Prostate Cancer Screening Practices and Knowledge of Prostate Cancer Screening Clinical Practice Guidelines By Primary Care Physicians: A Systematic Review of the Literature and Original Research Design

By

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Abstract
Objectives: The purpose of this paper is to systematically examine the literature regarding primary care physicians' knowledge and practice style concerning prostate cancer screening. I will then use the information to develop a research plan to assess physician practice styles, beliefs, and knowledge of recent guidelines and scientific evidence regarding prostate cancer screening.

Methods: I conducted a systematic evidence review to determine whether American primary care physicians are using shared decision-making when doing prostate cancer screening and which clinical practice guidelines (CPGs) they are aware of. I used a Medline search. Cross-sectional studies were included in the review. Randomized controlled trials, cohort studies and case-control studies would have been accepted except none were found. The main outcomes of interest were physicians' prostate cancer screening style specifically if they do pretest counseling (including shared decision-making), and knowledge of prostate cancer screening guidelines. Shared decision-making was defined as physicians doing prescreening discussions of the risks and benefits of prostate cancer screening and allowing their patients to participate in the decision whether or not to proceed with screening to the level the patient desired.

Results: Seven studies were included in the final review, none were done since the most recent guideline updates issued in 2008 and 2009 and none looked at knowledge of recent evidence from two large randomized controlled trials (RCT) on mortality benefit of PSA screening that were published in March of 2009. Several themes emerged from the literature review of studies published since 2000. It showed that between 60% and 100% of physicians report using shared decision-making. The 100% was from a focus group study, whereas in surveys between 66% and 99% of physicians report using shared decision-making. Physicians with knowledge of the guidelines or the unclear evidence of benefit are more likely to use shared decision-making than those without the knowledge. And between 0% and 33% of men age 50 and over are being screened for prostate cancer without a prescreening discussion of risks and benefits. No studies compared knowledge of guidelines to practice style.

Conclusion: Primary care physicians with greater knowledge of the insufficient evidence for prostate cancer screening are more likely than those lacking knowledge to be practicing shared decision-making. Since all of the studies were done prior to 2009, it is not clear whether physicians have knowledge of the newest CPGs and randomized-control trial evidence for prostate cancer screening. Yet, the results of this review show that knowledge of the latest developments is likely to influence practice.

Our research study is designed to assess the knowledge of the newest evidence and guidelines and the effect this has had on physician belief of benefit of prostate cancer screening. The primary outcomes will be knowledge of the mortality studies and current guideline, reported influence of the 2009 RCTs of prostate cancer screening on practice style, any association between knowledge of the RCTs or guidelines and belief of benefit of prostate cancer screening, and any association between knowledge of the mortality studies on practice style. We will also assess the way physicians report learning about the RCTs and any association between reported knowledge and correct knowledge answers with method of learning about the RCTs.
Introduction and Background

Prostate Cancer Prevalence

Prostate Cancer is the second most common cancer death in men in the United States. One in six men will develop prostate cancer at some point in their life. It is estimated that 27,360 men will die from prostate cancer in 2009 and 192,280 will be diagnosed with prostate cancer. Despite its high prevalence 80% of men who are diagnosed with prostate cancer are diagnosed with localized disease, which has a 100% 5-year survival rate. Prostate cancer had an overall 99.7% 5-year survival rate from 1999 to 2005. Prostate Cancer is often described as a cancer men die with instead of a cancer men die from.

Screening for Prostate Cancer

Screening for prostate cancer is done either with prostate-specific antigen (PSA) alone or PSA combined with digital rectal exam (DRE). Unfortunately, neither the PSA nor the DRE tests are specific. PSA levels can be elevated for many reasons besides prostate cancer and can remain normal in some men with cancer. Up to 38% of prostate cancers occur in men with PSA levels below 4ng/ml. The PPV of PSA is approximately 25.1%, from a pooled analysis of over 47,000 males (from 14 studies) aged 40-92 having a 10% prevalence of PSA >4ng/ml. The high false positive rate, 3 to 4 out of every 4 or 5 men with elevated PSA levels(above 4ng/ml), can lead to many unnecessary work-ups.

A variety of alterations have been considered for use of the PSA test to improve its accuracy; unfortunately none have been widely accepted due to unclear evidence of benefit. At least eight different versions of PSA testing have been tried. The PSA density, PSA Velocity, rate-specific PSA cutoffs, increased intervals for PSA screening, free PSA, complexed PSA and
age-specific PSA cutoffs have not been proven to improve the sensitivity and specificity of PSA. Each method has its advantages and its disadvantages. Some are more sensitive, others more specific. None have been shown to increase both sensitivity and specificity compared to normal PSA screening.\textsuperscript{2,4}

The accuracy of digital rectal exam (DRE) has been shown to vary among providers. Overall, it is thought to be more specific than it is sensitive. The test depends on the physician’s impression and has been shown to have a PPV of 28\% in a pooled analysis of 14 studies meaning that 72\% of patients with a positive DRE will not be found to have cancer on biopsy.\textsuperscript{5}

The benefits of the PSA test as a screening tool is debatable. It is clear that the PSA test can detect some asymptomatic prostate cancers and thus lead to earlier treatment. It remains unclear whether earlier detection and treatment leads to lower morbidity and mortality when done at a population level. Two large randomized trials, the Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial (PLCO) and the European Randomized Study of Screening for Prostate Cancer (ERSPC) published their intermediate results in March of 2009. Both had hoped to clarify the benefit of PSA screening. The PLCO study showed no significant mortality difference between the screened and unscreened group\textsuperscript{6}; and the ERSPC study showed a modest decrease in mortality of the screening group. The ERSPC study found that 1410 men would need to be screened and 48 men treated for prostate cancer to prevent one prostate cancer death.\textsuperscript{7} Both studies had significant limitations. One of the most important limitations of the PCLO study is the contamination of the control groups with men who had PSA tests done outside the protocol.\textsuperscript{8,9} The ERSPC did not have a standardized screening protocol between testing sites. PSA cutoffs ranged from 3ng/ml to 4ng/ml and some locations did DRE in addition
Prostate Cancer Diagnosis

Prostate cancer is diagnosed by biopsy. Biopsies are done after a patient has an abnormal PSA or DRE. Transrectal biopsies of the prostate are done and 8 to 19 core samples are taken. Higher numbers of core samples can lead to cancer detected at earlier stages. Based on the findings from the biopsy the cancer is assigned a Gleason score and staging is done with imaging if deemed necessary by Gleason score.

Prostate Cancer Treatment

Prostate cancer can be treated by a variety of methods. Depending on the Gleason score and stage of the cancer, patients have a variety of options. Eighty percent of prostate cancers are localized at diagnosis allowing patients to have multiple choices for treatment. Most patients are asked to choose between active surveillance, radical prostatectomy, and radiation (external beam or brachytherapy). Androgen deprivation therapy is also used for some patients. All have risks and benefits. Radical prostatectomy is the most common intervention chosen to treat localized prostate cancer.

All of the treatment interventions except active surveillance are associated with a risk of bowel dysfunction, sexual dysfunction and urinary incontinence. The risk of developing incontinence varies from 2 to 50% depending on the intervention with the highest risk associated with prostatectomy. Sexual dysfunction is even more common affecting between 20 and 92% of patients. The highest risk is with androgen deprivation and prostatectomy. Bowel
dysfunction varies from 4-35% with external beam radiation and brachytherapy having the highest risk.²

The stage of the prostate cancer helps determine whether active surveillance is a viable option or not. Patients choosing active surveillance have their PSA levels checked every 3 to 6 months, and have repeat DRE and biopsies done as needed.¹¹ In a study by Wong et al looking at SEER (Surveillance Epidemiology and End Results Medicare database) data, choosing active surveillance over treatment was shown to be associated with decreased long term survival for men between ages 65 and 75.¹² A review of literature done by Bastian et al in 2009 shows active surveillance to be a viable option for patients with a low Gleason score less than or equal to 6 and with organ confined disease. The studies in the review showed that active surveillance was not associated with increased mortality compared to treatment when done in the low risk group.¹¹

A retrospective cohort study by Albertson et al in 2005 looking at the risk of mortality by Gleason score showed that patients with a low Gleason score (2-4) have a minimal risk of dying from prostate cancer over 20 years (6 deaths per 1000 person-years). The higher the Gleason score the more likely the chance of death. Men with a Gleason score between 8 and 10 had 121 deaths per 1000 person-years.¹³ There are several randomized controlled trials currently going on to look at which choice of treatment is most beneficial for the variety of tumor grades. The PIVOT trial (prostate cancer intervention verses observation therapy), which should be completed in 2010, specifically addresses active surveillance as an option.¹⁴

The Dilemma
With this significant list of complications it is important to consider whether the benefits of screening and early treatment outweigh the harms. Many prostate cancers are slow growing and will not lead to death. The lifetime risk of dying from prostate cancer is only 3.4% despite a 15.9% lifetime risk of developing prostate cancer. It is estimated that a national prostate screening program would cost around twenty billion dollars without the cost of treating any cancers detected. The technology is present to both detect and treat prostate cancer but not to determine which cancers will progress and which cancers will not progress. This leads the medical community to both over-detect and over-treat. Over-detection and overtreatment have more than just financial costs; there are psychological consequences of having false positive tests and health risks of being over-treated. The rate of over-detection is as high as 56%.

Given the dilemma physicians are not supposed to screen patients for prostate cancer but are instead supposed to counsel them on the risks and benefits of screening. Patients should choose whether or not screening is right for them. Hoffman et al showed in the DECISIONS Study that while health care providers provided prescreening discussions the discussions failed to meet the criteria for shared decision making. The information was not unbiased or balanced and patients were often not asked for their preferences. If health care providers are unable to fully educate their patients on the risks and benefits of screening then, is the medical community breaking its oath to “first do no harm” by screening for prostate cancer in asymptomatic men?

Guidelines

Because of the debate over whether screening should be done and the increasing use of evidence based medicine in clinical practice, many different organizations have released guidelines regarding prostate cancer screening. In fact most of the organizations have updated their guidelines in 2008 or 2009 as a result of the changing body of evidence on the utility of
prostate cancer screening. "No major scientific or medical organizations, including the American Cancer Society (ACS), American Urological Association (AUA), US Preventive Services Task Force (USPSTF), American College of Physicians (ACP), National Cancer Institute (NCI), American Academy of Family Physicians (AAFP), and American College of Preventive Medicine (ACPM) support routine testing for prostate cancer at this time." from the American Cancer Society "Can Prostate Cancer Be Found Early?" ¹⁰
# Systematic Review Table 1

<table>
<thead>
<tr>
<th>Organization</th>
<th>Guideline</th>
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<tbody>
<tr>
<td>American Cancer Society (ACS)</td>
<td>Recommends making an <em>offer</em> of screening to men over age 50 who have at least a 10 year life expectancy, only after having a discussion about the benefits and limitations of screening. It recommends starting at age 45 for men at higher risk. No suggested age to stop screening. Updated 3/5/2008^{10}</td>
</tr>
<tr>
<td>American Urological Association (AUA)</td>
<td>Recommends discussing screening with men at age 40, if they wish to be screened doing a baseline PSA and DRE at age 40. It also emphasizes use of PSA velocity prior to proceeding to biopsy. Does not give age cut off for stopping but does state screening is most beneficial for men with at least a 10-year life expectancy. Updated 4/28/2009^{17}</td>
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| United States Preventive Services Task Force (USPSTF) | **"** The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of prostate cancer screening in men younger than age 75 years. Grade: I statement.  
* The USPSTF recommends against screening for prostate cancer in men age 75 years or older. Grade: D recommendation.  
Suggested practice: Given the uncertainties and controversy surrounding prostate cancer screening in men younger than age 75 years, a clinician should not order the PSA test without first discussing with the patient the potential but uncertain benefits and the known harms of prostate cancer screening and treatment. Men should be informed of the gaps in the evidence and should be assisted in considering their personal preferences before deciding whether to be tested." Updated August 2008^{18} |
| American College of Preventive Medicine (ACPM)     | "There is currently insufficient evidence to recommend routine population screening with digital rectal examination (DRE) or prostate-specific antigen (PSA), men should be given information about the potential benefits and harms of screening and limits of current evidence in order to make an informed decision about screening. Discussion about screening should occur annually, during the routine periodic examination, or in response to a request by the patient." Updated Feb 2008^{15} |
| American Academy of Family Practice (AAFP)         | The AAFP concludes that the current evidence is insufficient to assess the balance of benefits and harms of prostate cancer screening in men younger than age 75 years. The AAFP recommends against screening for prostate cancer in men age 75 years or older. Updated December 2008^{19} |
Adopting New Evidence

The incorporation of new evidence into clinical practice is influenced by many factors. One influence is how the new evidence is perceived. How and when physicians hear about the evidence or guidelines can affect how it is perceived. Did they hear about it from the news, a patient, a colleague, a formal CME presentation or an editorial? If they are hearing about from the news or a patient are they looking at the article or guideline themselves? Little research has been done to show how the media affects physician practice.

The dispersion and marketing of new evidence is probably the most important thing affecting its incorporation. Approximately 15% to 20% of physicians need to accept new evidence and change their practice before new evidence has enough momentum to spread on its own. Until, the first 20% of physicians have not only heard of but also accepted the new evidence it needs to be marketed. The ALLHAT dispersion study showed the value of marketing important research results and guidelines in order to increase acceptance.

New research once disseminated to clinicians can have varying levels of effect. If it decreases ambiguity, has clear benefit, and aligns with protocols, history, values or beliefs then new evidence is likely to be adopted quickly. The personal characteristics of the provider also influence adoption of new evidence. Five categories of individuals have been defined to explain personal adoption behavior: innovators, early adopters, early majority, late majority, and laggards. The categories are based on their place along the normal curve (1,2, and 3 standard deviations). Which category an individual provider falls in affects the speed at which they are likely to adopt new evidence. Contextual factors also affect adoption of new evidence. Environments can either promote or discourage individuals from adopting new evidence, which may differ from the current standard of care.
Pathman has described a model to encompass all of the stages for clinician adoption of new CPGs: physician awareness, agreement, adoption and adherence. We have already discussed many of the factors that can affect each stage of the pathway. It is important to realize that information alone does not typically change physician behavior.

The influence of prostate cancer screening guidelines and the mortality studies (ERSPC and PCLO) depends on several important barriers. First, the guidelines are not consistent. The lack of consensus lowers the likelihood of any guideline being followed. The content of some of the guidelines are not specific, leaving physicians to determine what the risks and benefits of prostate cancer screening are. The results of the mortality studies could potentially clarify the benefit of PSA screening. Unfortunately the two studies had differing interim results and have been subject to significant criticisms questioning the validity of their results. Despite these barriers the guidelines and mortality studies were well disseminated when released, being reported by most major news organizations and several large professional organizations. The broad dissemination increases the likelihood that some physicians will incorporate them into their practice if they agree with them.

**Physician Practice**

All of the guidelines tell primary care physicians to help their patients make an informed choice about prostate cancer screening. How this translates into practice is influences by a variety of factors. A study of 1369 primary care physicians in Washington State showed that the majority (67%), routinely recommended PSA screening. Reimbursement, physician age, and male sex of physician all increase the likelihood of ordering a PSA test. For physicians to follow the guidelines and counsel patients they must first understand the risks and benefits.
themselves and have the time or tools needed to explain them to their patients. In a study of Vermont primary care physicians, physician belief that the evidence for prostate cancer screening is not strong led to longer discussions and lower use of PSA screening.\(^{27}\) Another study supported the evidence that a physician’s interpretation of the utility of PSA screening affects his/her likelihood of not only discussing PSA screening with his/her patients but whether he/she would try to persuade patients to have the screening done.\(^{28}\)

**Introduction to Research Project and Systematic Review**

To determine if the new guidelines and the new evidence on PSA testing have affected provider practice, knowledge of past practice is needed. We have done a systematic review of literature looking at provider screening practices with PSA since 2000 in the United States. The focus on provider practice since 2000 was done because by the year 2000 several guidelines recommended counseling on risks and benefits over routine screening for prostate cancer existed.\(^{29}\) In addition, provider practice is being increasingly affected by clinical practice guidelines (CPG), with 38% percent of primary care physicians reporting that CPGs have a large influence on their practice in 2005 compared to only 24% in 2000.\(^{30}\) The growing influence of CPGs also increases the likelihood that physicians’ practices could be affected by changes in the guidelines.

While several studies have been published since the guidelines started to change in 2008, none of the data collection was done after that time.\(^{27,28,31-37}\) The results of the systematic review were used to develop a study design for a cross sectional survey to determine the reported association between reported physician practice regarding prostate cancer screening and the mortality study results and current CPGs. The study will show if physicians know about the new
guidelines and evidence? Do they report changing their practice as a result? Do physicians believe prostate cancer screening has more benefit than harm? By determining what providers are reporting as their current practice, assessing their knowledge of CPGs and the mortality studies, and level through this study, we hope to show whether an association exists between the mortality studies and CPGs and increased counseling of both the risks and benefits of prostate cancer screening.

**Systematic Review of the Literature on Provider Practice**

**Methods**

A systematic review of literature was done to answer several questions. What is current primary care practice regarding prostate cancer screening? Specifically are physicians providing their patients with the risks and benefits of prostate cancer screening prior to offering them test? Do physicians know the prostate cancer screening guidelines? A search on Medline was done using the MeSH terms: “Prostate Cancer”, “Prostate specific antigen” and “Primary Health Care”. The search was done on June 1, 2009 and returned 161 results. The results were limited to English language and publication after 2000, leaving 116 studies. No limitations were placed on study design for the initial search since few studies were expected to meet the inclusion criteria. Inclusion criteria were: all study types (except case report, editorial and reviews), men, prostate cancer, US physician prostate cancer screening practice, physician knowledge regarding prostate cancer screening, physician attitude or belief regarding prostate cancer screening. The exclusion criteria were: studies not focusing on provider use of PSA test, non-US based studies, research done before 2000, case reports, commentaries, reviews and letters. The review was
limited to studies involving US physicians since influences may be different on provider practice in other countries, which have a different system of providing medical care. It was limited to physicians since mid-level providers, nurse practitioners and physician assistants, are likely to have the same practice style as their supervising physician. Studies done only after the year 2000 were included because by 2000 several organizations had clinical practice guidelines recommending physicians using shared decision making for prostate cancer screening.

The 116 studies were evaluated by their abstract for relevance of study question. Thirty were found to have a relevant outcome or measurement and were further evaluated by the inclusion and exclusion criteria. Ten were excluded because they were either letters or review articles. Six were excluded because the research was done outside the United States. Five studies were excluded because the studies were done before 2000.

Nine articles were included for full review. Two studies were excluded during full review. One of the studies was by Sorum et al. It evaluated the level of regret physicians in the US and France would feel if they failed to diagnose prostate cancer through screening. It did not answer either study question. It neither evaluated whether or not physicians use prescreening discussion of risks and benefits nor did it evaluate whether physicians have knowledge of prostate cancer screening guidelines. A second study by Gonzalez et al, was excluded after full review for failure to answer either study question. It used NAMCS data to evaluate if patients were screened for prostate cancer during clinic visits by looking at claims information. The data used was not able to say anything about physician screening style or knowledge of guidelines other than if patients above or below the recommended ages are being screened. At the end of the selection process, I proceeded to critically review 7 studies on provider practice related to prostate cancer screening.
Systematic Review Figure 1. Quorum Table

161 by Medline for MeSH “Prostate Cancer”, “Prostate specific antigen” and “Primary Health Care” on June 1, 2009

45 Not English Or Published before 2000

116 abstracts reviewed for relevance of study focus

86 excluded for relevance of study focus

30 abstracts relevant and reviewed by inclusion/exclusion criteria

10 for being review articles or letters/editorials, 6 for being not US based studies, 5 for being done before 2000

9 full article review

2 excluded because they were not relevant to the study focus questions

7 studies included in final review
Systematic Review Table 2

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tbody>
<tr>
<td>Articles About:</td>
<td>Articles that are:</td>
</tr>
<tr>
<td>1. Men</td>
<td>1. Non-English</td>
</tr>
<tr>
<td>3. Screening</td>
<td>3. Related to cancers other than prostate.</td>
</tr>
<tr>
<td>4. Physician Practice</td>
<td>4. Reviews, Editorials, case reports</td>
</tr>
<tr>
<td>5. Knowledge, Attitudes, Value</td>
<td>5. Not done in the United States</td>
</tr>
<tr>
<td>6. All study types except reviews, editorials and case reports.</td>
<td>6. Done before 2000</td>
</tr>
<tr>
<td></td>
<td>7. Focus on patient reporting or patient characteristics</td>
</tr>
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All included studies were rated for quality on a scale of poor, fair, and good. A good study is not lacking any key elements, a fair study is lacking something but it does not have a fatal flaw, a poor study has a fatal flaw. A fatal flaw is a bias, which makes the validity of the results questionable. An example of a fatal flaw is a biased survey making the outcome of interest more likely based on the design of the questions. Each study was rated based on internal validity: selection bias, measurement bias, and confounding. Studies with a low risk of selection bias have randomized how they chose their study population or used exhaustive sampling of a population. Studies unlikely to have measurement bias will need to have validated their measurement tool and have a measurement tool with as little bias as possible. Studies which
adequately control for confounders in the study design or the analysis and report those confounders will receive a good for likelihood of confounders affecting the results. There are many things that are possibly confounders for prostate cancer screening practice style. Important confounders for studies to consider include age since personal risk increases as age increases, sex since men may feel more strongly about a cancer that is likely to affect them, and race since mortality risk differs among races. Another possible confounder is a history of prostate cancer in themself or a close friend or family member. It is also possible that a physician's practice setting, academic or community, may influence prostate cancer screening practice style since academically affiliated settings may have a higher emphasis on adherence to CPGs.

Studies found to have fair or good internal validity were also rated on external validity. External validity will be assessed by generalizability of the results. A good study will have more than one type of primary care physician and a study population that is large and diverse enough to apply to most of the United States primary care physician population.

Results of the Systematic Review

*Linder et al (2009)*

In 2004, Linder et al conducted a survey of 87 primary care providers in university-based family medicine clinics and six community health centers in Houston, TX. The survey was designed to assess physicians' use of prescreening discussions and rationale for why physicians either try to persuade or not persuade their patients to be screened if testing was refused. Sixty-three of the physicians completed the survey and were included in the analysis (28 internists, 35 family practitioners). Three others were excluded based on their specialty or practice type (urgent care and psychiatry). The questionnaire was developed using findings from other similar
studies to assist in the wording. It was checked for validity with interactive feedback from 3 primary care providers (PCP). Internal validity was established by having a second question address the practice style in a different format.

**Results**

Forty-five (71%) of the providers were classified as D (discussing) and 13 were classified as ND (not discussing). Three additional providers reported they neither order nor discuss PSA tests. The majority of the discussing providers (25) said they would let patients decide after discussing the harms and benefits while 20 providers reported they recommend screening. Only 36.8% (7) of the D providers who recommend screening report that they would try and persuade a man to have a PSA test done. Between 65.6 and 72% of discussing providers report that they are more likely to screen African American men and 80-96.3% report that they are more likely to screen men with a family history.

Overall the study showed that the majority of PCP discuss the harms and benefits of PSA testing with their patients and that physicians who believe PSA is beneficial are more likely to try and persuade their patients than those who are unsure of its benefit. The study did not report differences in screening style based on provider characteristics nor did it report knowledge of prostate cancer screening guidelines.

**Quality, Strengths and Weaknesses**

The internal validity of the study is fair because selection bias and confounding may have occurred. The study population included family practitioners and internists in university clinics a single urban Texas setting. No information was given as to how the different clinics were chosen for inclusion allowing for the possibility of selection bias. The measurement tool, the survey, was clearly described along with how control for internal and external validity of the tool
was done. The open-ended question section was coded separately by two authors and then grouped into themes. The outcome measurement was clear and appropriate given the measurement tool. The statistical analysis was clearly described. A weakness was seen in the lack of reporting of controlling for potential confounders (race, age, sex, history of prostate cancer) between provider types (D vs. ND).

The external validity was fair since the study population was limited to university clinics, which may not be applicable to community-based physicians. It did have both family practice and general internists in the sample; however, the sample size was small.

*Pendelton et al* (2008)

A 27-item questionnaire was sent to PCP in 2 Florida counties in 2004. A total of 264 physicians were randomly selected after being identified through local medical societies. Twenty physicians completed the survey in response to the email invitation and another 85 completed the survey after an in-person visit. The study population included a diverse group of primary care physicians in different practice settings. Fifty percent were connected to a University and 58% were family practitioners. Four percent were black and 68% were white. The study was designed to determine physician knowledge of prostate cancer and their attitude toward prostate cancer screening. The survey was created based on current accepted literature and was evaluated by a small group of diverse and experienced physicians including family practice, internal medicine, radiation oncology and urology. The survey was then modified based on their feedback.

*Results*
A total of 104 physicians completed the survey (39%). Forty-six percent of physicians report recommending prostate cancer screening to more than 75% of their patients over age 50. The overall score on the knowledge survey was 66% with providers who had either a high percentage of minorities in their practices or practices located in urban areas having higher scores than those with fewer minorities or rural practice locations. Only 39% of physicians knew that the PSA test is "highly sensitive" but not specific. A lack of knowledge of the weaknesses of the test may impede their ability to explain the risks and benefits of prostate cancer screening to their patients. Seventy-five percent of physicians knew that African decent and family history are risk factors for prostate cancer. Sixty-six percent of physicians reported that prostate cancer screening is effective and 64% felt that screening with PSA is beneficial. Only 53% offer screening to minorities while 70% offer it to men with a family history. Physician knowledge did not correlate with their reported practice in regards to screening higher risk men. Knowledge of prostate cancer screening guidelines was not assessed.

Quality, Strengths and Weaknesses

The internal validity of the study is poor. Measurement bias is a significant concern. The measurement tool was evaluated by a variety of provider types and altered based on their feedback. While it is a strength of the survey tool that primary care providers, urologists and oncologists were involved in its development, the final version was not assessed for validity prior to sending it out. The questions show bias toward higher screening and knowledge of statistics related to prostate cancer. The result is misclassifying physicians who are following the guidelines, which recommend sharing the risks and benefits of screening with patients and allowing patients to choose whether or not they are screened. The knowledge answers deemed correct and incorrect are also of concern. An example of this is the question that voiding
symptoms are one of the first symptoms of prostate cancer. The answer deemed correct was false because prostate cancer is usually asymptomatic. The question is poorly worded because once prostate cancer is symptomatic urinary tract symptoms, impotence and pain can occur. It also said that the PSA is highly sensitive when at a cutoff of 4ng/dL it has a sensitivity of 72% (range 67% - 100%). The analysis was also felt to have bias because the answers of the survey were interpreted to show more information than actually asked. Physicians were asked to report the proportion of male patients over age 50 for which they screen or recommend screening for prostate cancer. Physicians were deemed not to be following guidelines if they did not screen or recommend screening for their patients. It did not ask which guidelines they may know or be following. This allowed for misclassification of physicians who are following the USPSTF and other guidelines, which recommend discussing the risk and benefits of screening with patients instead of recommending or ordering PSA. The analysis did adjust for possible confounders including age, race, degree, practice type, practice setting. Selection bias is also unlikely, since the study population was randomly selected and included a diverse group of providers both by specialty, demographics, and practice characteristics. The sample size was small, making it hard to find differences between subgroups. Overall given the significant concern in bias in the measurement tool and its analysis the overall internal validity is poor and the results are limited in their able to provide information on physician screening style or physician knowledge of guidelines. The external validity was not assessed since the internal validity was poor.

Guerra et al (2007)

In 2004 Guerra et al, conducted interviews of 18 purposively sampled physicians from the University of Pennsylvania Health System (UPHS) network. The interviews were semi-
structured and were done by trained medical students within four months of each other. The interviews used chart stimulated recall to assist the discussion. The study aim was to determine barriers and facilitators to discussion of PCS. It did not try to determine PCS use. The interview guide was developed using the McPhee Systems Model and was pilot tested on faculty physicians.33

Results

All physicians reported generally using PSA discussion but 6 (33%) reported occasionally using PSA screening without discussions. Three explained that they would order PSA if not able to have a discussion because of liability concerns and perceived local standard of care. Two thirds reported they would initiate discussions at age 40 for higher risk men (family history or African American). Physicians reported lack of time and visits for other reasons besides physicals as another barrier to discussing PSA. Four providers also reported their own forgetfulness as a reason why the discussion did not occur. Physician, patient and system barriers and facilitators were identified that affect PSA discussion. Due to the small size statistical analysis could not be done. The study did not assess physician knowledge of guidelines.

Quality, Strengths and Weaknesses

Overall the internal validity of the study was fair. The validity of the measurement tool and the outcome were both well done. As a qualitative study the use of triangulation, a standardized and validated interview guide, transcripts of all interviews, and trained interviewers were all strengths. The results were grouped into categories with common or repeated responses noted. The use of chart stimulated recall allowed for a better understanding of provider practice beyond their reported practice. The study was unable to be statistically analyzed because of the
small study size resulting in limiting the understanding of the significance of the results. The external validity of the study was fair. The small sample size and academic, urban and suburban provider population were significant limitations to the generalizability to rural and community physicians. Purposeful sampling increased the diversity within the study group and its generalizability to academically connected physicians.

Bell et al (2006)^31

In 2005 Bell et al conducted a survey of 70 randomly sampled primary care providers in the Los Angeles, CA area. The purpose of the study was to develop a knowledge test related the USPSTF prostate cancer screening recommendations. The survey also covered attitudes and practices related to prostate cancer screening. Experts in the field for content validity reviewed the survey questions. The survey was web-based and physicians were contacted by email and phone for recruitment. Seventy physicians completed the survey and were eligible out of the 285 who were contacted. The physicians were diverse in ethnicity, practice setting, and were divided between family practice, general practice and internal medicine.

Results

Sixty percent of physicians reported using shared decision-making. Physicians who were board certified, had teaching affiliation or were within 20 years of medical school graduation had higher knowledge scores. The average knowledge scale score was 13.7 correct out of 30. The physicians with higher knowledge scores had an inverse relationship with belief in PSA screening (rating of -0.49 on -1 to 3 scale). No other variable had significant association with belief in PSA other than knowledge. Routine PSA use was found to be common with an average
score of 6.7 out of 10 (10 was for high use in all men over age 40). The study did not assess knowledge of guidelines other than USPSTF.

Quality, Strengths and Weaknesses

Unlike the other studies included in this review, the main purpose was to develop the knowledge scale based on the USPSTF guideline. The overall internal validity of the study was fair. The survey was not pilot tested on primary care providers prior to sending it out, though it was review by experts in the field for internal validity. The results of the knowledge survey were internally consistent and they corresponded to the expected results of the PSA screening practice part of the survey. Selection bias is unlikely since physicians were randomly chosen from the AMA registry for the Los Angeles area. Multiple possible confounders were controlled for including sex, years since graduation, specialty, practice type and age. The external validity of the study was fair. The study was limited by the small sample size and single large city, LA, making it less generalizable.

Kim et al (2002)32

Kim et al conducted an internet-based survey of internal medicine (IM) physicians (from a national list) and family practice physicians in New York, Illinois, and North Carolina. The survey was 18 questions long and was evaluated for internal validity through review by 2 urologists and 1 PCP. The purpose of the survey was to determine the practice patterns of physicians in regards to prostate cancer screening and management of BPH.

Results

Three hundred and fifty four physicians participated in the survey. A total of 49% of all PCP recommended PSA screening in men over age 50 with more FP physicians recommending it
compared to IM physicians. No significant differences in practice pattern were seen by sex.

Another 17% of physicians (IM and FP) report not recommending prostate cancer screening at any age. It did not assess knowledge of prostate cancer screening guidelines.

Quality, Strengths and Weaknesses

The internal validity of the study was fair. Selection bias is possible since it is unclear if all physicians with listed email addresses in the base population were recruited. The measurement tool could also have some bias. Only three physicians reviewed it during development, and the final version was not reviewed prior to use. The results were reported as physician practice when they are in fact physicians reported practice, which may differ from their actual practice pattern. Analysis was done looking at differences between screening styles by provider specialty. Confounding was only looked at for provider sex and other confounders (year since graduation from medical school, academic affiliation, knowledge, etc) could also affect screening styles. The external validity of the study was good. The larger base population and the more geographically diverse population make the results more generalizable.

Philips et al (2005)27

Philips et al conducted a cross-sectional study on prostate cancer and colon cancer screening practices of primary care providers. Two surveys were mailed to 416 Vermont family practice and general practice physicians over a three-month period in 2003. The first survey focused on prostate cancer and the second on colon cancer screening. The purpose of the survey was to assess physician attitudes, behavior, and underlying reasons for screening behavior. It was also designed to determine whether patients or physicians are driving PSA-based screening.

Results
The study found that 99% of physicians report routinely counseling on prostate cancer screening and 69% report routinely screening for prostate cancer. Most physicians (61%) feel that counseling is satisfactory for informed decision-making. Only 12% (10% unsure, 2% felt prostate cancer had stronger evidence) of physicians did not know that colorectal cancer screening has stronger evidence than prostate cancer screening. Sixteen percent of physicians were found to start prostate cancer screening with PSA before age 50 and 57% screen with DRE before age 50. An additional 29% of physicians never stop PSA screening and 60% never stop DRE. Physician age and having a close contact with prostate cancer was not found to affect screening practice or belief. Specific knowledge of guidelines was not assessed though aggressive screening was defined by current guidelines.

Quality, Strengths and Weaknesses

Its internal validity was poor since it failed to report enough information about the methods to allow for a full quality evaluation. No information was reported on how the survey was developed. It is unclear how many questions were on the survey and what the questions were. The timing of the mailings was also not reported but is important since information was provided on prostate cancer with the second mailing. Selection bias is unlikely since the Vermont medical board provided the list of physicians who were contacted. The analysis looked at some provider characteristics, which could influence screening behavior including age and having a close contact with prostate cancer. It did not look at other possible confounders including race and sex. External validity is unable to be assessed due to poor internal validity.

Purvis Cooper et al conducted a qualitative study using focus groups composed of 4 to 8 IM, FP or general practice physicians. A total of 14 focus groups were done including a total of 75 physicians from 35 different states. A professional moderator with extensive experience ran the focus groups. The focus groups were done via telephone in December 2001 and January 2002. The physicians were selected for recruitment by a random sample of 1000 physicians in the AMA registry. The discussion was focused around physicians PSA screening practices, the influences on theses practices and their familiarity with clinical practice guidelines related to PSA screening. All discussions were transcribed and triangulation was done of the data.

Results

Two groups of physicians emerged: those who routinely screen with PSA (n=58) and those who are not routine screeners (do not routinely order PSA tests) (n=14). Most “routine screening” physicians recommended use of PSA in men 50 or older with a longer than 10 year life expectancy and no risk factors. “Non-routine screeners” typically discuss the implications related to screening prior to offering the PSA test. The majority of these physicians did not offer recommendation to their patients as to whether or not they should be screened. “Routine screeners” cited their experience and patient expectations as major reasons why they routinely screen. Only a few could accurately describe the current clinical practice guidelines. “Routine screeners” were also more likely to cite concerns about perceived community standard of care, concerns of malpractice, and practicing “comprehensive” medicine as moderate reasons why they screen.

“Non-routine screeners” were all aware of clinical practice guidelines and could describe them mostly accurately. They were more likely to cite lack of scientific evidence as the major reason why they do not routinely screen and to report practicing evidence-based medicine as a
moderate reason for their practice style. Cost considerations and mandates from payors or practice settings were minor concerns for both groups of physicians.

Quality, Strengths and Weaknesses

The internal validity of this study was good. It is large enough and diverse enough that saturation of themes is likely to have occurred. Selection bias is unlikely. The participants were randomly selected participants from across the country. An analysis showed the study participants differed from the AMA master file only in that fewer were specialized in Internal Medicine compared to FP or General Practice. The data analysis was done in a systematic way using qualitative data software, coding and multiple coders to decrease possible bias. The results were consistent with prior research though they more clearly defined differences between physicians who are routinely screening and those who are not. The external validity of the study was also good given the adequately sized nationally representative sample of physicians making the results generalizable.

Overall Results and Conclusions from the Systematic

The overall strength of the evidence looking at whether physicians are currently using shared decision-making for prostate cancer screening and whether they have knowledge of the CPGs regarding prostate cancer screening is weak. No cohort or case-control studies were found. The studies as a whole were mainly focused on urban and academically affiliated physicians making them poorly generalizable to community physicians. The majority of the studies were on small mostly nonminority physicians. None of the studies were of high quality. Five of the seven studies identified through this review are of fair quality, the other two are of poor quality. No studies validated the physician reported practice through a parallel patient
survey allowing for nondifferential measurement bias to be a concern for all of the studies. Given that physicians do not have a clear ICD9 code to use to report the use of shared-decision-making to *not* screen a patient, interviewing both the physicians and their patients is the only way (besides video taping the encounter) to gain an accurate picture of the use of shared decision-making for prostate cancer screening. Although chart reviews may give an estimate of the use of shared decision making, they may have low accuracy. For example, one study looked at medical records and it found a large discrepancy between physician reported practice and physician’s written practice. The study by Guerra et al found all physicians reported generally having discussion but only 36% of the time were discussion documented in the medical record. While that study was too small for statistical analysis, it does highlight the possible bias of physicians to over-report using shared decision-making. Further studies need to be done to assess this and whether it is even higher for physicians who are aware of the CPGs since they may want to report what they know is the “correct” answer. Confounding is a significant concern for three of the studies since Edlefsen showed that provider characteristics, (year since graduation from medical school, gender, and mode of reimbursement) do affect self-reported PSA use. Kim et al only controlled for provider sex, and Philips et al controlled for age and having a close contact with prostate cancer but nothing else. Linder et al did not report controlling for any possible confounders. Only the studies by Pendelton and Bell controlled for multiple confounders.

Though several studies have been published in the last few years, only two, Purvis Cooper et al and Bell et al, were found that looked at any clinical practice guideline knowledge since the year 2000. Bell tested physician knowledge based on the USPSTF guideline and Purvis Cooper asked during the interviews about CPGs. Given that clinical practice guidelines
are developed with the goal of influencing clinical practice, the paucity of studies considering their effect shows a need for future research.

The current evidence, though too weak for conclusions to be drawn, can be used as a basis to determine trends in reported practice and needs for where future research should be focused. Five of the seven studies included in the review found that most physicians report providing at least some pretest counseling for prostate cancer screening. Between 61 and 100% of physicians reported having prescreening discussions or using shared decision-making for prostate cancer screening. Even in studies where most physicians report using shared-decision making, some physicians report routinely or occasionally ordering PSA without discussions. The majority of physicians in all of the studies report having prescreening discussions for prostate cancer. Many also admit when asked, that they do not always have them and Guerra showed that they documented doing it only 36% of the time.

It is unclear what the content is of those physician led discussions on prostate cancer screening since none of the studies addressed this. Are physicians who are having discussions truly practicing shared-decision making where the patient is not biased by the physician’s opinion or are physicians influencing their patients based on the content of the discussion? One study, Linder et al, reported 32% recommend screening and 11% of physicians would try and persuade patients who do not want PSA to have a PSA. If a physician is trying to persuade their patient either consciously or unconsciously based on the content they emphasize most patients will follow their physicians’ lead. If physicians are failing to adequately counsel on the possible harms of prostate cancer screening including the cascade from an elevated PSA through the work up and treatment of benign tumors and false positive tests, then many patients may feel that it is simply the risk of a blood draw. Further, if physicians are not adequately counseling is
it from ignorance, choice, lack of time, internal clinical policies, or some other reason? While several of the studies looked at physician knowledge related to prostate cancer screening, none of the studies were done after the interim results of the randomized trials (PCLO and ERSPC) looking at the effect of PSA on mortality were published. Even though the results were not conclusive, they still represent the best evidence we have on the harms and benefits related to prostate cancer screening until their final results are released. What are physicians now saying and what have they been saying as the risks and benefits of prostate cancer screening to their patients? It is not likely by chance that none of the CPGs specify what should be included in the shared decision-making discussion other than “risks and benefits.”

Despite the uncertainty of risk or benefit, physicians are still asked to counsel their patients on what we do know and not to just order a PSA. Few studies directly assessed knowledge of clinical practice guidelines. Physician knowledge of the unclear evidence for prostate cancer screening was found to be associated with higher adherence to the prescreening discussion and shared decision-making suggested in the current guidelines. Physician belief that prostate cancer screening is beneficial or has clear evidence was found to be associated with more aggressive screening styles. Also 2 studies showed providers are less likely to screen men who have multiple co-morbidities or are deemed to have a life expectancy of less than 10 years. The results of the studies are mixed on whether physicians might knowledge of the guidelines. It is clear that physician knowledge of the uncertainty of benefit results in higher rates of discussion before ordering a PSA test. It is not clear whether these physicians also know the guidelines, or are by chance following them.

The results show that physician knowledge of evidence related to the risks and benefits of prostate cancer screening are important in determining their practice style. Further a physician’s
ability to counsel their patients about prostate cancer screening will be by nature limited by their own knowledge. While few studies directly assessed knowledge and compliance with CPGs several indirectly looked at it. Physicians are screening the recommended groups of men more frequently than men of other ages or risks. The results also imply that some physicians are unable to adequately counsel their patients on the risks and benefits of screening because they do not correctly understand them themselves based on their answers on knowledge questions.

We will use this information to develop a survey, which will assess both provider reported practice and provider knowledge of the CPGs and the current evidence on the risks and benefits of prostate cancer screening (the randomized trial intermediate results published in NEJM in 2009). We will develop a survey, which distinguishes between providers who test without discussing and providers who discuss and offer testing. We will ask providers to first report their knowledge of CPGs and the randomized trials and then ask a knowledge question to confirm their report. We will ask providers to specify whether they weigh the harms or benefits higher (or equal) when discussing prostate cancer screening to gain some insight into the content of their discussion.

**Original Research Study Design**

**Population and Recruitment**

All family practice and internal medicine physicians in the State of North Carolina who are members of the North Carolina Medical Society (NMCS) will be eligible for the survey. Approximately 2664 family practice physicians and internal medicine physicians will be invited
to participate by an email sent through the NCMS. Physicians will also be recruited through a short ad included in two mailings of the NCMS weekly newsletter.

Survey Tool

We will conduct a cross-sectional survey to assess current provider knowledge of 2008 Prostate Cancer Screening guidelines, knowledge of PLCO and ERSPC randomized trials and current practice and beliefs in regards to use of PSA. The 25-question survey was developed using The Tailored Design Method from Dillman. Five questions on provider screening style, separating physicians into Discussing or Not Discussing, were adapted with permission from the survey by Linder et al. The survey will ask demographic information including sex, age, race, provider specialty, practice type, practice location and personal prostate cancer history. Based on the results from a study by Drummond et al on ordering of survey questions, the demographic information will come first. The survey will ask providers on their awareness of the 2008 and 2009 changes in prostate cancer screening guidelines and the 2009 prostate cancer screening mortality studies (PCLO and ERSPC). It will test this knowledge by asking providers to answer a few questions about both the guidelines and the papers. It will further ask whether or not their practice has been influenced by the new mortality studies and the provider’s current belief as to the benefit of screening.

The survey will be piloted on 8 physicians associated with the UNC Preventive Medicine Residency, 6 of whom are BC/BE each in one in of the following fields of medicine: family practice, geriatrics, gastroenterology, pediatrics, preventive medicine, and oncology. The other two resident physicians have preventive medicine as their main specialty. Any comments or
suggestions will be considered and the survey will be adapted as needed and again reviewed by two of the same group of physicians prior to sending it out.

The survey is located on a secure website (www.qualtrics.com) with emails sent containing links to the survey. A link to the survey and invitation to the study will also be included in two editions of the NCMS newsletter. A cover letter will be sent with the email. The consent letter will be posted at the website for participants to view before proceeding to the survey. The email and newsletter postings will be sent every 2 weeks starting with the email (email beginning of week 1, newsletter beginning of week 3, newsletter beginning of week 5).

Incentive

Based on the report in Dillman of a doubling of response rate from approximately 40% to 80% for a physician survey when a $10 incentive was included in the initial mailing we felt an incentive would be beneficial to our response rate. Our study will offer a drawing for 28, $50 gift cards for Amazon.com. If the anticipated 30% of physicians respond (799) then participants will have a 1/21 chance of winning a gift card. The drawing will be done to include all physicians who give a way of contacting them with the results of the drawing approximately 2 weeks after the last notice is sent in the NCMS newsletter.

Measures

Main Measure of Interest: Difference in provider belief of benefit of prostate cancer screening between providers with knowledge of at least one of the mortality studies compared to providers without knowledge of the mortality studies.
Secondary measure of interest: Provider reported practice style, provider knowledge of mortality studies, and provider knowledge of guidelines.

The results will be controlled for possible confounders including: difference in provider location (region of NC), practice type, years of medical practice, provider race (minority versus white), gender, specialty, and personal experience with prostate cancer. Any significant difference between providers’ knowledge, beliefs or reported practice style based on a demographic or descriptive characteristics will be reported.

Statistical analysis

The study population and size was selected based on a power calculation to allow a 10 percent difference between physicians belief of benefit from prostate cancer screening for physicians who know of at least one mortality study compared to those who know neither study, with a power of 0.8, alpha of 0.05. A population of 193 physicians needs to be aware of the studies, which based on an estimated 20% response rate to the invitation to the study and an estimated 40% of respondents having knowledge of the mortality studies, the study population size (2664) will be sufficient. The power calculation was based on this part of the study as the proportion of physicians with knowledge of the mortality studies is expected to be much lower than the proportion with knowledge of at least one guideline.

Descriptive statistics will be tabulated for all of the physicians participating in the study. Categorical variables will be compared using chi-square analysis and Fisher’s exact tests. T-tests and one-way analysis of variance (ANOVA) will be used to test for differences in the means for
continuous variables. For all statistical tests, statistical significance will be set at a p value of 0.05 using two-tailed tests. The statistical analysis will be performed using the Stata 10 software.

Result Tables

Table 1. Provider Characteristics

<table>
<thead>
<tr>
<th>Demographic Info</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (SD, median)</td>
<td></td>
</tr>
<tr>
<td>Sex, n(%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Race, n(%)</td>
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</tr>
<tr>
<td>White</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Medical specialty, n(%)</td>
<td></td>
</tr>
<tr>
<td>Family practice</td>
<td></td>
</tr>
<tr>
<td>Internal medicine</td>
<td></td>
</tr>
<tr>
<td>Mean Years since finishing residency (SD, median)</td>
<td></td>
</tr>
<tr>
<td>Practice setting, n(%)</td>
<td></td>
</tr>
<tr>
<td>Academic practice</td>
<td></td>
</tr>
<tr>
<td>Community clinic</td>
<td></td>
</tr>
<tr>
<td>Personal/Close contact with</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2. Physician Knowledge and Belief

<table>
<thead>
<tr>
<th>Physician Screening Style</th>
<th>% Discussing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of Guideline:</td>
<td>Yes + correct,</td>
</tr>
<tr>
<td>Any</td>
<td>Answers</td>
</tr>
<tr>
<td>USPSTF</td>
<td>Yes + incorrect</td>
</tr>
<tr>
<td>ACS</td>
<td>answers</td>
</tr>
<tr>
<td>AUA</td>
<td>No</td>
</tr>
<tr>
<td>AAFP</td>
<td></td>
</tr>
<tr>
<td>Knowledge of Mortality</td>
<td></td>
</tr>
<tr>
<td>Studies:</td>
<td></td>
</tr>
<tr>
<td>Any</td>
<td></td>
</tr>
<tr>
<td>ERSPC</td>
<td></td>
</tr>
<tr>
<td>PCLO</td>
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</tbody>
</table>

### Table 3. Mortality Study Knowledge, Influence

<table>
<thead>
<tr>
<th>Provider type (%)</th>
<th>Know 1 or more study + correct</th>
<th>Do Not know mortality study or incorrect on both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family practice/Internal medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussing/ Not Discussing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief of Benefit: % (95% CI)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More beneficial than harmful</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More harmful than beneficial</td>
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<td></td>
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<tr>
<td>Unsure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Practice because of study (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discuss more harms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discuss more benefits</td>
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<td></td>
</tr>
<tr>
<td>No Change</td>
<td></td>
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</tr>
<tr>
<td>Unsure</td>
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<td></td>
</tr>
<tr>
<td>Method for Learning of Studies</td>
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<tr>
<td>News</td>
<td></td>
<td></td>
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<tr>
<td>Read Article/CME</td>
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<td></td>
</tr>
<tr>
<td>Colleague</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related articles</td>
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</table>

** controlled for age, sex, race, history of prostate cancer in self or close friend/relative, knowledge of guidelines

Discussion

Primary care providers are tasked with providing preventive health care services for their patients including having a discussion with their patients to allow them to make an informed
decision on their preferences for Prostate Cancer screening. The complexity of the debate about the benefits and harms associated with prostate cancer screening make educating patients challenging. Yet most providers follow the guidelines and report doing shared decision making with their patients regarding prostate cancer screening. What information a provider gives during a discussion is limited by their knowledge.

If physician knowledge of at least one guideline and at least one mortality study is found to be associated with physicians having a discussing screening style compared to physicians with knowledge of only the guidelines then it will show that the mortality studies are influencing practice. The association between knowledge of a mortality study and physician screening practice will be further looked at by physician reported influence of the studies. Whether or not physicians report the mortality studies altering their screening practice and in what way will help determine whether an association or lack of association between screening styles and knowledge of the studies is truly present. Overall belief that prostate cancer screening is more beneficial than harmful or more harmful than beneficial will also be compared between providers with knowledge of the mortality studies and those without. If there is an association between belief of benefit or harm of screening and knowledge of the mortality studies it will also imply that the studies have impacted clinical practice. It is unlikely that the mortality studies are affecting clinical practice if physicians report that it is not and there is no association between knowledge of the mortality studies and physician screening style or physician belief in benefit or harm.

If an association is found between knowledge of the mortality studies and physicians being discussing providers, physicians believing in benefit or harm of prostate cancer, or physicians altering the content of their prescreening discussions then it will show the importance of increasing dissemination of the studies. If no association is found between knowledge of the
mortality studies and provider screening type, provider belief in benefit or harm of prostate cancer screening, or provider reported content of counseling then the extent of dissemination of these studies will be less important.

Further if the majority of providers are not aware of the mortality studies making it difficult to determine association between knowledge and physician screening characteristics, then it will show an area where further dissemination of the studies can be targeted. Analysis will be done to determine if there is a subgroup with significantly higher or lower knowledge than another helping to show where targeted dissemination efforts can be done. The same is true if they have inaccurate knowledge by being familiar with the studies but having incorrect recall of the results. If the study finds that the majority of providers are aware of the mortality studies then it will imply that successful dissemination of the information has occurred.

How physicians with knowledge of the studies report learning about them can be used to look for an association between physician knowledge and the news media dissemination compared to medical journal dissemination. The US news media had an emphasis on the negative or no benefit results of the mortality studies. If physicians report reading the journal articles but think that both studies found no benefit in mortality then it suggests that the US media may have influenced their perception of the articles. A study would need to be done to show if physicians’ perception of the mortality studies is influenced more by the news reporting of the study than by the actual journal article on the study.

Limitations

Our study has several limitations. The first is possible selection bias as physicians who choose to be members of the NCMS and have e-mail access may be different than internal
medicine and family practice physicians who are not members or do not have e-mail access. Further, the response rate may be low and there may be a difference between those physicians who responded to the survey and those who chose not to. Further our study population is all from the state of North Carolina so it is not a nationally representative sample though it does include physicians from all regions of the state and in diverse practice settings. Second, like all cross-sectional surveys it is difficult to know how closely reported information mirrors reality. We did try to limit this by using a validated group of questions to determine practice style and by having knowledge questions on the guidelines and the studies. Physician reported knowledge though verified by knowledge questions could also be inaccurate since chance could allow for correct answers as well. Third, while the results of this study are able to show associations between knowledge and practice the study by design is unable to show causality between knowledge of the mortality studies and change in clinical practice.

Public Health Implications and Future Studies

Levels of physician knowledge of new clinical practice guidelines and new randomized controlled trial evidence will have important implications for professional education needs. Physician’s reporting of how they learned their current knowledge will also have implications for methods of educational dissemination. Future research will need to be done in methods of dissemination for both CPGs and randomized control trial evidence. Particularly looking at evidence and guidelines that are either not clear or not major changes from current practice.

Whether or not physicians have belief in benefit of PSA and whether or not they are counseling on both risks and benefits will have implications for the likelihood that physicians are influencing their patients to have PSAs done or not. If physicians are actually encouraging more
PSA tests then it has large public health implications given the cost, both in health and money, of treating the false positives. Philips et al showed that physicians’ beliefs whether for or against screening predicted whether their patients received PSA tests. As long as the evidence remains unclear and physicians are tasked with counseling not recommending one course of action over another, their personal belief and knowledge will continue to affect their counseling. Further research needs to be done to understand the strength of this correlation. A study specifically assessing the content of pretest counseling is also needed to help determine if guidelines need to be more specific.

Until the PCLO and ERSPC have released their final results we will be unable to determine if there is more benefit than harm from PSA screening. Important in the results from those trials will be the analysis looking at the complications for the false positives. Public health policy makers will need to weigh whether the benefits of a potentially modest reduction in mortality out weighs the harms from the false positives. Physician practice may need to be changed depending on the results of the randomized trials and depending on what current practice is. If physicians are already feeling like the harms out weigh the benefits and the final results of the study support the same conclusion but evidence lacks the strength to stop all screening then little may change. Whether or not screening is cost-effective is another important consideration given high prevalence of the disease and the large risk pool. Important influences on the cost-effectiveness are the chronicity and prevalence of many complications from treatment compared to the clinically insignificance of many prostate cancers. If the PCLO and ERSPC trials show net benefit than a cost effective analysis will be an important next step.
REFERENCES

1. SEER stat fact sheets - cancer of the prostate. Available at:  


4. Prostate cancer screening - National Cancer Institute. Available at:  


Email Invite

Dear Colleague:

We are conducting a research study to better understand primary care providers' current practice and beliefs about prostate cancer screening. A total of 2,664 primary care physicians in North Carolina have been chosen to participate in this study. Your participation in this study is completely voluntary.

To participate, you would complete 25 questions addressing your current practice regarding prostate cancer screening, possible influences on that practice, and demographic information. Completion of the online questionnaire should take no longer than 10 minutes.

Please read the consent below regarding the questionnaire and a drawing for $50 Amazon gift cards in appreciation of your participation. After reading the consent, you may proceed to *****website link***** to complete the survey.

Thank you for considering participation in this study. We hope we can share your views with the greater professional community and use your response to help shape recommendations on prostate cancer screening.

Sincerely,

Tiffany Wedlake, MD, PGY3
Preventive Medicine Resident
UNC Chapel Hill

Margaret Gourlay, MD, MPH
Department of Family Medicine
UNC Chapel Hill

*********************************
Consent

Influences and Beliefs Regarding Prostate Cancer Screening

Date

Your participation in this questionnaire is anonymous. You are asked not to put any identifying information on the questionnaire. All data obtained in this study will be reported as group data. No individual can be or will be identified. We plan on publishing the results of this research as well as communicating these results to the NCMS for distribution to their members. The only persons who will have access to these data are the investigators named on this letter.
Because we want to encourage the participation of as many physicians as possible, we will be also be posting a link to the survey on the NCMS website. If you complete this questionnaire, you can elect to participate in a random drawing to receive one of 38, $50 gift cards for Amazon.com. In order to receive the gift card/be entered in the drawing you will need to provide some form of contact information (phone number, address, or email address) in the separate question block offered at the end of the survey. Any contact information provided here will not be included in the data analysis and will only be used to distribute the gift cards; the contact information will not be linked to the survey response. All contact data will be erased after the drawing is complete (6 weeks after first e-mail is sent) and the gift cards have been sent out. But please note that participating in the drawing/incentive is completely optional.

There are no anticipated risks or benefits to you if you participate in this study. However, there will be professional benefit, as the results of the study will be communicated to the profession through publication in the literature, presentation at professional meetings and direct dissemination to the professional associations. There is no cost to you and no guaranteed financial benefit for your participation.

You may contact us with any questions at (919) 843-8267 or by email wedlake@email.unc.edu

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

*****survey website link*****
<table>
<thead>
<tr>
<th>Authors, Year</th>
<th>Study Design</th>
<th>Population</th>
<th>Measurement</th>
<th>Significant results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linder, Hawley, Cooper, Scholl, Jibaja-Weiss, and Volk 2009</td>
<td>Cross-sectional,</td>
<td>Urban, university affiliated family practice clinics and urban community health centers, all located in Houston, TX</td>
<td>Mailed Survey</td>
<td>71.4% of physicians reported using prescreening discussions. ND providers more likely to order tests for high-risk patients (91% vs. 46% D providers). Physicians who think PSA is beneficial more likely to persuade patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 87 recruited</td>
<td>To determine provider reported use of prescreening discussion for use of PSA in age appropriate men: discussing (D) or not discussing (ND)</td>
<td>71.4% of physicians reported using prescreening discussions. ND providers more likely to order tests for high-risk patients (91% vs. 46% D providers). Physicians who think PSA is beneficial more likely to persuade patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 66 returned the survey</td>
<td>And it looked for difference in use of PSA in high risk men</td>
<td>71.4% of physicians reported using prescreening discussions. ND providers more likely to order tests for high-risk patients (91% vs. 46% D providers). Physicians who think PSA is beneficial more likely to persuade patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 excluded who either practice emergency medicine or psychiatry</td>
<td></td>
<td>71.4% of physicians reported using prescreening discussions. ND providers more likely to order tests for high-risk patients (91% vs. 46% D providers). Physicians who think PSA is beneficial more likely to persuade patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35 (53%) family practice</td>
<td></td>
<td>71.4% of physicians reported using prescreening discussions. ND providers more likely to order tests for high-risk patients (91% vs. 46% D providers). Physicians who think PSA is beneficial more likely to persuade patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28 (42%) internists</td>
<td></td>
<td>71.4% of physicians reported using prescreening discussions. ND providers more likely to order tests for high-risk patients (91% vs. 46% D providers). Physicians who think PSA is beneficial more likely to persuade patients</td>
</tr>
<tr>
<td>Pendleton, Curry, Kaserian, Chang, Anai, Nakamura, Abdoush, and Rosser 2008</td>
<td>Cross-sectional,</td>
<td>Random sample of primary care physicians from 2 FL counties* (Duval and Alachua)</td>
<td>Internet survey and hand delivered paper survey if non-responded after email invite.</td>
<td>46% of physicians recommend screening to more than 75% of men &gt;50 years old, 66% of physicians believed prostate cancer screening is effective Physicians working in urban areas or serving minorities had higher knowledge scores</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 264 recruited</td>
<td>27 item questionnaire, accessing provider knowledge and practice regarding prostate cancer.</td>
<td>46% of physicians recommend screening to more than 75% of men &gt;50 years old, 66% of physicians believed prostate cancer screening is effective Physicians working in urban areas or serving minorities had higher knowledge scores</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 104 returned the survey</td>
<td></td>
<td>46% of physicians recommend screening to more than 75% of men &gt;50 years old, 66% of physicians believed prostate cancer screening is effective Physicians working in urban areas or serving minorities had higher knowledge scores</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6 excluded because not physicians</td>
<td></td>
<td>46% of physicians recommend screening to more than 75% of men &gt;50 years old, 66% of physicians believed prostate cancer screening is effective Physicians working in urban areas or serving minorities had higher knowledge scores</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60 (58%) family practice</td>
<td></td>
<td>46% of physicians recommend screening to more than 75% of men &gt;50 years old, 66% of physicians believed prostate cancer screening is effective Physicians working in urban areas or serving minorities had higher knowledge scores</td>
</tr>
<tr>
<td></td>
<td></td>
<td>36 (35%) internist</td>
<td></td>
<td>46% of physicians recommend screening to more than 75% of men &gt;50 years old, 66% of physicians believed prostate cancer screening is effective Physicians working in urban areas or serving minorities had higher knowledge scores</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 (8%) general practice</td>
<td></td>
<td>46% of physicians recommend screening to more than 75% of men &gt;50 years old, 66% of physicians believed prostate cancer screening is effective Physicians working in urban areas or serving minorities had higher knowledge scores</td>
</tr>
<tr>
<td>Study Details</td>
<td>Study Type</td>
<td>Design</td>
<td>Methods</td>
<td>Participants Details</td>
</tr>
<tr>
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<tr>
<td>Guerra, Jacobs, Holmes, and Shea, 2007</td>
<td>Cross-sectional, qualitative</td>
<td>University affiliated primary care physicians* (University of Pennsylvania Health System)**</td>
<td>Semi-structured interviews with chart stimulated recall 30 to 45 minute interview by trained medical student, received $50 for participation, To determine barriers to physician discussion of PSA testing with patients</td>
<td>Physicians reported generally having discussions Only 36% of encounters had documentation of discussions Time, physician forgetfulness, competing priorities of patient health all were barriers for physicians having discussions</td>
</tr>
<tr>
<td>Bell, Hays, Hoffman, Day, Higa, and Wilkes, 2006</td>
<td>Cross-sectional</td>
<td>Random sample of urban primary care physicians from Los Angeles, CA from AMA role</td>
<td>Online Survey 30 minute online survey, $75 reimbursement To determine knowledge questionnaire and beliefs of prostate cancer screening.</td>
<td>60% of physicians reported using shared decision-making Physicians with higher knowledge about PCS had higher likelihood of being either selective or low users of PSA</td>
</tr>
<tr>
<td>Kim, Benson, Stern and Gerber 2002</td>
<td>Cross-sectional</td>
<td>Members of the Society of General Internal Medicine and members of the Illinois, North Carolina, and New York chapters of the Academy of Family Physicians*</td>
<td>Internet survey 18 item, 4-5 minutes To determine practice patterns of physicians related to management of prostate cancer (included screening) and BPH</td>
<td>49% of FP/IM recommend PSA screening for men over 50 with a higher proportion of FP (67) vs. (40) IM recommending screening with PSA</td>
</tr>
<tr>
<td>Philips, Reinier, Ashikaga, and Luebbers, 2005</td>
<td>Cross-sectional</td>
<td>Family practice, internal medicine, and general practice physicians in the rural state of Vermont, identified by the Vermont medical board.</td>
<td>2 Mailed surveys</td>
<td>99% of physicians report routinely counseling on prostate cancer screening</td>
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<tr>
<td>416 recruited</td>
<td>Reported only that the first survey focused on prostate cancer screening and the second colon cancer screening.</td>
<td>69% report routinely screening for prostate cancer</td>
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<tr>
<td>169 (40.6%) participated</td>
<td>80 (50%) family practice</td>
<td>61% report they feel counseling is satisfactory for informed decision-making</td>
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<tr>
<td>75 (47%) general internists, 76 (46%) physicians 50-70yo</td>
<td>53 (33%) had someone close to them with prostate cancer</td>
<td>88% felt evidence stronger for colorectal cancer screening compared to prostate cancer screening.</td>
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<tr>
<td>84% white</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Purvis, Cooper, Merritt, Ross, John, and Jorgensen, 2004</th>
<th>Qualitative</th>
<th>Random sample from AMA role of family medicine, internal medicine or general practice physicians from 35 states*</th>
<th>Physician Focus groups</th>
<th>Two groups of practice were found: one who routinely screened men over 50 and one who educated on screening but neither recommended for or against it.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 recruited</td>
<td>14 telephone focus groups were done including 6 to 8 physicians each</td>
<td>The educating group reported uncertainty of evidence supporting PSA use.</td>
<td></td>
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</tr>
<tr>
<td>187 expressed interest</td>
<td>Discussion was done on PSA screening practices, factors influencing these practices, and familiarity with clinical guidelines</td>
<td>The routinely screening group reported patient demand and experience of benefit as reasons for screening.</td>
<td></td>
<td></td>
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<tr>
<td>78 participated</td>
<td>64 did not meet inclusion criteria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45 unavailable to participate</td>
<td>51% family practice</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>33% internal medicine</td>
<td>33% internal medicine</td>
<td></td>
<td></td>
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<tr>
<td>16% general practice</td>
<td>16% general practice</td>
<td></td>
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<tr>
<td>79% male</td>
<td>79% male</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>84% white</td>
<td>84% white</td>
<td></td>
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</tr>
</tbody>
</table>

*did not report if population was urban or rural

**due to small sample size of study and inability of study to do statistical analysis break down of provider type not included here
<table>
<thead>
<tr>
<th>Study</th>
<th>Internal Validity</th>
<th>External Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linder et al 2009</td>
<td>Fair: selection bias – possible, reason for practice/physician selection not provided; confounding - possible, not controlled for or reported; measurement bias unlikely</td>
<td>Fair: contains both internists and family physicians; not generalizable to community physicians</td>
</tr>
<tr>
<td>Pendleton et al 2008</td>
<td>Poor: measurement bias in survey and its analysis, selection bias unlikely, confounding unlikely</td>
<td>Not assessed given poor internal validity.</td>
</tr>
<tr>
<td>Guerra et al 2007</td>
<td>Fair: study population too small to allow for statistical analysis, purposeful sampling and</td>
<td>Fair: contained urban/suburban academic-based physicians making it less generalizable to community and rural physicians</td>
</tr>
<tr>
<td>Bell et al 2005</td>
<td>Fair: measurement bias possible since survey was not piloted on any primary care physicians prior to use, selection bias unlikely, confounding unlikely</td>
<td>Fair: all physicians were in Los Angeles area making it less generalizable to physicians in other locations especially small cities, towns or rural areas</td>
</tr>
<tr>
<td>Kim et al 2002</td>
<td>Fair: some measurement bias possible since survey was only reviewed by 3 physicians prior to sending out and final version was not reviewed, selection bias is also possible since it is unclear how many of the eligible physicians in the population were recruited, confounding could be possible to account for the difference between specialty but was not assessed</td>
<td>Good: large population from several areas of the country including both family practice and internal medicine physicians</td>
</tr>
<tr>
<td>Philips et al 2005</td>
<td>Poor: unable to determine if measurement bias occurred due to lack of information about survey tool, selection bias unlikely since Vermont medical board identified providers for recruitment, provider characteristics were assessed for association with aggressive screening behavior making confounding less likely</td>
<td>Not assessed given poor internal validity.</td>
</tr>
<tr>
<td>Purvis Cooper et al 2004</td>
<td>Good: selection bias, measurement bias unlikely since controlled for in design</td>
<td>Good: Large nationally representative sample</td>
</tr>
</tbody>
</table>
Please answer the following questions.

Do you see male patients at least 50 years old for primary care?
- Yes
- No

What is your primary specialty?
- Family Practice Physician
- Internal Medicine Physician
- General Practice Physician
- Other (Please Specify)

Which year did you finish residency training? (YYYY)

Which of the following best describe your practice setting? (mark all that apply)
- Private Community Clinic
- Academic Outpatient Clinic (associated with an Academic Medical Center)
- Community/Migrant Health Center
- Other (Please Specify)

Which North Carolina Area Health Region (AHEC) is your practice located in?
- Mountain (Buncombe, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Polk, Rutherford, Swain, Transylvania, Yancey)
- Northwest (Alexander, Alleghany, Ashe, Avery, Burke, Caldwell, Catawba, Davidson, Davie, Forsyth, Iredell, Rowan, Stokes, Surry, Watauga, Wilkes, Yadkin)
- Charlotte (Anson, Cabarrus, Cleveland, Gaston, Lincoln, Mecklenburg, Stanly, Union)
- Greensboro (Alamance, Caswell, Chatham, Guilford, Montgomery, Orange, Randolph, Rockingham)
- Southern (Bladen, Cumberland, Harnett, Hoke, Moore, Richmond, Robeson, Sampson, Scotland)
- Wake (Durham, Franklin, Granville, Johnston, Lee, Person, Vance, Wake, Warren)
- South East (Brunswick, Columbus, Duplin, Pender, New Hanover)
- Area L (Edgecombe, Halifax, Nash, Northampton, Wilson)
- Eastern (Beaufort, Bertie, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Greene, Hertford, Hyde, Jones, Lenoir, Martin, Onslow, Pamlico, Pasquotank, Perquimans, Pitt, Tyrrell, Washington, Wayne)
Which sex are you?
- Male
- Female

Which ethnicity are you? (mark all that apply)
- White
- Hispanic or Latino
- African American or Black
- Asian or Pacific Islander
- American Indian/Alaska Native
- Other

Have you, a close family member, or a close friend ever had prostate cancer?
- Yes
- No

For which age groups do you discuss (or offer) prostate specific antigen (PSA) testing to screen for prostate cancer in healthy asymptomatic men with normal risk (only risk factor age and sex)?

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;40 Years</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>40-49 Years</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>50-60 Years</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>61-75 Years</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>&gt;75 Years</td>
<td>☐</td>
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</tr>
</tbody>
</table>

Which approach best describes your practice regarding PSA screening with healthy age-appropriate men who have no other risk factors? (Check one)
- I generally order the PSA test without discussing the possible harms and benefits with the patient.
- I generally discuss the possible harms and benefits of PSA screening with the patient, and then recommend the test.
- I generally discuss the possible harms and benefits of PSA screening with the patient, and then let him decide whether or not to have the test.
- I generally discuss the possible harms and benefits of PSA screening with the patient, and then recommend against the test.
- I generally do not order the PSA test nor discuss the possible harms and benefits with the patient.

How often do you order the PSA test to screen healthy age-appropriate men who have no other risk factors? (Check one)
- Never
- Rarely
- Some of the time
- Most of the time
-
Almost always
   - Always

How often do you discuss the possible benefits of prostate cancer screening with healthy age-appropriate men who have no other risk factors before ordering the PSA test? (Check one)
   - Never
   - Rarely
   - Some of the time
   - Most of the time
   - Almost always
   - Always

How often do you discuss the possible harms of prostate cancer screening with healthy age-appropriate men who have no other risk factors before ordering the PSA test? (Check one)
   - Never
   - Rarely
   - Some of the time
   - Most of the time
   - Almost always
   - Always

Are your prostate cancer screening practices any different for African American men? (Check one)
   - Yes, I am more likely to screen African American men for prostate cancer.
   - Yes, I am less likely to screen African American men for prostate cancer.
   - No, my screening practices are the same for African American men and other patients I see.

Are your prostate cancer screening practices any different for men with a family history of prostate cancer? (Check one)
   - Yes, I am more likely to screen men with a family history of prostate cancer.
   - Yes, I am less likely to screen men with a family history of prostate cancer.
   - No, my screening practices are the same for men with a family history of prostate cancer compared to other patients I see.

The following organizations have recently released updates of their guidelines on prostate cancer screening. Please mark the guidelines with which you are familiar. (mark all that apply)

- American Academy of Family Practice (AAFP) updated guideline in 2008
- American Urology Association (AUA) updated guideline in 2009
- US Preventive Services Task Force (USPSTF) updated guideline in 2008
Please mark the following statements as true or false.

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>The USPSTF guideline recommends against screening for prostate cancer in men under age 50.</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The USPSTF guideline recommends PSA tests for all men between age 50 and 74.</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The USPSTF guideline recommends against screening for prostate cancer in men over age 75.</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The AAFP guideline recommends using patient-provider shared decision making to determine which men between ages 50 and 74 are screened with PSA.</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The AAFP guideline reports insufficient evidence to determine whether men between ages 50 and 74 should be routinely screened.</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The AUA recommends offering PSA screening to well-informed men who are over age 40.</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The ACS guideline recommends using shared decision making and offering the PSA blood test and digital rectal examination annually to all men aged 45 and older.</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>All four of the guidelines recommend educating men about the limitations and benefits prior to doing screening for prostate cancer.</td>
<td>○</td>
<td>○</td>
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</tbody>
</table>

Have you read or heard of the PCLO study results published in March 2009 in the New England Journal of Medicine? (Randomized Prostate-Cancer Screening Trial by Andriole et al involving 76,000 men in the US) (mark all that apply)

- read the journal article or heard from a CME activity
Did it show a reduction in mortality from Prostate Cancer as a result of PSA screening and digital rectal exam?

- Yes
- No
- Don't Know

Have you read or heard of the ESPCM study results published in March 2009 in the New England Journal of Medicine? *(Screening and Prostate-Cancer Mortality in a Randomized European Study by Schröder et al. involving 162,000 men in seven European countries)* (mark all that apply)

- read the journal article or heard from a CME activity
- heard or read in the news
- heard from a patient
- heard from a colleague
- read related journal articles
- not aware of the results

Did it show a reduction in mortality from Prostate Cancer as a result of PSA screening?

- Yes
- No
- Don't Know

As a result of either of these studies, do you feel the evidence FOR using PSA tests as a screening tool for prostate cancer is?

- Much Better
- Better
- About the Same
- Worse
- Much Worse
- Not applicable (not familiar with the studies)
After learning about the results of the mortality studies, how have your prostate cancer screening practices changed? (mark all that apply)

- I spend more time counseling on harms
- I spend more time counseling on benefits
- I am more likely to order PSA without first discussing the risks/benefits with my patient
- I am less likely to order PSA tests without first discussing the risks/benefits with my patient
- I did not change any part of my practice as a result of this evidence
- Not applicable (not familiar with the studies)

Do you feel that Prostate Cancer Screening with PSA in asymptomatic men between age 50 and 74 with more than a 10 year life expectancy is?

- More beneficial than harmful
- More harmful than beneficial
- Harms and Benefits are equal
- Don't know or Unsure

Block 1