STUDY

Skin Cancer Screening by Dermatologists, Family Practitioners, and Internists

Barriers and Facilitating Factors

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Objective: To determine barriers and facilitating factors to skin cancer screening practices among US primary care physicians and dermatologists.

Design: Survey.

Setting: Physicians randomly selected from the American Medical Association's Medical Marketing Services database from April 1 through November 30, 2005.

Participants: A total of 2999 US dermatologists, family practitioners, and internists.

Main Outcome Measures: Results based on 1669 surveys returned regarding practice characteristics, skin cancer screening behaviors, and barriers and facilitating factors to performing full-body skin examinations for patients.

Results: The overall response rate was 59.2%. More dermatologists (552 [81.3%]) reported performing full-body skin examinations on patients than did family practitioners (333 [59.6%]) ($P<.05$) or internists (243 [56.4%]) ($P<.05$). Among all physicians, time constraints, competing comorbidities, and patient embarrassment were reported as the top 3 barriers to performing full-body skin examinations, and these barriers were different among medical specialties. Among all physicians, having patients at high risk for skin cancer, patient demand for complete examination/mole check, and the influence of medical training were reported as facilitating factors to performing full-body skin examinations.

Conclusion: Becoming more knowledgeable about physician barriers to skin cancer screening could help improve primary and secondary practices in both the primary care and dermatology settings.

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Skin cancer, the most frequently diagnosed cancer in the United States, constitutes a significant public health problem. The most common forms of skin cancer are basal cell carcinoma and squamous cell carcinoma, which together constitute more than 1 million new cases annually. Malignant melanoma, although not as common, is the most fatal skin cancer; an estimated 68 720 people in the United States were diagnosed as having melanoma in 2009, with approximately 8650 associated deaths.[1]

See Practice Gaps at end of article

It is critical for patients to adhere to primary prevention behaviors and for clinicians to adopt secondary prevention strategies aimed at early detection of skin cancer to reduce its associated morbidity and mortality. Previous studies have suggested that many individuals, particularly those with established risk factors for melanoma, would benefit from active skin cancer screening and surveillance,[2-6] and screening by dermatologists in particular may also be cost-effective.[7,8] However, widespread acceptance of screening has been limited by the lack of randomized clinical trials demonstrating the efficacy, feasibility, and cost-benefits of skin cancer screening,[9-16] and existing guidelines on skin cancer screening remain inconsistent, ranging from no formal recommendations to annual screening for all adults. The recent US Preventive Services Task Force did not recommend routine screening and concluded that the current evidence is insufficient to assess the balance of benefit and harm of using whole-body skin examination by a primary care clinician or patient self-examination of the skin for the early detection of skin cancer.[16]

Despite this lack of uniform screening recommendations, it has been previously determined that dermatologists report a high rate of screening for skin cancer; 79% of dermatologists surveyed reported per-

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forming full-body skin cancer screening for all of their adult patients or for those at high risk for skin cancer.[17] In the primary care setting, where physicians see a much larger segment of the population compared with dermatologists, the rates of screening are lower.[18,19] Although increased efforts at skin cancer detection and education have been proposed in the primary care setting, there remain significant barriers to effective skin cancer detection and education by physicians.[12,19-24]

The objective of this study was to determine the barriers and facilitating factors to skin cancer screening practices among US physicians. Specifically, we designed this study to elucidate differences among dermatologists, family practitioners, and internists. We conducted this survey in the context of a larger randomized intervention study designed to understand the effects of the following 2 modes of data collection: a mixed-mode electronic and postal mail survey delivery vs an entirely postal mail delivery.

METHODS

STUDY POPULATION

We identified board-certified US physicians from the American Medical Association Medical Marketing Services database.[25] The database (n=30 000) is a representative sample of office-based practicing physicians by specialty and by state. Physicians were identified in each of 3 subgroups, including family practitioners (n=999), internists (n=1000), and dermatologists (n=1000). Physicians in each subgroup were identified by stratified random sampling applied to the database. Eligibility for inclusion in the study sample required having a postal mail and an electronic mail address.

SURVEY INSTRUMENT

The survey instrument was developed by experts in dermatology and epidemiology and pilot tested. These experts worked collaboratively to (1) review relevant literature to identify barriers and facilitating factors that physicians face when performing skin examinations; (2) identify new barriers and facilitating factors; and (3) pilot test the final survey on a group of physicians (n=12).

Physicians within each specialty group were asked to report on barriers and facilitating factors to skin cancer screening. The survey consisted of 13 questions about demographics, practice characteristics, skin cancer screening behaviors, and barriers and facilitating factors to performing full-body skin examinations. Specifically, physicians were asked to report on the following barriers to skin cancer screening: lack of skill or training, uncertainty about what to look for when the patient has many moles, time constraints, lack of proper equipment (eg, poor lighting), patient embarrassment or reluctance, not routinely seeing the skin uncovered, lack of or inadequate reimbursement, low probability of finding cancer, lack of importance of skin examinations, lack of standardized guidelines, patients who are not at high risk, and the presence of competing comorbidities. Physicians were also asked to report on the following facilitating factors to skin cancer screening: skill or expertise in performing full-body skin examinations and diagnosing skin cancer, influence of medical training, presence of patients at high risk, patient demand for a complete skin examination and/or mole check, adequate reimbursement, medicolegal pressure to perform preventive procedures, completeness of patient records, and evidence supporting skin examinations as a tool for skin cancer prevention. Possible responses to the questions aimed at detecting barriers and facilitating factors to screening were on a 4-point scale ranging from "not a factor" (1) to "major factor" (4).

SURVEY STUDY DESIGN AND ADMINISTRATION

We conducted this survey in the context of a larger randomized intervention study to understand the effects of the following 2 modes of data collection: mixed-mode electronic and postal mail survey delivery and an entirely postal mail survey delivery. We conducted the survey from April 1 through November 30, 2005. Physicians in each specialty were randomized to 2 different survey delivery groups. One group received the first 2 contacts via electronic mail and subsequent contacts via postal mail (mixed-mode group), and the other group received all contacts via postal mail (postal group).

The study was accepted by the institutional review board and a waiver was approved.

STATISTICAL ANALYSIS

Descriptive frequencies and percentages were calculated to characterize physician demographics, practice characteristics, and survey response rates in each cohort. We compared responses across specialties using a z test for 2 proportions and calculated P values with statistical significance evaluated at the level of $\alpha = .05$ (2-tailed).

RESULTS

Of the 2999 physicians who were contacted, 179 were ineligible (41 dermatologists, 63 family practitioners, and 75 internists) because they had moved with no forwarding address (n=102), were not a clinician (n=30), had retired (n=18), were not a practicing physician (n=14), had unsubscribed via the e-mail link (n=12), or had died (n=3). Thus, 1669 physicians responded, for an overall rate of 59.2%. The response rates by specialty were 559 (59.7%) for family practitioners, 431 (46.6%) for internists, and 679 (70.8%) for dermatologists. Dermatologists had significantly higher response rates than family practitioners ($P < .05$) and internists ($P < .05$), and family medicine physicians had a significantly higher response rate than internists ($P < .05$).

Demographics and practice characteristics of the survey respondents are depicted in eTable 1 (http://www.archdermatol.com). Most respondents were part of a group private practice (741 [44.4%]) or a solo private practice (524 [31.4%]). Less than half of all respondents (800 [47.9%]) had their practice in a suburban setting, and 1072 (64.2%) see from 201 to 600 patients per month. More than half of all respondents (988 [59.2%]) graduated medical school more than 20 years ago, and most (1053 [63.1%]) who responded were aged 41 to 60 years. Almost three-quarters of all respondents (1206 [72.3%]) were male.

More than half of the patients treated by 81.6% of the respondents were white and non-Hispanic (90.3% of dermatologists, 79.8% of family practitioners, and 73.5% of internists). More than two-thirds of all respondents routinely stated that they perform full-body skin examina-

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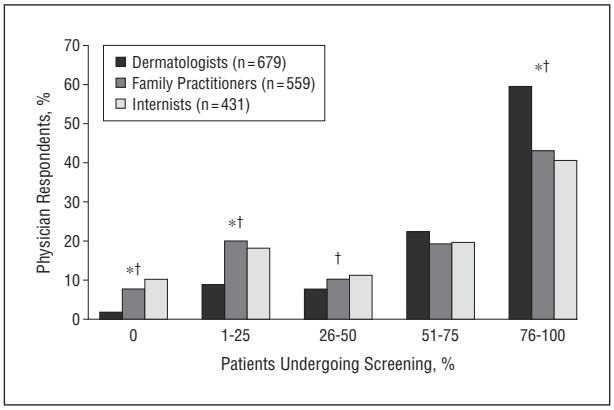

Figure 1. Reported performance of full-body skin examinations for white non-Hispanic patients older than 50 years by US physician specialty. *For dermatologists vs family practitioners, $P<.05$. †For dermatologists vs internists, $P<.05$.

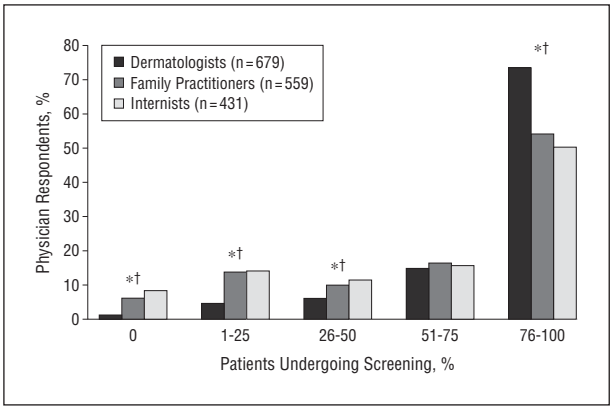

Figure 3. Reported performance of full-body skin examinations for white non-Hispanic patients at high risk for skin cancer by US physician specialty. *For dermatologists vs family practitioners, $P<.05$. †For dermatologists vs internists, $P<.05$.

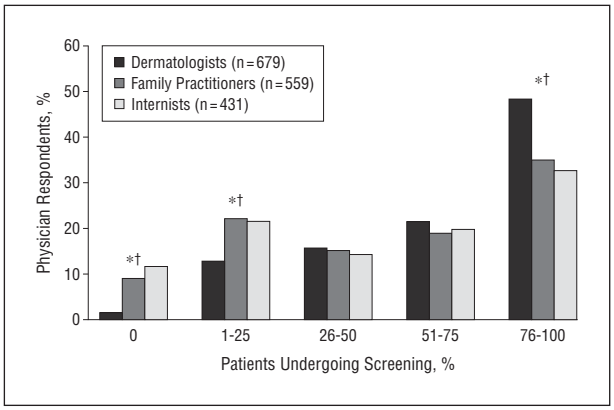

Figure 2. Reported performance of full-body skin examinations for white non-Hispanic patients aged 20 to 50 by US physician specialty. *For dermatologists vs family practitioners, $P<.05$. †For dermatologists vs internists, $P<.05$.

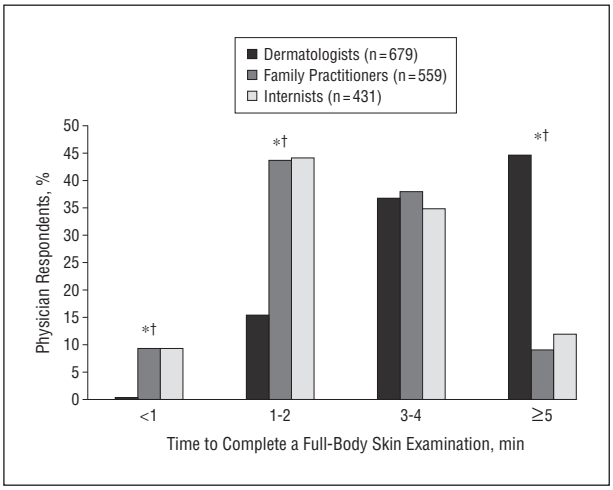

Figure 4. Reported time to perform a full-body skin examination for a patient by US physician specialty. *For dermatologists vs family practitioners, $P<.05$. †For dermatologists vs internists, $P<.05$.

tions on their patients during a complete physical examination (552 dermatologists [81.3%], 333 family practitioners [59.6%], and 243 internists [56.4%]).

Skin cancer screening practices reported by responding physicians are presented in **Figures 1**, **2**, **3**, and **4**. More physicians routinely reported that they performed full-body skin examinations for 76% to 100% of their white non-Hispanic patients older than 50 years (Figure 1), more than for their white non-Hispanic patients aged 20 to 50 years (Figure 2), and dermatologists reported screening rates of both age groups that were significantly higher than the rates for family practitioners ($P<.05$) and internists ($P<.05$). Full-body examination rates among physicians were highest for patients with at least 1 additional risk factor for skin cancer; 72.8% of dermatologists reported screening for 76% to 100% of their high-risk patients, which was significantly more than the 53.1% of family practitioners ($P<.05$) and 49.4% of internists ($P<.05$) who reported the same (Figure 3). Dermatologists took longer to complete a full-body skin examination for their patients than did family practitioners and internists (Figure 4).

In terms of specialty, 48.2% of dermatologists spend most of their time (76%-100%) practicing general dermatology, although more than 88% of dermatologists reported spending as much as 25% of their time practicing pediatric dermatology, cosmetic dermatology, Mohs surgery, and/or basic or clinical research. Most family practitioners and internists (66.3% and 75.2%, respectively) reported spending 76% to 100% of their time practicing primary care, whereas more than 94% of both specialties reported spending as much as 25% of their time practicing pediatrics, adolescent medicine, and/or basic or clinical research. Of the various sources of payment reported by physicians, health maintenance and preferred provider organizations and Medicare were reported as the most used.

The barriers and facilitating factors to skin cancer screening among specialties are reported in eTables 2 and 3, respectively. Of all responding physicians, time constraints, competing comorbidities, and patient embarrassment or reluctance were reported as the top 3 moderate or major barriers to performing full-body skin examinations on patients, but these barriers were different among specialties. Significantly more family practitioners (304 [54.4%]) ($P<.05$) and internists (235 [54.5%])

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($P<.05$) reported time constraints as a moderate or major barrier than did dermatologists (208 [30.6%]), and significantly more family practitioners (282 [50.4%]) ($P<.05$) and internists (223 [51.7%]) ($P<.05$) reported competing comorbidities as a moderate or major barrier compared with dermatologists (111 [16.3%]). On the other hand, significantly more dermatologists (300 [44.2%]) reported patient embarrassment or reluctance as a moderate or major barrier than did family practitioners (175 [31.3%]) ($P<.05$) and internists (141 [32.7%]) ($P<.05$).

Of all responding physicians, having patients at high risk, patient demand for complete examinations or mole checks, and the influence of medical training were reported as the top 3 moderate or major facilitating factors to performing full-body examinations. Significantly more dermatologists reported the following factors as moderate or major facilitating factors to performing full-body skin examinations than did family practitioners and internists: skill/expertise in performing full-body skin examinations and diagnosing skin cancer, influence of medical training, and having patients at high risk for skin cancer.

eTable 4 presents the ranking for each barrier and facilitating factor by physician specialty. The ranking was determined by combining the percentages for major and minor factors reported in eTables 2 and 3. These findings provide a relative strength of importance for each factor within each physician specialty. Variability in ranking of importance by physician specialty was more pronounced for barriers compared with facilitating factors.

COMMENT

Our study showed that routine skin cancer screening as stated by family practitioners and internists is occurring at a significantly lower rate than it is by dermatologists. Becoming more knowledgeable about physician barriers to skin cancer screening could help improve primary and secondary practices in the primary care and dermatology settings. This result is not surprising given dermatologists' training and specialized focus on the skin, and it is also consistent with previous studies that have indicated that skin examinations are lacking within primary care settings.[18,19,23,26,27] Our study surveyed a larger number of dermatologists (n=1000), family practitioners (n=999), and internists (n=1000) across the United States and thus may be more representative of national screenings rates than other studies.

In contrast to family practitioners and internists, the self-reported rate at which dermatologists screen for skin cancer among their patients is high; 81.3% of dermatologists screen routinely, whereas 87.4% screen for skin cancer among more than half of their patients who have at least 1 additional risk factor. However, only 72.8% of dermatologists are screening for skin cancer among 76% to 100% of their high-risk patients, and only 57.9% of dermatologists are screening for skin cancer among 76% to 100% of their white non-Hispanic patients who are older than 50 years. Given that screening every 2 years among siblings of patients with melanoma and 1-time screening among the general population older than 50 years have been found to be cost-effective,[7] dermatologists' screening rates for high-risk and older individuals should approach nearly 100%. However; it will be necessary to respect patient preferences and the fact that some high-risk or older individuals may not want to undergo screening, and thus, screening rates of 100% probably cannot be achieved.

The differences observed between generalists and dermatologists are not surprising given dermatologists' training and specialized focus on the skin, as well as the competing health conditions and responsibilities. The reason for lack of performance of skin cancer screening, particularly among family medicine practitioners and internists, could be attributable to time constraints and competing comorbidities; more than 54% of family practitioners and internists reported time constraints as a moderate or major obstacle, and more than 51% of family practitioners and internists reported competing comorbidities as a moderate or major obstacle to skin cancer screening. Based on a literature review of skin cancer screening in the primary care setting, the principal barriers to skin cancer detection were found to be the low priority of skin cancer screening in primary care, that most examinations do not result in significant findings, and that many providers lack expertise to adequately identify high-risk lesions.[23] Lack of reimbursement for preventive care, time constraints, and distraction by other health problems (competing comorbidities) may also impede skin cancer screening efforts.[23] In a survey of primary care physicians in the United States, nearly 60% reported routinely performing full-body skin examinations of their high-risk patients, and lack of time was reported as the strongest barrier (odds ratio, 0.3; 95% confidence interval, 0.2-0.6).[28]

Patient embarrassment and time constraints were the top 2 barriers associated with skin cancer screening among dermatologists. This finding was consistent with another study, in which 42% of dermatologists reported lack of time as an impediment to screening and 9% did not screen for skin cancer because of potential patient embarrassment.[17] More dermatologists consider patient embarrassment a major barrier to skin cancer screening compared with family practitioners and internists. A possible reason may be that patients treated by dermatologists present with more stigmatizing problems that are visible on their skin than those presenting to primary care physicians. Alternatively, the perceived patient expectation may be an issue. Patients may see a dermatologist for an isolated skin condition, such as a wart, and the dermatologist may feel awkward asking this person to undress for a full-body skin examination. Conversely, internists and primary care providers routinely ask patients to undress for physical examinations (such as pelvic and rectal examinations); thus, undressing for the examination is understood and expected by the patient. Further, patient embarrassment may be explained by the lack of a strong physician-patient relationship with respect to specialists. Primary care physicians have years to build relationships with their patients and, as noted, the patients are accustomed to annual examinations and other similar visits that involve disrobing. To overcome this barrier, dermatolo-

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gists could educate their patients about the role of the full-body skin examination in a routine visit by providing them with written material to read and establishing a comforting patient-physician relationship.

There is a lack of consensus for skin cancer screening, and widespread acceptance of screening has been limited by the lack of randomized clinical trials demonstrating the efficacy, feasibility, and cost-benefits of skin cancer screening.[9-16] In our study, family physicians and internists reported that the lack of standardized guidelines affected routine screening. Among dermatologists, family practitioners, and internists alike, the most frequently reported moderate or major facilitating factor to screening was found to be patients at high risk for skin cancer. Despite this finding, only 87.4% of dermatologists, 69.0% of family practitioners, and 64.7% of internists stated that they screen for cancer among most of their high-risk patients. Primary care physicians, including family practitioners and internists, have the potential to play a vital role in primary and secondary prevention of skin cancer. Of all melanomas that are discovered by physicians, most (76%) are detected by primary care physicians or internists.[29] There is an opportunity for primary care physicians to perform skin cancer screening because a large segment of the population is seen by a primary care physician each year; approximately 41.8% of annual office visits in the United States are to a family practitioner or internist.[30]

Another moderate or major facilitating factor to screening among all physicians was patient demand for a complete skin examination and/or mole check. It is possible that public education efforts have reached the patient population enough to motivate them to adhere to primary prevention behaviors and to request screening, and it is important that these public campaign programs continue in the future.

A major difference in the reported facilitating factors between dermatologists and both family practitioners and internists is the skill and expertise dermatologists have in performing full-body skin examinations and diagnosing skin cancer: 77.6% of dermatologists reported skill as a moderate or major factor in facilitating their screening practices, whereas only 54.2% and 56.2% of family practitioners and internists, respectively, reported the same. These results suggest that 1 possible strategy to ensure screening activities among all physicians, particularly among family practitioners and internists who have lower screening rates, may be through education and/or providing more dermatological training during medical school and offering additional continuing medical education for current physicians.

There are several limitations to this study. First, the study results may not reflect the true practices of physicians, particularly because physicians tend to overestimate their prevention strategies; therefore, the screening rates reported herein may be inflated.[31] Future research could benefit by taking this into account and conducting validation studies of self-reported physician behavior. Surveying physicians and using patient interviews or standardized patient actors could be 1 way of validation. Second, 40.8% of physicians (29.2% of dermatologists, 40.3% of family practitioners, and 53.4% of internists) who were sent a survey did not respond to multiple contacts attempting to reach them. The reported screening rates and barriers and facilitating factors to screening by nonresponders may be different than those reported by responders.

Skin cancer is an ideal cancer for encouraging screening because many risk factors are well known, including family history, the presence of atypical nevi, skin type, and history and pattern of sun exposure; because the disease is highly prevalent; and because there are opportunities for early detection.[32-40] The results of our study suggest that becoming more knowledgeable about physician barriers to skin cancer screening could help improve primary and secondary practices in both the primary care and dermatology settings. Understanding the determinants of patient skin cancer screening could help promote interventions based on physician characteristics that are amenable to change, potentially improve physicians' prevention practices, and help promote early detection.

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Author Contributions: Dr Oliveria had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Oliveria, Cushman, and Halpern. *Acquisition of data:* Oliveria and Heneghan. *Analysis and interpretation of data:* Oliveria, Heneghan, Ughetta, and Halpern. *Drafting of the manuscript:* Oliveria and Heneghan. *Critical revision of the manuscript for important intellectual content*: Oliveria, Cushman, Ughetta, and Halpern. *Statistical analysis:* Oliveria, Heneghan, and Cushman. *Obtained funding:* Oliveria. *Administrative, technical, and material support:* Heneghan, Cushman, and Ughetta. *Study supervision:* Oliveria, Ughetta, and Halpern.
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PRACTICE GAPS

Need to Improve Skin Cancer Screening of High-Risk Patients

In their study, Oliveria et al reveal a practice gap in which more than 3 of 10 primary care physicians (PCPs) and 1 of 10 dermatologists report not screening more than half their high-risk patients for skin cancer. While a knowledge gap in identifying high-risk patients may be a contributing factor, time constraints, competing morbidities, and patient embarrassment/reluctance were cited as the strongest barriers to performing a full skin examination (FSE).

The continued existence of barriers to PCPs performing skin cancer screenings is not unexpected in the context of a shortage of PCPs coupled with a predicted health care overhaul that will provide first-time health care for millions of patients. To narrow this gap, dermatologists can train current and future PCPs to identify patients at the highest risk of advanced melanoma (white men older than 50 years) and devote more time to screening patients with multiple risk factors while limiting efforts toward low-risk patients. Although performing the FSE should remain within the province of PCPs and dermatologists, other specialists who see high-risk patients may improve early detection rates by integrating a focal skin examination into the specialty visit. For instance, the scenario in which the cardiologist, trained in the FSE dur-

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