Update on the Methods of the U.S. Preventive Services Task Force: Insufficient Evidence

Diana B. Petitti, MD, MPH; Steven M. Teutsch, MD; Mary B. Barton, MD, MPP; George F. Sawaya, MD; Judith K. Ockene, PhD, MEd; and Thomas DeWitt, MD, on behalf of the U.S. Preventive Services Task Force

The U.S. Preventive Services Task Force (USPSTF) seeks to provide reliable and accurate evidence-based recommendations to primary care clinicians. However, clinicians indicate frustration with the lack of guidance provided by the USPSTF when the evidence is insufficient to make a recommendation. This article describes a new USPSTF plan to commission its Evidence-based Practice Centers to collect information in 4 domains pertinent to clinical decisions about prevention and to report this information routinely. The 4 domains are potential preventable burden, potential harm of the intervention, costs (both monetary and opportunity), and current practice. The process and rationale used to select these domains are presented, along with examples of how clinicians might use the information to guide clinical decision making when evidence is insufficient.

Ann Intern Med. 2009;150:199-205. www.annals.org
For author affiliations, see end of text.

The U.S. Preventive Services Task Force (USPSTF) is an independent panel of experts that is convened and supported by the Agency for Healthcare Research and Quality (AHRQ). The U.S. Congress has charged the USPSTF to review the scientific evidence for clinical preventive services and develop evidence-based recommendations about their delivery. In its recommendations, the USPSTF seeks to maximize population health benefits while minimizing harms. The target audience for USPSTF recommendations is primary care clinicians, but the recommendations are widely used by others as well (1). The USPSTF processes and methods are continually examined, and recent updates have been published (1–3). The USPSTF Procedure Manual is posted on the AHRQ Web site (4).

In this issue, the USPSTF reports that it concluded that the evidence to determine whether the benefits of skin cancer screening outweigh the harms was insufficient (5). No recommendation was made, and no letter grade was assigned. Instead, the USPSTF issued an I statement (2). Evidence is often found to be insufficient for topics considered by the USPSTF. Even for screening topics that pertain to all or a large majority of adults, children, or adolescents, evidence is often insufficient (**Table 1**) (6).

The release of the I statement for skin cancer screening provides an opportunity for the USPSTF to describe its plan to expand the kinds of information it commissions to be collected and reported routinely by Evidence-based Practice Centers, to describe the process that led to selection of this information, and to illustrate the uses of the information with examples.

Problem Statement

Primary care physicians and their professional societies expressed frustration with the frequency with which the USPSTF concluded that "evidence is insufficient" to make a recommendation. In the past, the USPSTF coupled this conclusion with a "recommendation" worded as follows:

> . . . the USPSTF concludes that the evidence is insufficient to recommend for or against routine provision of *xxx service*.

Clinicians pointed out that this wording is not a recommendation. Anecdotally, the statement was characterized as "useless" and sometimes as "worse than useless."

In focus groups of practicing primary care providers, a common request was for USPSTF guidance on a course of action with individual patients in situations in which evidence about net benefit is insufficient. Professional society representatives reinforced the need for guidance.

The USPSTF and other bodies have generally held that the strongest argument for providing an intervention is based on scientific evidence from multiple large, well-conducted, randomized clinical trials (RCTs). However, for most clinical preventive services, this standard of evidence is unattainable.

Requirements for RCTs of behavioral counseling interventions are especially problematic because the study interventions in gold-standard RCTs may be artificial. Tucker and Roth (7) discuss this problem in the context of behavioral interventions for substance abuse. They point out that requiring "fidelity" in treatment delivery in a "gold-standard" RCT may eliminate the contextual aspects of the treatment experience and the adaptation of treatment to individual needs that underlies treatment success. Requiring a no-treatment or usual-treatment control condition may produce insurmountable barriers to recruitment. Requiring a control condition with the same num-

See also:

Print
Related articles 188, 194

Web-Only
Conversion of graphics into slides

Table 1. **Insufficient Evidence Statements for Screening of Large Population Subgroups***

Topic	Type of Service	Population
Cervical cancer	Screening using human papillomavirus testing	Women
Chlamydia	Screening	Men
Dementia	Screening	Older adults
Diabetes (type 2)	Screening	Adults
Glaucoma	Screening	Adults
High blood pressure	Screening	Children
High blood pressure	Screening	Adolescents
Lung cancer	Screening using computed tomography	Adults
Oral cancer	Screening	Adults
Prostate cancer	Screening	Men
Skin cancer	Screening using whole-body examination	General population
Thyroid disease	Screening	Adults
Vitamin supplementation to prevent cancer and cardiovascular disease	Vitamins A, C, and E and multivitamins	Adults

* From reference 6.

ber of contact hours as the treatment condition can compromise retention.

For different reasons, the conduct of RCTs for preventive services delivered to infants, children, and adolescents also presents challenges. For some preventive services, the long timeline required to improve health outcomes makes RCTs impractical. Consensus is lacking about the appropriate outcomes for preventive interventions in children, although agreement is universal that decreasing mortality is not the only goal of preventive services provided to this age group.

Finally, many valuable preventive interventions will never be evaluated in an RCT because a trial would be too expensive, recruiting enough participants is not feasible, or investigator interest or funding is lacking.

Acknowledging the Contribution of Non-RCT Evidence and Persisting Issues

Recognizing the paucity of evidence from RCTs, the USPSTF and other groups consider evidence from non-RCT study designs (such as cohort, cross-sectional, case–control, or quasi-experimental) as a standard strategy. Use of an analytic framework, which is an organizing principle for all recent or current USPSTF systematic reviews, permits incorporation of evidence from studies with a variety of designs and yields certainty that can in theory approach the certainty of evidence derived from RCTs.

In constructing an analytic framework, clinical problems are conceptualized in terms of a sequence of key questions (8). A systematic review is generally done to answer each key question. When considered together, the key question evidence forms a chain of evidence that permits firm conclusions about net benefit.

In the case of skin cancer, notwithstanding the use of an analytic framework and consideration of study designs other than RCTs, the USPSTF could not conclude with even moderate certainty that the benefits of skin cancer screening by inspection outweighed the harms or that the harms outweighed the benefits, making the evidence insufficient to make a recommendation (9). Even when non-RCT evidence is considered within a structured causal framework, the problem of insufficient evidence persists.

A New Approach: Process and Outcome

In response to the concerns about the frequency of I statements, the frustration expressed by clinicians, and the call for guidance, the USPSTF held a workshop in spring 2005 to consider how better to meet the needs of its constituents when evidence is insufficient. The workshop involved members of the USPSTF, AHRQ staff, and scientists from the Evidence-based Practice Center supporting the USPSTF. The charge to workshop participants was to develop a strategy that would reduce confusion created by the wording "I recommendation," and to consider whether the USPSTF should "nuance the I"—that is, make a suggestion in favor of or against providing the service. At the workshop, attendees heard presentations from AHRQ and Evidence-Based Practice Center staff involved in the efforts of the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) working group (10–

Table 2. **The 4 Domains of Information Pertinent to Clinical Decision Making for Preventive Services**

Domain	Description
Potential preventable burden	Amount of death, disability, and suffering caused by this condition in the U.S. population. Considers the incidence of the condition; the consequences of the condition in terms of disfigurement, disability, suffering, and death; and burden to family, society, and the health care system.
Potential harms	Immediate or long-term harms associated with delivering this service in routine care. Could include a range of harms from minor (e.g., anxiety associated with further testing after a positive screening result) to major morbidity or mortality (e.g., procedures that would be done to follow up on a positive test result that carry a measurable risk for death).
Costs	Costs associated with delivering this service on a population level, including the costs of the screening tests; the effort and time to deliver the service; and costs of integrating the delivery of the service into clinical practice, such as training and personnel requirements. Opportunity costs, including the benefits that might derive from alternative uses of the time or money, are also considered.
Current practice	Current level of use of the service.

Table 3. **Application of the 4 Domains: Skin Cancer Screening by Using Visual Inspection**

Domain	Information
Potential preventable burden	About 1 000 000 cases of nonmelanoma skin cancer and 52 000 cases of melanoma are diagnosed each year in the United States (23). About 11 000 deaths per year are attributable to skin cancer, about 8000 of which are from melanoma. Melanomas detected at a late stage have a poor prognosis.
Potential harms	Screening identifies suspicious skin lesions that are ultimately shown not to be cancer. Evaluation of suspicious skin lesions may require biopsy, which can be painful. Waiting for a definitive diagnosis after a suspicious lesion is found may cause anxiety.
Costs	The primary care infrastructure to screen for skin cancer by inspection exists. The amount of time that a primary care provider would need to do a screening examination is at least 10 minutes. Provision of this service may allow for less time for provision of preventive services that have proven value (opportunity costs).
Current practice	Skin cancer screening using visual inspection is not widespread. In clinical settings in which many patients have had extensive sun exposure, or in patients with risk factors, skin inspection is sometimes done routinely by physicians with special skills in skin inspection or a particular interest in this condition.

12). Other publications about approaches to grading recommendations were identified and reviewed (13).

The workshop resulted in a decision to transform what was formerly called an "I recommendation" into an "I statement," as described elsewhere (2). The workshop also led to a group decision to reject the proposal to "nuance the I." Nuancing would have resulted in recommendations that clinicians act routinely to offer a service even in the absence of at least moderate certainty that the preventive service has net benefits at the population level, thus violating an underlying principle guiding the work of USPSTF: avoidance of overall harm.

Before the workshop, attendees were charged with bringing to the meeting suggestions for criteria that might be used to "nuance the I," with practice relevance for clinicians, patients, or systems as the basis for these suggestions. During the workshop, further criteria were identified by using a brainstorming technique. The product of these processes was a list of possible factors that could be used to "nuance the I." After rejecting the idea of "nuancing the I," the USPSTF decided to explore, after the workshop, whether provision of information about the factors identified during this process might be useful to clinicians. This follow-up work was delegated to the Methods Workgroup and members of the Evidence-based Practice Center.

The follow-up group noted that almost all of the factors fell into 1 of 4 groups. The 4 information groups came to be described as "domains," a term that connotes hierarchical ranking and is apt, even if accidental. That is, these information domains constitute a limited number of broadly applicable collections of factors, considerations, or attributes pertinent to decision making about preventive services when evidence is insufficient to conclude, with certainty, that there is net benefit or net harm.

After more deliberation, the Methods Workgroup proposed in 2006 that the Evidence-based Practice Center gather pertinent information in the 4 domains as part of its evidence retrieval process. The full USPSTF accepted the proposal, and members provided further input to the descriptions of the domains. The authors of this article were asked to prepare a manuscript about the process and product on behalf of the USPSTF.

Domains and Rationale

The first domain is potential preventable burden of suffering from the condition. When evidence is insufficient, provision of an intervention designed to prevent a serious condition (such as dementia) might be viewed more favorably than provision of a service designed to prevent a condition that does not cause as much suffering (such as rash). The USPSTF recognized that "burden of suffering" is subjective and involves judgment. In clinical settings, it should be informed by patient values and concerns.

The second domain is potential harm of the intervention. When evidence is insufficient, an intervention with a large potential for harm (such as major surgery) might be viewed less favorably than an intervention with a small potential for harm (such as advice to watch less television). The USPSTF again acknowledges the subjective nature and the difficulty of assessing potential harms: For example, how bad is a "mild" stroke?

The third domain is cost—not just monetary cost, but opportunity cost, in particular the amount of time a provider spends to provide the service, the amount of time the patient spends to partake of it, and the benefits that might derive from alternative uses of the time or money for patients, clinicians, or systems. Consideration of clinician time is especially important for preventive services with only insufficient evidence because providing them could "crowd out" provision of preventive services with proven value, services for conditions that require immediate action, or services more desired by the patient. For example, a decision to routinely inspect the skin could take up the time available to discuss smoking cessation, or to address an acute problem or a minor injury that the patient considers important.

The fourth domain is current practice. This domain was chosen because it is important to clinicians for at least

Table 4. **Application of the 4 Domains: Colorectal Cancer Screening by Using CT Colonography***

Domain	Information
Potential preventable burden	A screening program that incorporates the option of CT colonography could help reduce colorectal cancer mortality in the population if patients who would otherwise decline screening found it an acceptable alternative.
Potential harms	The potential harms from evaluation of incidental findings found with CT colonography may be large. The lifetime cumulative radiation risk from use of CT colonography to screen for colorectal cancer should be considered, as well as the growing cumulative radiation exposure from the use of other kinds of diagnostic and screening tests that involve radiation exposure.
Costs	Patient time and burden to participate in colorectal cancer screening using test strategies that require bowel preparation are substantial. A CT colonography screening strategy that does not involve bowel preparation would decrease the burden of adherence. The cost of CT colonography is high.
Current practice	CT colonography performed by trained and experienced radiographers may not be currently available in many parts of the United States.

CT = computed tomography.
* From reference 24.

2 reasons. Clinicians justifiably fear that not doing something that is done on a widespread basis in the community may lead to litigation (14, 15). More important, addressing patient expectations is a crucial part of the clinician–patient relationship in terms of building trust and developing a collaborative therapeutic relationship. The consequences of not providing a service that is neither widely available nor widely used are less serious than not providing a service accepted by the medical profession and thus expected by patients. Furthermore, ingrained care practices are difficult to change, and efforts should preferentially be directed to changing those practices for which the evidence to support change is compelling.

Although the reviewers did not explicitly recognize it when these domains were chosen, the domains all involve consideration of the potential consequences—for patients, clinicians, and systems—of providing or not providing a service. Others writing about medical decision making in the face of uncertainty have suggested that the consequences of action or inaction should play a prominent role in decisions (16, 17).

Decision Making

Decision makers do not have the luxury of waiting for certain evidence. Even though evidence is insufficient, the clinician must still provide advice, patients must make choices, and policymakers must establish policies.

Decision makers appropriately consider a broad array of information when making policies and recommendations for different settings (18–22). The GRADE working group approach (10–12) contrasts with the USPSTF approach. For every topic, the GRADE methodology results in a recommendation that is assigned 1 of 4 grades: weakly or strongly positive or negative. In arriving at the 1 of the 4 recommendation grades, GRADE, like the USPSTF, assesses the quality of evidence about benefits, reviews the evidence about harms, and arrives at a judgment on the magnitude of the benefits and harms and its confidence about them. Unlike the USPSTF system, the GRADE recommendation grades also take into account the importance of the outcome that the treatment prevents, the burdens of the therapy, the monetary costs of the therapy, and the

Table 5. **Application of the 4 Domains: Lung Cancer Screening by Using CT**

Domain	Information
Potential preventable burden	About 170 000 new cases of lung cancer are diagnosed each year in the United States. About 160 000 deaths per year are attributable to lung cancer. Currently, lung cancer has an appreciable 5-year survival rate only if it is diagnosed at an early stage.
Potential harms	Suspicious lung lesions are identified by CT screening in about 13% of at-risk individuals, such as ever-smokers. About 10% of these lesions found on initial screening and 5% of those found on annual screening turn out to be lung cancer (26). Evaluation of suspicious lung lesions may require additional imaging tests, and some patients may need thoracotomy to rule out lung cancer. Waiting for definitive diagnosis after finding a suspicious lesion may cause anxiety. Screening CT delivers exposure to 0.3 to 0.55 mSv of radiation, which is the equivalent of about 2 chest radiographs (27) or 1 to 2 mammograms (28).
Costs	The costs of creating the infrastructure to deliver this service to all smokers and ex-smokers would be large. Helical CT takes 30 minutes of patient time and 10 minutes of technician time (29). Provision of this service may allow for less time for provision of preventive services that have proven value (opportunity costs).
Current practice	Screening for lung cancer with helical CT is not widespread.

CT = computed tomography.

Table 6. **Application of the 4 Domains: Screening for High Blood Pressure in Adolescents**

Domain	Information
Potential preventable burden	High blood pressure in adolescence is a risk factor for hypertension in adulthood. Hypertension in adults increases the risk for cardiovascular disease. The potential of effective interventions in adolescents to prevent future morbidity and mortality due to cardiovascular disease is high.
Potential harms	A potential harm of screening adolescents for high blood pressure is labeling. Pharmacologic treatment of high blood pressure has side effects. The potential long-term harms of pharmacologic treatment of high blood pressure when started at a young age are not known.
Costs	Measuring blood pressure requires <3 minutes of nurse/medical assistant time and the same amount of additional patient time.
Current practice	Routine measurement of blood pressure in adolescents is common practice.

guideline developers' estimation of the average person's values and preferences. In the GRADE approach, no category corresponds to the USPSTF I statement.

After deliberation, the USPSTF decided not to adopt the GRADE approach. It is beyond the scope of this article to provide an in-depth discussion of the differences in perspective and problems between the GRADE and USPSTF approaches that are at the root of this decision. We hypothesize that the exigencies of clinical practice in the case of treatment and diagnosis are much greater than for decisions about prevention. Choosing whether to treat or to pursue a diagnosis is necessary for every patient with a disease or a symptom suggesting illness. In contrast, prevention is offered to an asymptomatic person as a putative "extra" good. If a test or service existed but there was no evidence of net benefit, a decision not to offer the service is perfectly acceptable, because the patient is healthy and free of symptoms.

The USPSTF does not intend to synthesize the information within or across domains. When considering clinical preventive services, clinicians probably already consider these factors as part of their thinking process when making clinical judgments. The USPSTF seeks to make available information that might not otherwise be known and would not necessarily be easy to retrieve quickly and reliably. It is hoped that ready availability of information in each domain will make an explicit thinking process easier and that discussions with patients will be better informed and of higher quality.

Application of the 4 Domains in Clinical Practice

Skin Cancer Screening

This issue includes a recommendation statement and an accompanying evidence report on skin cancer screening (5, 9). **Table 2** shows the 4 domains, and **Table 3** shows how they pertain to clinical decision making for skin cancer screening (23).

Considering this information in a particular clinical situation, a clinician could decide against routinely inspecting the skin to detect skin cancer because the burden of suffering due to skin cancer is comparatively low, skin inspection takes time, and routine screening is not widespread. Alternatively, for a given patient with high lifetime exposure to ultraviolet light or in places where most people have high ultraviolet light exposure (for example, Arizona and Florida), the clinician might choose to recommend the service.

Colorectal Cancer Screening

The recently published USPSTF recommendation on colorectal cancer screening included 2 technologies for which evidence on net benefit was deemed insufficient (24). Information in the 4 domains was provided for computed tomography (CT) colonography in that publication and is repeated here (**Table 4**). Considering this information, a clinician might opt to discuss CT colonography with a patient who has objections to other established screening modalities if high-quality CT colonography is available locally.

Screening for Lung Cancer by Using Helical CT

Screening for lung cancer by using helical CT is another topic for which the USPSTF concluded that evidence of net benefit is insufficient (25). **Table 5** shows information in the 4 domains for this service (26–29). Considering this information, a clinician might decide against recommending lung cancer screening, even to a smoker, because the test finds suspicious lesions that turn out not to be cancer in a high percentage of people screened and the evaluation of suspicious lesions can be invasive. Moreover, the test is neither widely available nor in widespread use.

Contrast: Screening for High Blood Pressure in Adolescents

Screening for high blood pressure in adolescents is another topic for which the USPSTF concluded in 2003 that evidence was insufficient (30). This conclusion was based on the lack of evidence on the long-term outcomes of treatment for high blood pressure starting in adolescence and concern about the harms of long-term pharmacologic treatment started early. Considering this information, a cli-

nician might decide in favor of assessing blood pressure routinely in adolescents because it requires little effort when added to the routine assessment of growth by using height and weight and because identification of high blood pressure might provide an impetus for dietary and lifestyle changes that would alter the trajectory of blood pressure. **Table 6** shows how the new domains would facilitate this decision-making process.

Conclusion

For many topics considered by the USPSTF, the scientific evidence from research encompassing a variety of research designs does not permit even moderate certainty about the net benefit of the preventive service. Evidence about the net benefits of preventive services in subgroups defined by age, sex, race, and other factors is likely to remain perpetually uncertain because additional subgroup questions are defined once evidence is obtained.

The challenge of decision making under conditions of uncertainty is a recurring issue in medicine (31). When uncertainty about what course of action to recommend persists even after a thorough systematic review of evidence on clinical benefits and harms, the USPSTF will begin routinely to seek and provide structured information in the 4 domains selected for their relevance to prevention. The USPSTF intends that this information strategy will help guide the clinician's decision and enhance the discussion between the clinician and the patient and the patient's confidence about the decision.

The USPSTF recognizes that these domains do not define the universe of domains applicable to clinical prevention problems. It acknowledges the role of judgment in selection of the domains and the factors that make up the domains. The USPSTF is receptive to consideration and explication of other domains that would be important for problems other than clinical prevention and to suggestions of alternatives to the domains selected by the USPSTF for clinical prevention. The USPSTF also hopes to generate more and sustained interest in developing a deeper understanding of what information best serves the goal of sound decision making in conditions of uncertainty.

From Arizona State University, Phoenix, Arizona; Merck & Co., West Point, Pennsylvania; Center for Primary Care, Prevention and Clinical Partnerships, Agency for Healthcare Research and Quality, Rockville, Maryland; University of California, San Francisco, San Francisco, California; University of Massachusetts Medical School, Worcester, Massachusetts; and Cincinnati Children's Hospital Medical Center, University of Cincinnati College of Medicine, Cincinnati, Ohio.

Potential Financial Conflicts of Interest: None disclosed.

Requests for Single Reprints: Reprints are available on the AHRQ Web site (www.preventiveservices.ahrq.gov).

Current author addresses are available at www.annals.org.

References

1. **Gurguis-Blake J, Calonge N, Miller T, Siu A, Teutsch S, Whitlock E. U.S. Preventive Services Task Force.** Current processes of the U.S. Preventive Services Task Force: refining evidence-based recommendation development. Ann Intern Med. 2007;147:117-22. [PMID: 17576998]

2. **Barton MB, Miller T, Wolff T, Petitti D, LeFevre M, Sawaya G, et al. U.S. Preventive Services Task Force.** How to read the new recommendation statement: methods update from the U.S. Preventive Services Task Force. Ann Intern Med. 2007;147:123-7. [PMID: 17576997]

3. **Sawaya GF, Guirguis-Blake J, LeFevre M, Harris R, Petitti D. U.S. Preventive Services Task Force.** Update on the methods of the U.S. Preventive Services Task Force: estimating certainty and magnitude of net benefit. Ann Intern Med. 2007;147:871-5. [PMID: 18087058].

4. U.S. Preventive Services Task Force Procedure Manual. AHRQ publication no. 08-05118-EF. Rockville, MD: Agency for Healthcare Research and Quality; July 2008. Accessed at www.ahrq.gov/clinic/uspstf/08/methods/procmanual.htm on 19 November 2008.

5. **U.S. Preventive Services Task Force.** Screening for skin cancer: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med. 2009;150:188-93.

6. Guide to Clinical Preventive Services, 2008: Recommendations of the U.S. Preventive Services Task Force. AHRQ publication no. 08-05122. Rockville, MD: Agency for Healthcare Research and Quality; 2008. Accessed at www.ahrq.gov/clinic/pocketgd08/ on 18 November 2008.

7. **Tucker JA, Roth DL.** Extending the evidence hierarchy to enhance evidence-based practice for substance use disorders. Addiction. 2006;101:918-32. [PMID: 16771885]

8. **Harris RP, Helfand M, Woolf SH, Lohr KN, Mulrow CD, Teutsch SM, et al. Methods Work Group, Third US Preventive Services Task Force.** Current methods of the US Preventive Services Task Force: a review of the process. Am J Prev Med. 2001;20:21-35. [PMID: 11306229].

9. **Wolff T, Tai E, Miller T.** Screening for skin cancer: an update of the evidence for the U.S. Preventive Services Task Force. Ann Intern Med. 2009;150:194-8.

10. **Atkins D, Best D, Briss PA, Eccles M, Falck-Ytter Y, Flottorp S, et al. GRADE Working Group.** Grading quality of evidence and strength of recommendations. BMJ. 2004;328:1490. [PMID: 15205295].

11. **Atkins D, Eccles M, Flottorp S, Guyatt GH, Henry D, Hill S, et al. GRADE Working Group.** Systems for grading the quality of evidence and the strength of recommendations I: critical appraisal of existing approaches: The GRADE Working Group. BMC Health Serv Res. 2004;4:38. [PMID: 15615589].

12. **Atkins D, Briss PA, Eccles M, Flottorp S, Guyatt GH, Harbour RT, et al. GRADE Working Group.** Systems for grading the quality of evidence and the strength of recommendations II: pilot study of a new system. BMC Health Serv Res. 2005;5:25. [PMID: 15788089].

13. **Ebell MH, Siwek J, Weiss BD, Woolf SH, Susman J, Ewigman B, et al.** Strength of recommendation taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. J Am Board Fam Pract. 2004;17:59-67. [PMID: 15014055]

14. **Merenstein D.** A piece of my mind. Winners and losers. JAMA. 2004;291:15-6. [PMID: 14709561]

15. **Krist AH, Woolf SH, Johnson RE.** How physicians approach prostate cancer screening before and after losing a lawsuit. Ann Fam Med. 2007;5:120-5. [PMID: 17389535]

16. **Feinstein AR.** The 'chagrin factor' and qualitative decision analysis. Arch Intern Med. 1985;145:1257-9. [PMID: 4015276]

17. **Djulbegovic B, Hozo I, Schwartz A, McMasters KM.** Acceptable regret in medical decision making. Med Hypotheses. 1999;53:253-9. [PMID: 10580533]

18. **Lomas J, Culyer T, McCutcheon C, McAuley L, Law S.** Conceptualizing and Combining Evidence for Health System Guidance. Ottawa: Canadian Health Services Research Foundation; 2005.

19. **Steinberg EP, Luce BR.** Evidence based? Caveat emptor! Health Aff (Millwood). 2005;24:80-92. [PMID: 15647218]

20. **Teutsch SM, Berger ML.** Evidence synthesis and evidence-based decision making: related but distinct processes. Med Decis Making. 2005;25:487-9. [PMID: 16160204]

21. **Clancy CM, Cronin K.** Evidence-based decision making: global evidence, local decisions. Health Aff (Millwood). 2005;24:151-62. [PMID: 15647226]

22. **Atkins D, Siegel J, Slutsky J.** Making policy when the evidence is in dispute. Health Aff (Millwood). 2005;24:102-13. [PMID: 15647220]

23. **Bruce AJ, Brodland DG.** Overview of skin cancer detection and prevention for the primary care physician. Mayo Clin Proc. 2000;75:491-500. [PMID: 10807078]
24. **U.S. Preventive Services Task Force.** Screening for colorectal cancer: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med. 2008;149:627-37. [PMID: 18838716]
25. **U.S. Preventive Services Task Force.** Lung cancer screening: recommendation statement. Ann Intern Med. 2004;140:738-9. [PMID: 15126258]
26. **Henschke CI, Yankelevitz DF, Libby DM, Pasmantier MW, Smith JP, Miettinen OS. International Early Lung Cancer Action Program Investigators.** Survival of patients with stage I lung cancer detected on CT screening. N Engl J Med. 2006;355:1763-71. [PMID: 17065637]
27. **Diederich S, Lenzen H.** Radiation exposure associated with imaging of the chest: comparison of different radiographic and computed tomography techniques. Cancer. 2000;89:2457-60. [PMID: 11147626]
28. **Brenner DJ, Elliston CD.** Estimated radiation risks potentially associated with full-body CT screening. Radiology. 2004;232:735-8. [PMID: 15273333]
29. Swedish Lung Cancer Screening Program. 2008. Accessed at www.swedish.org/body.cfm?id=347 on 24 November 2008.
30. U.S. Preventive Services Task Force recommendation on high blood pressure screening, 2003. In: Guide to Clinical Preventive Services, 2005. Archive, Section 2. Recommendations for Adults: Heart and Vascular Diseases: Screening for High Blood Pressure. Accessed at www.ahrq.gov/clinic/pocketgd05/gcps2a.htm#Blood on 24 November 2008.
31. **Helfand M.** Using evidence reports: progress and challenges in evidence-based decision making. Health Aff (Millwood). 2005;24:123-7. [PMID: 15647222]

Current Author Addresses: Dr. Petitti: Department of Biomedical Informatics, Arizona State University, Phoenix, AZ 85041.
Dr. Teutsch: Outcomes Research, Merck & Co., West Point, PA 19486.
Dr. Barton: Center for Primary Care, Prevention and Clinical Partnerships, Agency for Healthcare Research and Quality, Rockville, MD 20850.
Dr. Sawaya: Department of Obstetrics, Gynecology and Reproductive Science, University of California, San Francisco, San Francisco, CA 94143.
Dr. Ockene: Department of Medicine, University of Massachusetts Medical School, Worcester, MA 01655.
Dr. DeWitt: Department of Pediatrics, Cincinnati Children's, University of Cincinnati College of Medicine, Cincinnati, OH 45229.