identified in this study as cases. Note that the effect of this secular social interaction is opposite to that of sacred social interaction and that these findings do not bode well for church-based interventions. Additional analyses (not shown) designed to clarify this quandary failed to detect any statistical interaction between secular and sacred social interaction.

This study is not without limitations, and these may be grouped into three categories. The first involves the measurement of the risk factors. The LSOA does not contain indicators of all known or plausible risk factors for prostate cancer, and several of the available measures are indirect. Most notably, the LSOA contains no information about family history. There is no evidence in the literature, however, to suggest that the absence of a family history measure would confound the associations observed for the other factors (2,6,8,13,14). Moreover, the literature suggests that the risk associated with family history itself is greatest for early-onset prostate cancer (8). In addition, self-reported height and weight were used to calculate BMI as a proxy for dietary information, and marital status was used as a proxy for sexual activity. Although previous studies have used similar measures (23,25), more rigorous and direct assessment of these risk factors would have been preferable.

The second category of limitations involves case identification. The protocol for case identification relied on primary prostate cancer or personal history of prostate cancer ICD9-CM codes appearing in the first five discharge diagnosis fields in each man’s hospital claims records during 1984 through 1991. Because no information on admission diagnosis or treatment regimens was available, the analyses could not be adjusted or stratified on the basis of those factors. Reliance on the discharge diagnoses poses three problems. (i) Not all men with prostate cancer were hospitalized during this period, (ii) the identifying ICD9-CM codes may not have shown up in the first five discharge diagnosis fields for at least one hospital episode for all men with prostate cancer, and (iii) men who were hospitalized and did have prostate cancer may not have been so diagnosed. Therefore, the prevalence of prostate cancer is greater than the 6.8% period-prevalence rate of hospitalization for the disease observed in this study.

The third category of limitations involves the historical context from which these data emerged. Throughout the 1980s, the principal screening test for prostate cancer was the digital rectal examination (DRE), an uncomfortable procedure often avoided by men and more likely to detect frank rather than subtle abnormalities (4,5). Combined with the generally slow growth rate of prostate cancer, this resulted in most diagnoses involving advanced disease with a concomitantly low 5-year survival rate (2,6). With the increased use of the prostate-specific antigen blood test in the 1990s as an adjuvant to the DRE, early detection has been more common, and 5-year survival rates have improved (3,7). Today, 58% of newly detected prostate cancer cases involve localized disease (with nearly 100% 5-year survival rates), 31% involve disease that has spread only to surrounding tissues (with 94% 5-year survival rates), and 11% involve disease that has spread more distally (with 31% 5-year survival rates) (2,6). Thus, factors associated with being hospitalized with indications of prostate cancer today may not be the same as those identified in these data from 1984 through 1991.

Acknowledgments

This research was supported by Grant R37-AG-09692 to Dr. Wolinsky from the National Institutes of Health. The opinions expressed herein are solely those of the authors and do not necessarily represent the official positions or policies of the supporting institutions and agencies.

Address correspondence to Dr. Wolinsky, Saint Louis University School of Public Health, 3545 Lafayette Avenue, St. Louis, MO 63104-1399. E-mail: wolinsky@slu.edu

References


Received March 2, 2001
Accepted May 17, 2001