Background: The fact that thin melanomas are associated with a greater than 95% survival rate, while later, more deeply invasive melanomas have a 5-year survival rate of less than 10%, demonstrates the potential personal and public health impact of early detection. The majority of patients with skin lesions are seen by nondermatologists who infrequently counsel patients about skin cancer prevention or perform a complete skin examination as part of routine care. We documented the antecedents of physician practice by evaluating medical students’ observation, training, performance, and self-reported skill level for the skin cancer examination and sun protection counseling.

Methods: Surveys were administered and completed in classrooms and student workshops in each of the 4 medical school years during the spring of 1996 and 1997. We concentrate our analysis on the graduating fourth-year students.

Results: Of the 302 fourth-year students enrolled at Boston University School of Medicine, Boston, Mass, in 1996 and 1997, 223 (74%) completed surveys. Among fourth-year students, 52% rated themselves as unskilled in skin cancer examinations. Twenty-eight percent of fourth-year students had never observed a skin cancer examination, 40% had received no training, and 35% had never practiced the examination. However, fourth-year students reporting at least 1 opportunity to observe, train, or practice an examination were 3 times as likely to report themselves as moderately to very skilled as students without such opportunities.

Conclusion: If medical student training rates for the skin cancer examination are equally low elsewhere, as is likely, the present data suggest that even brief additions to the current curriculum, integrated into systems teaching, would augment student exposure and likely boost student skill levels.

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SKIN CANCER is the most common malignancy in the United States with an estimated 1.3 million cases each year. Melanoma is the most lethal skin cancer but the diagnosis of thin melanoma is associated with a greater than 95% five-year survival rate. The majority of patients with skin lesions are seen by nondermatologists, who therefore need to have the clinical skill to recognize early cancer. Acquisition of basic clinical skills required of most physicians should be part of the curriculum at all medical schools.

To investigate medical student training for the examination of the skin for cancer, we surveyed fourth-year medical students at Boston University School of Medicine, Boston, Mass, to determine the frequency of observation, training, and practice of the skin cancer examination. These data were correlated with self-reported skill levels for the skin cancer examination. This survey immediately followed a national recommendation for inclusion of skin cancer education in the medical school curriculum.

METHODS

Since there were no cancer education survey instruments for skin cancer detection or prevention, the group prepared one, drawing mostly from the medical literature of instruments that measure a student’s prevention and detection skills for other chronic diseases. A subcommittee developed a survey and, after individual questions were tested for content, 10 students who completed the survey as a pilot tested the entire instrument for length and comprehensibility. Their responses were not included in the final analysis. The final computer-scannable instrument included 39 questions; a longer summary of the survey was published elsewhere.

ADMINISTRATION OF SURVEY

Surveys were administered and completed in classrooms and student workshops during the spring of 1996 and 1997. Surveys were collected anonymously.

OUTCOME MEASURES

Students were asked to rate their current skill levels for their performance of skin examinations, including surveying for atypical moles.
and for counseling regarding sun protection practices. Response choices were very unskilled (1), somewhat unskilled (2), neither skilled nor unskilled (3), somewhat skilled (4), and very skilled (5). Students selecting 1, 2, or 3 were categorized as unskilled.

Students were also asked to report the number of times they had observed a physician or been trained by a physician in the skin cancer examination or for counseling patients about sun protection. Students were also asked about the number of times they had performed a complete skin cancer examination, examined a patient for atypical moles, or counseled a patient about sun protection.

Students were also asked to recall if they had been taught cancer prevention in their required lectures, Integrated Problems course, faculty discussions, or clinical rotations.

STATISTICAL ANALYSIS

Two analyses were performed. First, the self-reported skill levels for the skin cancer examination for fourth-year students were calculated in the context of their opportunities for observation, training, and practice. Second, a $\chi^2$ analysis was performed to compare the proportion of fourth-year students reporting themselves as very or somewhat skilled according to their exposure to cancer prevention education and training. In addition, the tests were repeated in a multivariate general linear model including terms for all of the types of education and training to determine the independent association of each with reported skills in the skin cancer examination.

RESULTS

Of the 302 students enrolled at Boston University School of Medicine in the 1996 and 1997 academic years, 223 fourth-year students (74%) completed surveys, reflecting attendance at the sampled classroom sessions. Forty-one percent of the respondents were women and the mean age of respondents was 27.5 years (SD, 3.7), virtually identical to the sex and age profiles of the class overall. There were no significant differences between students completing the survey in 1995-1996 vs 1996-1997.

SKILL LEVEL, OBSERVATION, TRAINING, AND PRACTICE

Fifty-two percent of fourth-year students reported being unskilled in the skin cancer examination (Table 1).

Twenty-eight percent of fourth-year students had never examined a patient for atypical moles and an additional 47% had done 1 to 5 times.

Overall, 35% of fourth-year students had never performed a complete skin examination, and an additional 40% had completed 5 or fewer examinations (Table 3). Twenty percent of students had never examined a patient for atypical moles and an additional 47% had done so only 1 to 5 times.

ASSOCIATIONS OF SKILL WITH OBSERVATION, TRAINING, AND PRACTICE

Fourth-year students who had observed, been trained for, or practiced a skin cancer examination even once were approximately 3 times more likely to report being skilled in the skin cancer examination than those without this experience (Table 4). Those rating themselves as skilled were more likely than unskilled students to have observed at least 1 examination (59% vs 21%; $P<.001$), been trained at least once (67% vs 18%; $P<.001$), and performed at least 1 examination (64% vs 17%; $P<.001$).

Exposure to cancer-prevention education through lectures, Integrated Problem courses, faculty discussions, and clinical rotations was also associated with higher self-reported skill levels ($P<.05$). However, this association was not observed in the multivariate model, which included the terms for observation, training, and practice, implying that these differences were largely explained by the fact that students in the teaching programs were more likely to have observed, been trained in, or practiced skin cancer examinations.

COMMENT

Our survey of medical students at 1 university found disturbingly low rates of observation, training, and prac-

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tice for the skin cancer examination. Twenty-eight percent of fourth-year students had never observed a skin cancer examination, 40% had received no training, and 35% had never practiced the examination. Fourth-year students reporting at least 1 opportunity to observe, train, or practice an examination were 3 times as likely to report themselves as moderately to very skilled as students without such opportunities.

Our finding that medical students receive very little training or practice in the skin cancer examination is consistent with the historically inadequate performance by non-dermatologist physicians and physicians-in-training in screening or evaluating skin lesions.\(^3\)\(^-\)\(^10\)

Teaching of the examination for skin cancer appears to be minimal in one medical school; the lack of such teaching almost certainly reduces the likelihood that newly graduating generalist physicians will include thorough skin cancer examinations during their routine patient examinations. Our survey illustrates the need to examine skin cancer education curricula at other medical schools. The present data suggest that even brief additions to current curricula, integrated into systems teaching and coupled with faculty development programs, would augment student exposure and likely boost their interest and skill in the performance of the examination. Increased effort and awareness by all physicians should result in earlier detection of both melanoma and nonmelanoma skin cancer, thus reducing morbidity and mortality.

Student response rates were high, but self-reported data are susceptible to both underestimation and overestimation of performance. Additionally, these data are from a single institution; thus, we cannot be certain that our survey findings are representative of the situation at other American medical schools. We strongly suspect that the majority of graduating students at Boston University reporting frequent observations and training took the 1-month dermatology elective available to about 25% of fourth-year students, but the survey did not specifically inquire about the impact of this experience on their level of self-confidence and intended future practices regarding skin cancer screening.

This study follows the creation of a national skin cancer agenda developed collaboratively by the American Academy of Dermatology and the Centers for Disease Control and Prevention, in which a new curriculum for the teaching of skin cancer prevention and detection for medical students, nursing students, and allied health professionals was recommended. Developing a plan to teach the skin cancer examination to future physicians was recommended on the basis that 1 in 5 Americans will develop skin cancer over his or her lifetime and 1 in 75 will develop melanoma.\(^11\) The majority of lesions are asymptomatic and thus it is anticipated that performance of complete skin examinations by all examining physicians will significantly improve detection of lesions in early stages.\(^12\) Action on these recommendations is urgently needed.

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The opinions and interpretations expressed by Dr Koh are his own and do not necessarily reflect those of the Massachusetts Department of Public Health or any of its agents or governing authorities.

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