Prostate Biopsies in Men with Limited Life Expectancy

PATTERNS OF PRACTICE

JOHN H. WASSON, MD
THOMAS A. BUBOLZ, PhD
Dartmouth Medical School
Hanover, NH

GRACE LU YAO, PhD
Healthstat
Princeton, NJ

MICHAEL J. BARRY, MD
Massachusetts General Hospital
Boston, Mass

CONTEXT. Authorities discourage prostate screening in men who are likely to die from causes other than prostate cancer.

PRACTICE PATTERN EXAMINED. Use of prostate biopsy—a proxy for screening—in men aged 65 and older with limited life expectancy (i.e., estimated to be less than 10 years).

DATA SOURCE. Five percent samples of Part A (hospital) and Part B (physician) Medicare claims for 1993 through 1997.

RESULTS. 22% of all Medicare beneficiaries who underwent a prostate biopsy had a limited life expectancy, corresponding to a rate of 1420 biopsies per 100,000. This rate did not change significantly between 1993 and 1997. For men with a life expectancy greater than 10 years, the biopsy rate was 2360 per 100,000. Among men with limited life expectancy, in the year following the biopsy, 1.6% had radical prostatectomy and 2.3% had external-beam radiation. Thirty-nine percent were hospitalized.

CONCLUSION. A substantial proportion of prostate biopsies are being performed in men with a life expectancy of less than 10 years. These men are unlikely to benefit from the biopsy or subsequent treatment.

Screening for prostate cancer is very controversial.[1] Some organizations advocate screening,[2] while others believe that a fair amount of evidence supports excluding prostate cancer screening from routine examinations.[3] This controversy stems from the lack of randomized trials demonstrating a benefit of screening or a survival advantage for prostate cancer treatment administered with curative intent. Despite the limited data, physicians who treat prostate cancer have strong convictions about the efficacy of the treatment they provide.[4]

Most authorities—even those that recommend prostate cancer screening—agree that screening does not make sense for men with a life expectancy of less than 10 years.[5, 6] The rationale for this belief comes from several observations. Decision analytic models demonstrate that for an older man or one with serious comorbid conditions, a competing hazard is much more likely to result in morbidity or death than is prostate cancer,[1, 7] suggesting that more elderly men die with, rather than of, slowly progressive prostate cancer. Side effects following prostate cancer treatment (e.g., incontinence, impotence) are also higher in older men.[8] Furthermore, in a large population-based study, almost 20% of men had at least one complication following biopsy.[9]

The purpose of this study is to examine the frequency of prostate biopsies among Medicare beneficiaries with a life expectancy less than 10 years—men who are not likely to benefit from prostate cancer treatment with curative or palliative intent. We focused on prostate biopsies, since there is no national data source to directly estimate rates of prostate cancer screening. Prostate biopsy is a good proxy for screening since it is almost always done to follow-up abnormal screening results.

Edited by Lisa M. Schwartz, MD, MS

In addition, we sought to describe subsequent prostate cancer treatments and health care utilization following prostate biopsies.

Methods

Overview

We defined the subgroup of men with limited life expectancy, calculated the rate of prostate biopsy among these men, and described their health care utilization in the year following the biopsy. **Figure 1** provides an overview of how we selected the patient population and defined limited life expectancy.

Study Population

We sought to identify all men without a known history of prostate cancer who had undergone a prostate biopsy during the years 1993 through 1997. We used data from 5% of national samples of Part A (hospital) and Part B (physician) Medicare claims. Biopsy for men 65 years of age or older was identified by line-item current procedural terminology (CPT) codes 55700, 55705, and 88170 in Medicare's Physician/Supplier Part B, 5% national sample, standard analytic files. We identified 61,043 men who had at least one prostate biopsy during this period. We excluded 8475 men with a known history of prostate cancer (i.e., International Classification of Diseases, 9th revision, clinical modification [ICD-9-CM], code 185 in either the Part A or Part B Medicare data file within the year before the biopsy). Thus, 52,568 men 65 years of age or older with at least one prostate biopsy and no previous diagnosis of prostate cancer were eligible for analysis.

Limited Life Expectancy

Most experts agree that prostate cancer screening is not indicated for men with a life expectancy of less than 10 years. For the purposes of this study, we used the "less-than-10-years" time frame to define limited life expectancy. It has been observed that as life expectancy decreases, mortality rates become almost constant over time and can be estimated by using a declining exponential function.[10] Based on this assumption, a life expectancy of 10 years or less corresponds to an annual mortality rate of 10% or higher. We calculated the 1-year mortality rate for the men in the study according to two fundamental risk factors for death—age and comorbid conditions—to identify subgroups with an annual mortality rate exceeding 10%.

The presence of comorbid conditions before biopsy was determined using the MedPAR discharge record
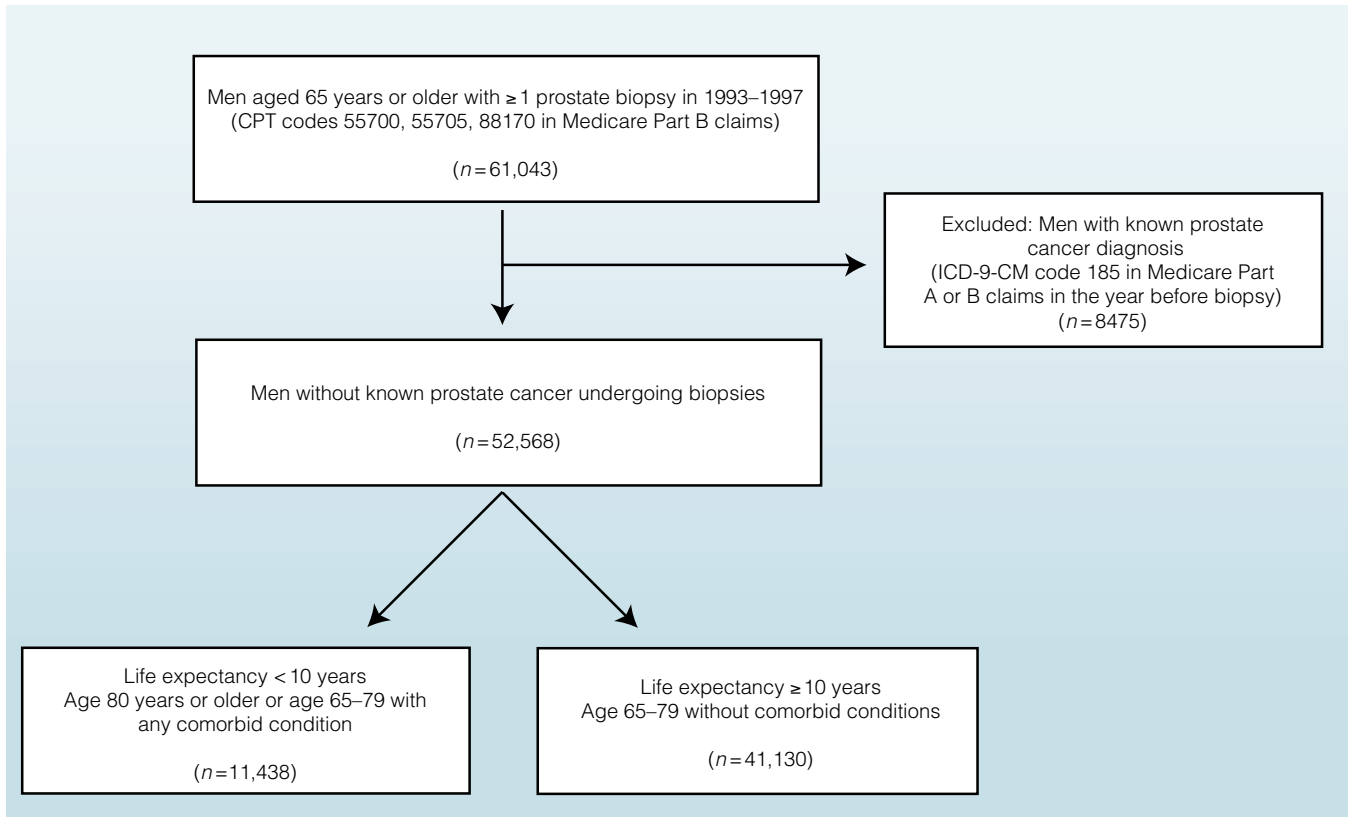

FIGURE 1. Selection of study population and definition of limited life expectancy. CPT = current procedural terminology; ICD-9-CM = International Classification of Diseases, 9th revision, clinical modification.
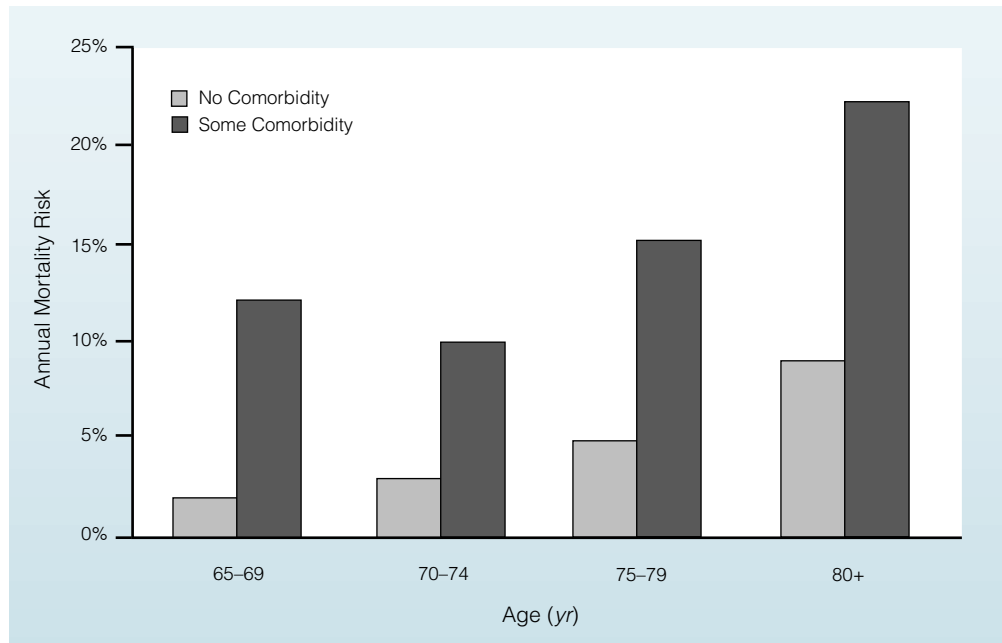
FIGURE 2. Annual mortality risk for men according to age and presence of at least one comorbid condition from the Charlson Index. On the basis of these data, we designated men aged 80 years or older and those aged 65 through 79 with any comorbid condition as having limited life expectancy (i.e., <10 years).

diagnosis codes recorded up to 1 year before the biopsy.[11] We considered patients to have a comorbid condition if they had one of the disorders included in the Charlson Index. The index was originally developed as a weighted index of chronic diseases that was predictive of 1-year mortality and has been found to be a good predictor of perioperative mortality and other adverse outcomes following treatment in acute care hospitals.

Figure 2 shows that men aged 80 years or older and those aged 65 to 79 with comorbid conditions have an actual 1-year mortality rate greater than 10%; these men constituted the group with limited life expectancy (*n* = 11,438). The remaining men were those with an expected life expectancy of at least 10 years (*n* = 41,130). Overall, men in the limited life expectancy group were approximately four times more likely to die in the next year than were those who had a life expectancy that exceeded 10 years (12.5% vs. 3.3%).

Outcomes

Prostate Biopsy

We calculated prostate biopsy rates for men with and without limited life expectancy. Not all biopsies are done as part of screening—some are done to secure a diagnosis in order to initiate palliative care. We estimated the proportion of biopsies done for prepalliation by using Surveillance, Epidemiology, and End Results (SEER) data for the study period to estimate the stage distribution of prostate cancer and the SEER-Medicare linked data to obtain stage distribution by biopsy history.[12] Stage of disease is a surrogate for palliative treatment:

Advanced disease would certainly justify palliation, and regional disease might.

Health Care Utilization

To identify prostate cancer treatments after biopsy, we used ICD-9-CM code 60.5 to identify radical prostatectomy and CPT codes 77402 through 77416 to identify external-beam radiation. We also identified all hospital admissions following prostate biopsy.

Analysis

To calculate prostate biopsy rates, men were assigned to age cohorts on the basis of their most recent age at the time of a prostate biopsy. Person-years were calculated for the period that each man was in an age cohort. For deaths and hospital admissions following biopsy, we calculated proportions using counts of men with biopsies in the denominator. We compared treatments and outcomes of men with and without limited life expectancy using the chi-square test. Analyses were done using STATA, Version 7.0 (College Station, TX).

Results

Prostate Biopsy Rates

The biopsy rate per 100,000 men was 1873 for ages 65 to 69, 2194 for ages 70 to 74, and 1658 for men aged 75 years or older. Comorbid conditions were present at the time of biopsy in 22% of these men: 8.8% in men aged 65 to 74 and 13.2% in men aged 75 years or older. The biopsy rate was 1914 per 100,000 for men with comorbid conditions and 1875 per 100,000 for those without.

During the 5-year study period (1993 through 1997), 22% of Medicare beneficiaries who underwent prostate biopsies had limited life expectancy (i.e., less than 10 years). **Figure 3** shows that biopsies are less frequently done in men with shorter life expectancy. In 1997, the biopsy rate for these men was 1420 per 100,000 (95% CI, 1200 to 1640) versus 2360 (CI, 2210 to 2500) for other men. For men with limited life expectancy, the biopsy rate has not changed over time (i.e., the rate in 1997 is not statistically different from that in 1993).

Prostate Cancer Treatments

Men with limited life expectancies were less likely to undergo prostate cancer treatments than were those with life expectancies of at least 10 years. **Table 1** shows that 1.6% of men with limited life expectancy underwent radical prostatectomy compared with 9.2% of other men ($P < 0.001$). A smaller difference was observed with external-beam radiation: 2.3% of those with limited life expectancy had external-beam radiation vs. 3.6% ($P < 0.001$) of those with greater life expectancy. Of note, rates of transurethral resection of the prostate were similar for men with and without limited life expectancy (5.5% vs. 5.1%; $P < 0.001$).

Subsequent Hospitalization

Men undergoing biopsy with a limited life expectancy were more likely to be hospitalized in the subsequent year than were those without (39% vs. 24%; $P < 0.001$) (**Table 1**). Men with reduced life expectancy who were hospitalized were also more likely to have multiple admissions within 1 year after the biopsy (48% vs. 37%;

$P < 0.001$). The most common medical reasons for admission of the group with limited life expectancy were infection or cardiovascular collapse.

Discussion

Most proponents of early detection and treatment of prostate cancer agree that men with a life expectancy of less than 10 years are seldom candidates for treatment with curative intent.[5, 6] Even if benefits were eventually demonstrated, treatment would probably remain inappropriate in persons at high risk for competing causes of death.[7] The morbidity and mortality from causes other than prostate cancer significantly reduce any purported benefit of testing and treatment. More than 40% of men with limited life expectancy will die or be hospitalized within a year following the biopsy. Nonetheless, we found that more than 20% of biopsies are being performed in a group of Medicare beneficiaries who have a life expectancy of less than 10 years. The rate of biopsy in this group of men is lower than the peak rate in 1993, but the reduction has recently stabilized or possibly reversed.

Why are biopsies being performed in these men? Without direct information from them or their clinicians, we can identify three possible causes.

First, screening for prostate cancer with the prostate-specific antigen (PSA) test in men with limited life expectancy is performed by many primary care clinicians.[4, 13–15] Many patients with limited life expectancy are then confronted with a worrisome PSA test result. The most direct way to resolve the uncertainty of the abnormal PSA is to have a biopsy. The patient may perceive a benefit in "knowing," even if nothing is to be done.
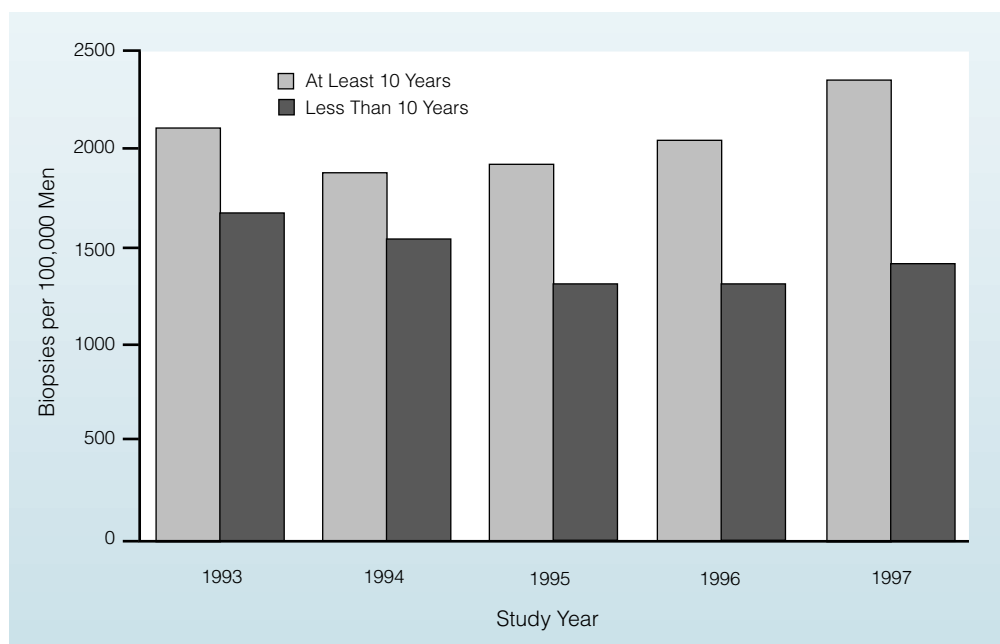

FIGURE 3. Trends per year in the rate of prostate biopsy for men with and without limited life expectancy.

Prostate Cancer Treatment and Hospitalization Following Prostate Biopsy*

VARIABLE	LIFE EXPECTANCY < 10 YEARS	LIFE EXPECTANCY ≥ 10 YEARS
1-year mortality	12.5%	3.3%
Prostate cancer treatment, *n*	11,438	41,130
Radical prostatectomy	1.6%	9.2%
External-beam radiation	2.3%	3.6%
Hospitalization, *n*†	11,255	37,371
Within 30 days	12%	6%
Within 1 year	39%	24%

*All comparisons are statistically significant (P <0.001).
†We excluded men who underwent radical prostatectomy from subsequent analyses to examine the "noncurative" hospital-based medical and surgical experiences of these men. We also excluded those who underwent biopsies and had known prostate cancer, those who were admitted concurrent with the performance of a biopsy, and those who were admitted for radical prostatectomy.*

Second, a significant minority of urologists, and to an even greater extent radiation oncologists, believe in the efficacy of treatment with curative intent in very old men and advocate PSA testing in men with less than a 10-year life expectancy.[4, 16] Moreover, from the clinical perspective, there are few disincentives to biopsy and many ways to justify it. Diagnostic certainty as an end in itself is a common justification.

Third, some prostate biopsies may be done to justify androgen-deprivation therapy or other types of palliative therapy.[17–19] We tried to exclude these biopsies by removing men known to have had a prior diagnosis of prostate cancer from our analyses. While we cannot know what proportion of the remaining biopsies were done for prepalliation, we know that during the period of 1993 through 1997, the proportion of men with regional or metastatic prostate cancer was 25.6% for men 75 years of age or older and 18.5% for men 80 years of age or older.[12] These data suggest that about 75% to 80% of the older men who underwent biopsy had no need for palliation.

We believe that the results of our analysis are conservatively biased. Since the information on comorbid conditions is based on previous hospital diagnoses, many men with serious comorbid illness have undoubtedly not been counted. Furthermore, an additional 14% of prostate biopsies were excluded from the analysis because they occurred in 8475 men already diagnosed with prostate cancer—2719 of these men had an average life expectancy of less than 10 years. The justification for a diagnostic procedure in men already known to have cancer is not clear.

Is a recommendation against prostate biopsy in men with limited life expectancy a rational clinical practice policy or "age discrimination"? On the one hand, it can be argued that it is wrong to use a life expectancy threshold of 10 years—or any length of time—to eliminate biopsies from men and that the biopsy is justified for the small number of men who will be found to have highly aggressive cancer. The risk for death from cancer in these men may outweigh the risk from competing causes for morbidity and mortality. On the other hand, it is not known if local treatment of aggressive prostate cancer actually reduces the risk for cancer death. It is known that prostate biopsy is associated with complications and that many men with reduced life expectancy will die of other causes or have significant morbidity (as documented by both the number and character of hospital admissions) within a year of the biopsy.

The precursor for most prostate biopsies is a PSA screening test. One study of informed consent for PSA screening found that two thirds of the patients either did not know the test was done or did not recall any discussion about the risks and benefits of the test.[20] Another study found that when men are fully informed, many decide not to be tested.[21] This limited literature strongly supports our belief that clinician enthusiasm for testing is the most likely cause for the use of prostate biopsy in the group of men with reduced life expectancy.

Some readers may view eliminating biopsies from men with limited life expectancy as a thinly veiled form of discrimination. After all, patient age and the comorbidity measures used here are imperfect predictors of competing hazards, and some older men with good functional health and physiologic measures will survive for many years. However, age and the measures used to define limited life expectancy are easy to obtain and have a striking predictive power for subsequent mortality and hospitalization. Regardless of the precise threshold chosen, this analysis strongly supports the notion that men with reduced life expectancy should receive clear communications that a PSA test and prostate biopsy are very unlikely to be helpful to them. Informed clinical decision making need not wait for perfect data.

We conclude that prostate biopsies are being performed on a significant proportion of Medicare beneficiaries who are very unlikely to benefit from prostate cancer testing and treatment. All men and particularly those in a limited life expectancy group need to be informed about the advantages and disadvantages of PSA screening and subsequent biopsy.

Take-Home Points

- Authorities discourage prostate screening in men who are likely to die of causes other than prostate cancer because this group is very unlikely to benefit from prostate cancer treatment.

- We used patient age and simple measures of comorbid illness to identify men with limited life expectancy (i.e., less than 10 years) using national Medicare data from 1993 through 1997.

- About one in five men aged 65 years or older who underwent prostate biopsy had limited life expectancy. In 1997, this corresponded to an annual rate of about 1.4%.

- Clinicians should inform all men—and particularly those with limited life expectancy—about the potential harms and benefits of prostate cancer screening tests.

References

1. 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. 1993;269:2650-8.
2. Smith RA, Mettlin CJ, Curtis J, Johnston DK, Eyre H. American Cancer Society Guidelines for the Early Detection of Cancer. CA Cancer J Clin. 2000;50:34-49.
3. Woolf SH. Screening for prostate cancer: United States Preventive Services Task Force. The Guide to Clinical Preventive Services, 2nd ed. Alexandria, VA: International Medical Publishing, Inc; 1996:119-34.
4. Fowler FJ, McNaughton Collins M, Albertsen PC, Zietman A, Elliott DB, Barry MJ. Comparison of recommendations by urologists and radiation oncologists for treatment of clinically localized prostate cancer. JAMA. 2000;283:3217-22.
5. Thompson I, Carroll P, Coley C, et al. Prostate-specific antigen (PSA) best practice policy. Oncology. 2000;14:267-86.
6. American Cancer Society. Available at: www.cancer.org. Accessed on March 26, 2002.
7. Welch HG, Albertsen PC, Nease RF, Bubolz TA, Wasson JH. Estimating treatment benefits for the elderly: the effect of competing risks. Ann Intern Med. 1996;124:577-84.
8. Potosky AL, Miller BA, Albertsen PC, Kramer BS. The role of increasing detection in the rising incidence of prostate cancer. JAMA. 1995;273:548-52.
9. Roberts RO, Bergstralh EJ, Besse JA, Peterson NR, Lieber MM, Jacobsen SJ. Risk factors for complications following a prostate biopsy: a community-based study. J Urol. 2000;163:91.
10. Beck JR, Kassirer JP, Pauker SG. A convenient approximation of life expectancy (the DEALE) I. Validation of the method. Am J Med. 1982;73:883-8
11. Deyo RA, Cherkin DC, Ciol MA. Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. J Clin Epidemiol. 1992;45:613-9.
12. Surveillance, Epidemiology, and End Results Program. National Cancer Institute. Available at: http://seer.cancer.gov/. Accessed on March 26, 2002.
13. Lawson DA, Simoes EJ, Sharp D, et al. Prostate cancer screening—a physician survey in Missouri. J Community Health. 1998;23:347-58.
14. Fawzy A, Fontenot C, Guthrie R, Baudier MM. Practice patterns among primary care physicians in benign prostatic hyperplasia and prostate cancer. Fam Med. 1997;29:321-5.
15. Collins MM, Stafford RS, Barry MJ. Age-specific patterns of prostate-specific antigen testing among primary care physician visits. J Fam Pract. 2000;49:169-72.
16. Fowler FJ Jr, Bin L, Collins MM, et al. Prostate cancer screening and beliefs about treatment efficacy: a national survey of primary care physicians and urologists. Am J Med. 1998; 104:526-32.
17. Wasson JH, Fowler FJ, Barry MJ. Androgen deprivation therapy for asymptomatic advanced prostate cancer in the prostate specific antigen era: a national survey of urologist beliefs and practices. J Urol. 1998;159:1993-7.
18. Physicians risk prosecution for selling drug samples. AMA News.2000; 24 April.
19. Inside Health Care: Doctors pained by probe of TAP's lupron drug. Chicago Tribune. 2000; 8 May.
20. Federman DG, Goyal S, Kamina A, Peduzzi P, Concato J. Informed consent for PSA screening: does it happen? Eff Clin Pract. 1999;2:152-7.
21. Flood AB, Wennberg JE, Nease RF Jr, Fowler FJ Jr, Ding J, Hynes LM. The importance of patient preference in the decision to screen for prostate cancer. Prostate Patient Outcomes Research Team. J Gen Intern Med. 1996;11:342-9.

Correspondence

John H. Wasson, MD, Herman O. West Professor of Geriatrics, Director, Center for the Aging, 7265 Butler Building, Dartmouth Medical School, Hanover, NH 03755-3862; telephone: 603-650-1823; fax: 603-650-1331; e-mail: john.h.wasson@dartmouth.edu.