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Use of and intentions to use dermoscopy among physicians in the United States

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ABSTRACT

Background: Dermatologists routinely use dermoscopy to improve diagnostic accuracy of skin cancers. Much less is known about its use among other physicians who routinely examine the skin, such as family physicians, internists and plastic surgeons.

Objectives: To document the use of dermoscopy in a sample of US physicians and to examine physician and practice characteristics associated with ever having used a dermascope and having some intentions to incorporate dermoscopy into clinical practice during the next 12 months.

Methods: From September 2015 to February 2016, we recruited 1,466 practicing physicians in person and online to complete an anonymous survey that assessed: demographic factors; physicians and practice characteristics; confidence differentiating skin lesions; knowledge and use of dermoscopy; and intentions and barriers to use dermoscopy. We conducted bivariate analysis to examine the relationship between key factors and the outcomes and entered the significant predictors into two separate logistic regressions.

Results: Fifteen percent of participants had ever used a dermascope and 6% were currently using it. Factors significantly associated with ever having used a dermascope (Model 1) and having intentions to use (Model 2) at the multivariate level were: recent graduation from medical school (strongest predictor in both models), identifying as a family physician, seeing a higher number of patients with skin cancer and having a higher level of confidence differentiating skin lesions. Both models were highly significant.

Conclusion: Use of dermoscopy was low. Promotional efforts to increase dermoscopy use in the US are needed.

Introduction

Skin cancer is the most common cancer in the United States (US) [1]. Over the past three decades, there have been more cases of skin cancer reported than all other cancers combined [2,3]. Skin cancer poses a substantial and increasing economic burden on the US health care system [4]. Between 2007 and 2011, the average annual cost for treating skin cancer increased by 126.2% compared to a 25.1% increase for all other cancers [4]. Although non-melanoma skin cancers are more prevalent, melanoma is far more deadly [5]. During the past three decades, there has been 20% to 60% decrease in mortality rates for cancers of the cervix, colon, prostate and breast while mortality from melanoma has increased [6,7]. Early detection is key to achieving more positive treatment outcomes [8].

Because many patients are seen first by primary care physicians (PCPs), these doctors are poised to play a critical role in early detection of skin cancers. The most common way that many PCPs screen for skin cancer is through visual inspection, which is not highly sensitive [9]. Among PCPs the sensitivity of visual inspection ranges from 37.5% to 60.9% [9]. Thus, reliance on visual inspection alone may not be the optimal strategy for early detection of skin cancers. Adding relatively inexpensive, but highly sensitive and specific non-invasive technology, such as the dermascope, may enhance the effectiveness of visual exams for detecting early stage skin cancers.

Dermoscopy is a non-invasive in vivo technique that allows visualization of subsurface structures of the skin that are not visible with the naked eye. Several meta-analyses provide strong evidence indicating that dermoscopy improves accuracy in diagnosing skin cancer [10-12]. In a 2008 meta-analysis, the odds of melanoma detection by dermoscopy was 15.6 times higher than by naked-eye examination (CI = 2.9-83.7, p = .016), and the sensitivity rate was 90% compared to 71% for naked-eye examination with no significant changes in specificity [10]. In a more recent study, dermoscopy resulted in 42% fewer excisions compared to naked-eye examination and had a 21% increase in specificity [13].

Despite the benefits, the diagnostic accuracy of the dermascope is contingent on the skill of the user and the cancerous lesions having typical features [14]. Notwithstanding, dermoscopy is routinely used among dermatologists in many countries. For instance, approximately 95% of dermatologist in France, 98% of those in Australia, and 98.5% of those in the UK use dermoscopy in their clinical practice [15]. In contrast, use of dermoscopy among US dermatologists is much lower. In 2009, 48% of the 3,238 US dermatologists surveyed reported using dermoscopy in their practice [16]. Efforts to promote the use of the dermascope among US dermatologists are warranted.

Because dermascopes are relatively inexpensive and easy to use with minimal training, they can be readily integrated into routine primary care [17]. There is emerging evidence indicating that PCPs can effectively use the dermascope to increase their sensitivity of diagnosing malignant skin lesion with little or no decrease in specificity [17-19]. For instance, Argenziano et al reported statistically significant differences in sensitivity between dermoscopy and visual examination (79.2% vs 54.1% respectively); 23 malignant skin tumors were missed using visual examination and only 6 using dermoscopy [17]. In another study, dermoscopy significantly increased the PCP's ability to detect melanoma from dermoscopic images; sensitivity increased from 54.6% to 75.9% [18]. Using within-lesion controls, Menzies et al asked participants to rate suspicious lesions and provide management options (e.g., referral, biopsy, etc.) using visual inspection and then to repeat the rating with the aid of a dermascope [19]. There was a 63.5% reduction in the number of benign lesions requiring excision or referral from use of the dermoscopic intervention and sensitivity of diagnosis almost doubled. A recent study of French PCPs provides additional evidence supporting use of the dermascope for melanoma screening [20]. These studies suggest dermoscopy can improve the PCP's diagnostic accuracy for skin cancer.

Another group that may benefit from using the dermascope is plastic surgeons. Interest among this group of physicians is increasing as demonstrated by a recent study conducted among plastic surgeons attending the first Dermoscopy for Plastic Surgeons conference [21]. Participants were asked to mark skin lesions as certainly benign (leave), probably benign (excise) and malignant (excise) based on a clinical picture before and after a one-day dermoscopy training course [21]. After the training course, and with the addition of the dermoscopic images, the sensitivity of accurately diagnosing a malignant lesion increased from 56% to 64% and specificity increased from 44% to 64%. Dermoscopy also resulted in a near doubling in the number of correctly diagnosed benign lesions. Expanding use of the dermascope among plastic surgeons may yield additional benefits in the diagnosis and treatment of skin cancer and may also lead to additional uses for the dermascope.

In spite of this strong evidence supporting the dermascope as an important diagnostic tool, little is known about use of the dermascope among US based physicians. In response to this need, we conducted a study to: (1) document the use of dermoscopy in a sample of US physicians; (2) examine physician and practice characteristics associated with ever having used a dermascope and intentions to use a dermascope; and (3) examine possible barriers that might hamper its use.

Methods

From September 2015 to February 2016, we recruited 1,466 physicians representing 49 states in person (e.g., conferences, offices, houses, etc.) and online (professional associations,

e-mail, etc.) to complete a brief cross-sectional survey. We recruited at nine national and international conferences that primarily targeted PCPs and others most likely to use dermoscopy. We purposefully excluded recruiting at conferences targeting dermatologists. To reduce cost, we focused on conferences held in cities (e.g., Tampa, Orlando, Miami, Fort Lauderdale, Atlanta, Boca Raton, Weston) geographically more proximal to the investigators, such as the 2015 conference for the American College of Osteopathic Internists and the 2016 Southeastern Society of Plastic and Reconstructive Surgeons. To be eligible, physicians had to be: (1) 18 years of age or older; (2) currently practicing in the US; and (3) able to understand English. The study was approved by the Nova Southeastern University (NSU) Institutional Review Board as exempt on August 27, 2015.

We approached potential participants, briefly described the study and ascertained whether or not they were eligible. To those eligible and willing to participate, we gave a clipboard with the survey and an explanatory cover letter stating that participation is voluntary, that they would not receive an incentive, and that by completing the survey they were consenting to be in the study. Eighty-six percent of participants were recruited face-to-face and the majority of those eligible agreed to participate. We used SurveyMonkey® to create an electronic version of the cover letter and questionnaire which we distributed via personal e-mails and professional list servers. Eligible and willing participants clicked on the link provided and were redirected to a secure website to complete the survey. We entered paper surveys into SPSS® and merged the file with the data collected online.

Because we found no standardized instrument to measure dermoscopy use in the published literature, we selected specific items from past surveys directly relevant to our study and developed new items to assess domains of interest. We pilot tested the newly developed survey on ten respondents to assess comprehension and readability. We revised select items to improve comprehension and omitted items that were redundant or unclear. The final instrument consisted of 46 items measuring the following areas:

Demographic factors: Participants reported their age, gender and race/ethnicity.

Physician characteristics: Participants reported their type of medical degree (Doctor of Osteopathic Medicine [DO] or Medical Doctor [MD]), year of graduation from medical school, percentage of time spent in direct patient care, number of patients seen per month and number of patients presenting with lesions suspicious for skin cancer in a typical month.

Practice characteristics: Participants reported their type of medical practice (e.g., solo, group, academic, etc.), the state in which they practiced, and location of practice (urban, suburban or rural).

Confidence in differentiating skin lesions: Participants reported their degree of confidence differentiating between cancerous and non-cancerous skin lesions using a 5-point Likert scale ranging from "not confident at all" to "very confident".

Knowledge and use of dermoscopy: Using four dichotomous items, participants reported whether or not they had heard of, read about, ever used and currently use a dermascope.

Intentions to use a dermascope in the next 12 months: Using a 5-point Likert scale, where 1 is "not at all likely" and 5 is "very likely", participants reported how likely they are to incorporate the dermascope into their clinical practice within the following 12 months. To create the dichotomous outcome variable, intentions to use the dermascope in the following 12 months, all scores of 1 were recoded as no intentions and scores of 2 and greater were collapsed and recoded as some intentions.

Barriers: For each of 10 potential barriers (e.g., insufficient reimbursement, increased patient anxiety, etc.), participants reported the degree to which the item was a barrier to incorporating dermoscopy in their clinical practice. Response options ranged from 1 "no barrier" to 5 "a very big barrier". For each item, we calculated mean scores and used these scores to identify the top three barriers.

Analysis plan: We used measures of central tendency (mean, mode) and descriptive statistics (frequencies, etc.) to examine sample characteristics and conducted bivariate analysis (chi square) to examine the relationship between key factors and our two dependent variables: (1) ever used the dermascope; (2) intentions to incorporate use of the dermascope into their clinical practice in the following 12 months. In accordance with Hosmer and Lemeshow, we entered the variables whose p values were statistically significant or approaching significance ($p < .20$) in the bivariate analysis in the logistic regressions [22]. The sample size for the logistic regression on "ever used a dermascope" (which we refer to as Model 1) was 1,332 and the sample size for the logistic regression on "intentions to use a dermascope" (which we refer to as Model 2) was 1,168. The reduced sample size for Model 2 was due to missing data on the dependent variable, which occurred at the early stages of data collection. As soon as we realized that some participants were skipping the intention item because it was partially hidden by the clipboard, we remedied the situation.

Results

Sample characteristics are described in Table 1. Our sample was primarily white (77.1%), males (65.3%), trained as DO's (62%), and identified as family physicians (48.4%). Fifty-four

TABLE 1. Sample characteristics. [Copyright: ©2017 Morris et al.]

Variable	n	Valid %
Year of graduation (N[1] = 1,391)		
Before 1980	182	13.1
1980-1989	316	22.7
1990-1999	305	21.9
2000-2009	352	25.3
2010-2015	236	17.0
Ethnicity (N[1] = 1,452)		
White	1,119	77.1
Black	103	7.1
Hispanic/Latino	96	6.6
Asian/Pacific Islander	92	6.3
Other	42	2.9
Gender (N[1] = 1,456)		
Male	951	65.3
Female	505	34.7
Degree (N[1] = 1,455)		
D.O.	900	61.7
M.D.	558	38.3
Practice location (N[1] = 1,450)		
Urban	532	36.7
Suburban	609	42.0
Rural	296	20.4
Other	13	.9
Specialty (N[1] = 1,458)		
Family Medicine	705	48.4
Internal Medicine	298	20.4
Plastic Surgery	231	15.8
Other[2]	224	15.4
Practice type (N[1] = 1,455)		
Solo	402	27.6
Group	495	34.0
Hospital-based	254	17.5
Academic medicine	158	10.9
Community health	94	6.5
Other	52	3.6
Time in direct patient care (N[1] = 1,457)		
0-25%	54	3.7
26%-50%	55	3.8
51%-75%	167	11.5
76%-100%	1181	81.1
# of patients/month (N[1] = 1,437)		
≤100	327	22.8
101-200	330	23.0
201-300	295	20.5
301-400	257	17.9
≥ 401	228	15.9
# of patients/month with suspicious lesions (N[1] = 1,424)		
≤ 1.5	298	20.9
1.51-4.99	248	17.4
5-9.99	250	17.6
10-19.99	278	19.5
≥ 20	350	24.6
Level of confidence (N[1] = 1,451)		
Not confident at all	59	4.1
A little confident	311	21.4
Neither confident nor unconfident	310	21.4
Confident	616	42.5
Very confident	155	10.7
Heard of a dermascope (N[1] = 1,451)		
Yes	787	54.2
Read about a dermascope (N[1] = 1,426)		
Yes	377	26.4
Used a dermascope (N[1] = 1,445)		
Yes	211	14.6
Currently use a dermascope (N[1] = 1,445)		
Yes	87	6.02
Intentions to incorporate dermoscopy into clinical practice in 12 months (N[1] = 1,267)		
Yes	656	51.8

[1]N varies due to missing data

[2] Other category includes specialties with less than 25 participants that included pediatricians, geriatricians, obstetricians etc.

percent of participants had heard of the dermascope and 26% had read about it in the medical literature. Fifteen percent of our sample had ever used the dermascope and 6% were currently using it in their clinical practice. The most frequently cited barriers to incorporating the dermascope in routine care were: (1) the cost of the equipment (M = 3.72, SD = 1.29); (2) time and training requirements to become proficient in its use (M = 3.46, SD = 1.24); and (3) insufficient reimbursement (M = 3.32, SD = 1.49).

Table 2 summarizes factors significantly associated with ever having used a dermascope and with having some intentions to use the dermascope in the following 12 months at the bivariate level. At the bivariate level, ever having used a dermascope was significantly associated with year of graduation, gender, degree, specialty, practice type, percentage of time spent in direct patient care, number of patients seen per month who present with suspicious skin lesions that may be cancerous, and level of confidence differentiating benign and malignant skin lesions. Having intentions to use in 12 months was significantly associated with year of graduation, gender,

TABLE 2. Bivariate analysis of factors associated with ever having used a dermascope and having some intentions to use a dermascope in the next 12 months. [Copyright: ©2017 Morris et al.]

	Ever used a dermascope		Some intentions to use in 12 months	
	2	ρ	2	ρ
Year of graduation	49.61_4	.000*	19.86_4	.001*
Ethnicity	2.12_4	.833	7.47_4	.188
Gender	7.12_1	.008*	7.57_1	.006*
Degree	4.17_1	.041*	14.79_1	.000*
Practice location	3.72_3	.294	24.04_3	.000*
Specialty	32.11_3	.000*	106.51_3	.000*
Practice type	34.18_5	.000*	15.48_5	.009*
% of time spent in direct patient care	7.91_3	.048*	4.61_3	.203
# of patients/month	6.82_4	.146	29.77_4	.000*
# of patients/month with suspicious lesions	17.41_4	.002*	46.69_4	.000*
Level of confidence	49.01_4	.000*	24.71_4	.000*

*Statistically significant

degree, practice location, specialty, practice type, number of patients seen per month, number of patients seen per month who present with suspicious skin lesions that may be cancerous, and level of confidence differentiating benign and malignant skin lesions.

The results of the two logistic regressions are reported in Table 3. Graduating medical school more recently, being a family physician, seeing a higher number of cancer patients and having a higher level of confidence differentiating benign and malignant skin lesions were significantly associated with ever having used a dermascope and having intentions to use a dermascope. Recent graduation from medical school was the strongest predictor in both logistic regression models; participants who graduated between 2010 and 2015 were 8.10 times more likely to have used the dermascope and 2.86 times more likely to report intentions to use it than physicians who graduated before 1980. Participants with a higher level of confidence differentiating skin lesions were 2.18 times more likely to have used a dermascope and 1.16 times more likely to report intentions to use than those with a lower level of confidence. Model 1 correctly classified 86.6% of participants ($p < .001$) and Model 2 correctly classified 66.2% of participants ($p < .001$).

Discussion

Although there is widespread use of dermoscopy among physicians in other countries, our study indicates low use among US physicians. Treatment guidelines from other countries recommend use of dermoscopy to improve diagnostic accuracy [23,24]. Similar recommendations have yet to be issued for US physicians. Thus, the low rates of dermoscopy use in our study may be partially explained by the absence of practice guidelines. Reimbursement rates may also be a limiting factor to its use in the US since no additional reimbursement is provided, as is true for otoscopy or stethoscopy [25]. This is in direct contrast to practices in other countries such as Australia, where dermoscopy has been reimbursable since 1987 [26]. Given skin cancer's burden on the health care system and the benefits of early detection, promoting the use of dermoscopy to US physicians, who routinely examine pigmented skin lesions, is warranted.

It is interesting to note that cost and reimbursement were two of the three most frequently cited barriers to incorporating the dermascope into routine practice. Although not specifically stated, the other barrier, time and training requirements, also has fiscal elements. In the current managed care environment with its increased competition for health care dollars, negotiated payment structures, shrinking reimbursements and patient quotas, physicians are concerned about introducing procedures which may impact their productivity and bottom line. Given that dermoscopy significantly improves the diagnosis of melanoma and the cost of treating melanoma is reduced when detected early, routine dermoscopic screening for individuals at high risk should be adequately reimbursed and incorporated into the preventive care services mandated through the Patient Protection and Affordable Care Act [27].

Another important contribution of our study was examining the factors associated with use of the dermascope and having some intention to use the dermascope in the next 12 months. It was noteworthy that for both regression models, the same set of factors emerged as significant predictors,

TABLE 3. Logistic regression models. [Copyright: ©2017 Morris et al.]

	Model 1- Ever used a dermascope				Model 2- Some intentions to use in 12 months			
	Beta	OR	95% CI	ρ	Beta	OR	95% CI	ρ
Year of graduation								
Before 1980 (referent)								
1980-1989	-.13	.88	.42-1.76	.721	.64	1.90	1.22-2.99	.005*
1990-1999	-.01	.99	.49-2.01	.986	.46	1.59	1.00-2.53	.051
2000-2009	1.01	2.73	1.39-5.37	.004*	.70	2.00	1.25-3.19	.004*
2010-2015	2.09	8.10	3.83-17.12	.000*	1.05	2.86	1.66-4.93	.000*
Specialty								
Family Med. (Referent)								
Internal Medicine	-.95	.39	.23-.66	.000*	-.26	.78	.55-1.10	.156
Plastic Surgery	-1.81	.16	.08-.36	.000*	2.04	.13	.08-.22	.000*
Other	.06	1.06	.64-1.73	.828	-.52	.60	.41-.87	.008*
# of patients/month with suspicious lesions								
≥ 20 (Referent)								
10-19.99	-4.27	.65	.40-1.06	.087	-.18	.84	.57-1.23	.367
5-9.99	-.681	.51	.30-.86	.011*	-.42	.66	.44-.98	.041*
1.51-4.99	-.303	.74	.43-1.30	.266	-.40	.67	.44-1.00	.052
≤ 1.5	-1.30	.27	.14-.52	.000*	-1.05	.35	.23-.53	.000*
Level of confidence	.78	2.18	1.77-2.68	.000*	.15	1.16	1.02-1.32	.020*

*Statistically significant

suggesting that these are robust predictors. However, the magnitude of the associations differed. For instance, recent graduates, those who graduated after 2009 and those who graduated between 2000 and 2009, were 8.1 times and 2.73 times more likely, respectively, to have ever used the dermascope compared to those graduating before 1980. Since use of the dermascope in the US has been slowly gaining acceptance during the last decade, it could be that more training programs have been acquiring the device [28,29]. Thus, more recent graduates could have been exposed or have had experience using the dermascope during medical school or residency. Furthermore, since 41.2% of participants who had ever used the dermascope were currently using it, exposure during medical training could have promoted current use.

Similarly, those who graduated after 2009 and those who graduated between 2000 and 2009, were 2.86 times and 2 times more likely, respectively, to report having some intentions to incorporate the dermascope into their practice in the following 12 months. It could be that recent graduates, who are likely to be younger, may be more open to trying new technology compared to participants graduating prior to 1980 who may be nearing retirement age. Although intentions do not always predict future behaviors, it was encouraging to note that 52% of participants expressed some intention to incorporate dermoscopy into their practice within the next 12 months [30]. Media attention, editorials in the medical literature and additional promotional efforts by experts and professional organizations may persuade those with intentions to incorporate the dermascope into their practice to actually do so. Studies with representative samples of physicians who graduated within the last 15 years would yield additional data to further elucidate the factors associated with use and intentions to use dermoscopy.

Type of medical specialty was another important predictor in both models. In contrast to other subspecialties, family physicians had the highest odds of ever having used a dermascope and intentions to incorporate its use in their clinical practice. In some ways this is not surprising because family physicians conduct more skin cancer screenings than other PCPs, and the dermascope has been shown to increase diagnostic accuracy for melanoma [31]. Additionally, since the intention item was placed near the end of the survey and many of the prior items highlighted the characteristics and benefits of the dermascope, participants who regularly screen for skin cancer may have been primed to express more favorable intentions regarding future use of the dermascope.

Notwithstanding the significance of our findings, our sample may not be representative of the population of US based physicians due to convenience sampling. Although we recruited physicians practicing in all states but Nebraska, a

large proportion of participants practiced in the Southeast since we primarily recruited at conferences located in this region of the country. Our findings can only be generalized to physicians attending these conferences. Our data collection method was self-report, which has some limitations [32]. However given that we were not collecting sensitive data, the tendency towards providing socially desirable responses in self-report data was minimized. Because we expected that many participants would have little knowledge of the dermascope, we provided a brief description of its properties (that it was relatively inexpensive, easy to use and more effective for screening than naked-eye examinations) as a preamble to the intention items. Although this positive description might have prompted some participants to respond more favorably, almost half did not suggesting that the effect was attenuated. Last, because participants completed the survey without direct oversight from the researchers, there were some skip pattern errors and missed responses.

In summary, our study represents an initial step in understanding use of dermoscopy among US based physicians. Despite the strong evidence supporting use of dermoscopy to enhance diagnostic accuracy primarily for melanoma, the low levels of use among US-based physicians is concerning, particularly in light of the morbidity, mortality and health care cost of melanomas, especially those detected later in their disease course. Although the evidence supporting routine population-based screening for skin cancer is equivocal, promoting routine dermoscopic screening of patients at high risk may be beneficial [33]. Efforts to increase dermoscopy use among physicians routinely examining high-risk patients are needed.

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Please read each question carefully and provide your answers by circling the number that reflects your answer or writing the response on the line provided. Please remember that this survey is completely anonymous and there are no right or wrong answers. Thank you once again for your participation in this study.

1. How old are you?_____
2. What is your gender?
   1. Male
   2. Female
3. Which of the following most closely describes your ethnic background?
   1. White, non-Hispanic origin
   2. Black, non-Hispanic origin
   3. Hispanic/Latino/Latina
   4. Asian/Pacific Islander
   5. Native American
   6. Other, please specify_____
4. In which state do you spend the majority of your time practicing medicine? _____
5. What type of medical degree do you have?
   1. D.O.
   2. M.D.
6. What year did you graduate from medical school?_____
7. How would you best describe your primary specialty area?
   1. Family Practice
   2. Internal Medicine
   3. Obstetrics/Gynecology
   4. Pediatrics
   5. Adolescent Medicine
   6. Surgery
   7. Geriatrics
   8. Other, please specify_____
8. What percentage of your time is spent in direct patient care?
   1. 0 to 25%
   2. 26% to 50%
   3. 51% to 75%
   4. 76% to 100%
9. Which of the following best describes your type of medical practice?
   1. Solo practice
   2. Single specialty group practice
   3. Multispecialty group practice
   4. Hospital-based practice
   5. Academic medicine
   6. Community health center or community clinics
   7. Other, please specify¬_____
10. Which of the following best describes the location of your primary practice?
    1. Urban
    2. Suburban
    3. Rural
    4. Other, please specify_____
11. In a typical month, approximately how many patients do you see?_____
12. In a typical month, approximately how many of the patients you see present with suspicious skin lesions that might be cancerous?_____
13. How confident are you in your ability to differentiate between cancerous and non-cancerous skin lesions?
    1. Not confident at all
    2. A little confident
    3. Neither confident nor unconfident
    4. Confident
    5. Very confident
14. When a patient presents with a suspicious skin lesion, which of the following most closely describes what you typically do?
    1. Conduct a naked eye examination of the lesion
    2. Examine lesion with the aid of a magnifying device
    3. Refer patient to a dermatologist
    4. Other, please specify_____
15. Physicians use different strategies to get up to date medical information. Which of the following are your 2 top sources for obtaining information on skin cancer screening and prevention?
    1. Medical journals
    2. Internet sources other than medical journals
    3. Conferences
    4. Discussions with colleagues
    5. Media coverage
    6. Other, please specify_____
16. Have you ever heard of a dermascope, a device that helps physicians screen for skin cancers?
    1. No (skip to Q17)
    2. Yes
       If yes, in what context did you hear about it?
       1. A conversation with a colleague
       2. At a conference
       3. At a ground rounds
       4. At a class
       5. Other, please specify_____
17. Have you ever read about dermoscopy in the medical literature?
    1. No (skip to Q18)
    2. Yes
       If yes, how much have you read?
       1. 1 article
       2. 2 to 4 articles
       3. 5 or more articles
18. Have you ever used a dermascope?
    1. No
    2. Yes
       If yes, do you currently use it in your clinical practice?
       1. No
       2. Yes

Intention to use

The following questions address different properties of skin cancer screening tools that make them more or less acceptable to physicians. Using a scale from 1 to 5, where 1 is not at all likely and 5 is very likely, please tell us how likely you are to use a dermascope in your clinical practice if it . . .

	Not at all likely				Very Likely
1. Was easy to use	1	2	3	4	5
2. Costs less than $500	1	2	3	4	5
3. Could be attached to a smartphone	1	2	3	4	5
4. Was handheld	1	2	3	4	5
5. Training could be done in 1 day	1	2	3	4	5
6. Is more sensitive than a naked eye exam	1	2	3	4	5
7. Costs more than $1500	1	2	3	4	5
8. Requires little maintenance	1	2	3	4	5
9. Requires a lot of practice	1	2	3	4	5
10. Does not record digital images	1	2	3	4	5
11. Reduces the need for biopsies	1	2	3	4	5
12. Can help identify suspect skin lesions quickly	1	2	3	4	5
13. Decreases cost of care	1	2	3	4	5
14. Increases your confidence in screening for skin cancer	1	2	3	4	5
15. Could increase revenue	1	2	3	4	5
16. Adds a few minutes to the patient encounter	1	2	3	4	5

The prevalence of skin cancer is increasing and primary care providers are well poised to assist in its early detection. Dermascopes are relatively inexpensive, easy to use, and there is strong evidence indicating that they are more effective at screening for skin cancer than naked eye examinations.

19. Using a scale from 1 to 5, where 1 is not at all likely and 5 is very likely, how likely are you to incorporate use of a dermascope as part of your clinical practice within the next 6 months?_____

20. Using a scale from 1 to 5, where 1 is not at all likely and 5 is very likely, how likely are you to incorporate use of a dermascope as part of your clinical practice within the next 12 months?_____

Barriers to use

There are a number of issues that may keep physicians from incorporating dermoscopy into their clinical practice. On a scale from 1 to 5, where 1 is no barrier and 5 is a very big barrier, please tell us the degree to which each of the following items represents a barrier to incorporating dermoscopy into your clinical practice.

	No Barrier				Very Big Barrier
1. Insufficient reimbursement	1	2	3	4	5
2. Added time to the patient encounter	1	2	3	4	5
3. Cost of the equipment	1	2	3	4	5
4. Time and training requirements to become proficient in its use	1	2	3	4	5
5. Skin cancer screening is a low priority for non-dermatologists	1	2	3	4	5
6. Increased patient anxiety	1	2	3	4	5
7. Increased risk of lawsuits	1	2	3	4	5
8. Patients may not accept it	1	2	3	4	5
9. Dermatologic concerns may be secondary to chief complaint if there are multiple comorbidities	1	2	3	4	5
10. No available training	1	2	3	4	5
11. Dermatologic concerns may be secondary to chief complaint if there are multiple comorbidities	1	2	3	4	5
12. No available training	1	2	3	4	5