

# Skin Cancer Education in the Medical School Curriculum

John Plante, MD, MSCR; Manuel Valdebran, MD; Lara Wine Lee, MD, PhD

## PRACTICE POINTS

- Nondermatologist practitioners play a notable role in mitigating the health care burden of skin cancer by screening with the skin cancer examination.
- Exposure to the skin cancer examination should occur during medical school prior to graduates' entering diverse specialties.
- Most medical students received relatively few hours of skin cancer education, and many never performed or even observed a skin cancer examination prior to graduating medical school.
- Increasing hands-on training and clinical exposure during medical school is imperative to adequately prepare future physicians.

To the Editor:

Skin cancer represents a notable health care burden of rising incidence.<sup>1-3</sup> Nondermatologist health care providers play a key role in skin cancer screening through the use of skin cancer examination (SCE)<sup>1,4</sup>; however, several factors including poor diagnostic accuracy, low confidence, and lack of training have contributed to limited use of the SCE by these providers.<sup>4,5</sup> Therefore, it is important to identify and implement changes in the medical school curriculum that can facilitate improved use of SCE in clinical practice. We sought to examine factors in the medical school curriculum that influence skin cancer education.

A voluntary electronic survey was distributed through class email and social media to all medical student classes at 4 medical schools (Figure). Responses were collected between March 2 and April 20, 2020. Survey items assessed demographics and curricular factors that influence skin cancer education. Our study was approved by the Institutional Review Board for Human Research of the Medical University of South Carolina (Charleston, South Carolina).

Knowledge of the clinical features of melanoma was assessed by asking participants to correctly identify at least 5 of 6 pigmented lesions as concerning or not concerning for melanoma. Confidence in performing the SCE—the primary outcome—was measured by dichotomizing a 4-point Likert-type scale (“very confident” and “moderately confident” against “slightly confident” and “not at all confident”).

Logistic regression was used to examine curricular factors associated with confidence; descriptive statistics were used for remaining analyses. Analyses were performed using SAS 9.4 statistical software. Prior to analysis, responses from the University of South Carolina School of Medicine Greenville were excluded because the response rate was less than 20%.

The survey was distributed to 1524 students; 619 (40.6%) answered at least 1 question, with a variable response rate to each item (eTable 1). Most respondents were female (351 [56.7%]); 438 (70.8%) were White.

Most respondents said that they received 3 hours or less of general skin cancer (74.9%) or SCE-specific (93.0%) education by the end of their fourth year of medical training. Lecture was the most common method of instruction. Education was provided most often by dermatologists (48.6%), followed by general practice physicians (21.2%). Numerous (26.9%) fourth-year respondents reported that they had never observed SCE; even more (47.6%) had never performed SCE. Almost half of second- and third-year students (43.2% and 44.8%, respectively) considered themselves knowledgeable about the clinical features of melanoma, but only 31.9% of fourth-year students considered themselves knowledgeable.

Only 24.1% of fourth-year students reported confidence performing SCE (eTable 1). Students who received most of their instruction through real clinical encounters were 4.14 times more likely to be confident performing SCE than students who had been given lecture-based

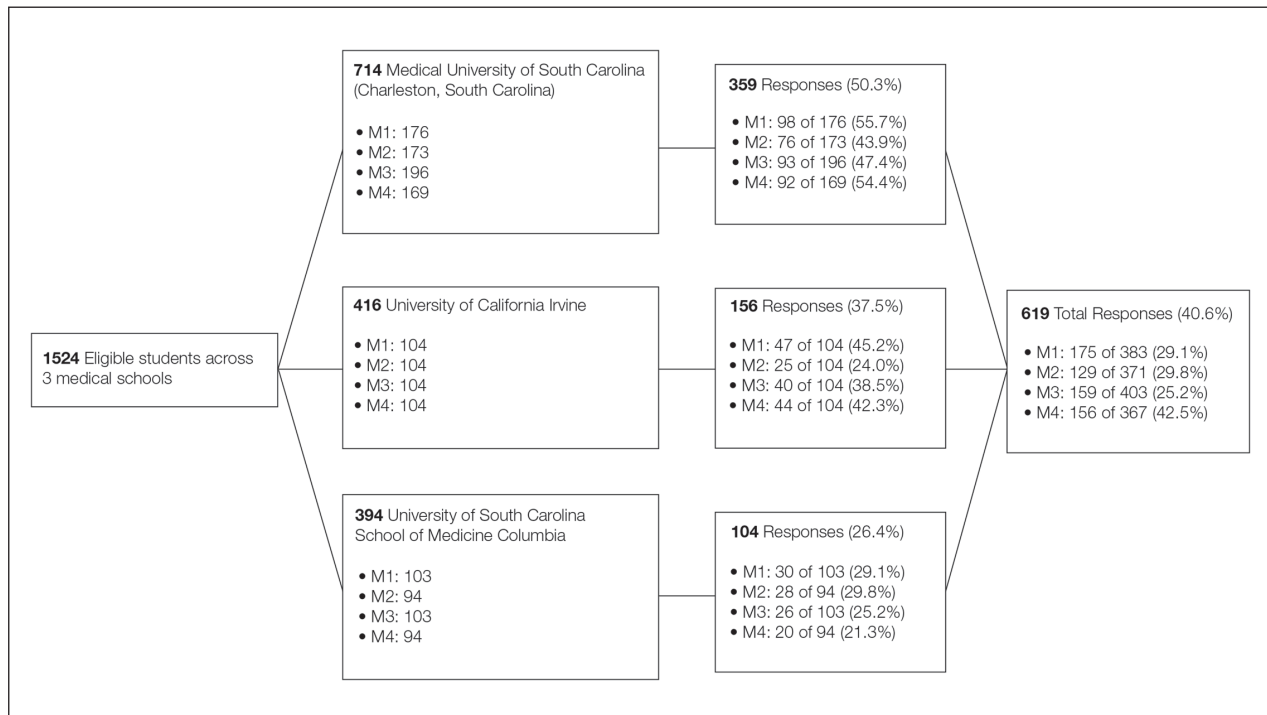
From the Department of Dermatology and Dermatologic Surgery, Medical University of South Carolina, Charleston. Drs. Valdebran and Wine Lee also are from the Department of Pediatrics.

The authors report no conflict of interest.

The eTables are available in the Appendix online at [www.mdedge.com/dermatology](http://www.mdedge.com/dermatology).

Correspondence: John Plante, MD, MSCR, 135 Rutledge Ave, MSC 578, Charleston, SC 29464 ([jplan1992@yahoo.com](mailto:jplan1992@yahoo.com)).

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Survey distribution and medical student participation. Responses were collected between March 2 and April 20, 2020. The survey was distributed to 4 medical schools; one institution was excluded prior to analysis due to a response rate less than 20%. M indicates medical school year.

learning. Students who performed 1 to 3 SCE or 4 or more SCE were 3.02 and 32.25 times, respectively, more likely to be confident than students who had never performed SCE (eTable 2).

Consistent with a recent study,<sup>6</sup> our results reflect the discrepancy between the burden and education of skin cancer. This is especially demonstrated by our cohort's low confidence in performing SCE, a metric associated with both intention to perform and actual performance of SCE in practice.<sup>4,5</sup> We also observed a downward trend in knowledge among students who were about to enter residency, potentially indicating the need for longitudinal training.

Given curricular time constraints, it is essential that medical schools implement changes in learning that will have the greatest impact. Although our results strongly support the efficacy of hands-on clinical training, exposure to dermatology in the second half of medical school training is limited nationwide.<sup>6</sup> Concentrated efforts to increase clinical exposure might help prepare future physicians in all specialties to combat the burden of this disease.

Limitations of our study include the potential for selection and recall biases. Although our survey spanned multiple institutions in different regions of the United States, results might not be universally representative.

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## APPENDIX

**eTABLE 1. Survey Findings: Demographic and Curricular Characteristics**

Characteristic	First-year medical student, n (%) <sup>a-c</sup>	Second-year medical student, n (%) <sup>a-c</sup>	Third-year medical student, n (%) <sup>a-c</sup>	Fourth-year medical student, n (%) <sup>a-c</sup>	Total cohort, n (%)
Age	n=175	n=129	n=159	n=156	N=619
19–24 y	117 (66.9)	73 (56.6)	28 (17.6)	3 (1.9)	221 (35.7)
25–29 y	48 (27.4)	55 (42.6)	116 (73.0)	137 (87.8)	356 (57.5)
≥30 y	10 (5.7)	1 (0.8)	15 (9.4)	16 (10.3)	42 (6.8)
Sex	n=175	n=129	n=159	n=156	N=619
Male	70 (40.0)	60 (46.5)	66 (41.5)	69 (44.2)	265 (42.8)
Female	104 (59.4)	68 (52.7)	93 (58.5)	86 (55.1)	351 (56.7)
Other	0	0	0	1 (0.6)	1 (0.1)
Prefer not to answer	1 (0.6)	1 (0.8)	0	0	2 (0.3)
General SCE received	n=164	n=127	n=154	n=145	N=590
<1 h	113 (68.9)	16 (12.6)	6 (3.9)	14 (9.7)	149 (25.3)
1–3 h	45 (27.4)	78 (61.4)	95 (61.7)	75 (51.7)	293 (49.7)
>3 h	6 (3.7)	33 (26.0)	53 (34.4)	56 (38.6)	148 (25.1)
SCE-specific education received	n=163	n=127	n=154	n=145	N=589
<1 h	137 (84.0)	72 (56.7)	70 (45.5)	66 (45.5)	345 (58.6)
1–3 h	24 (14.7)	48 (37.8)	72 (46.8)	59 (40.7)	203 (34.5)
>3 h	2 (1.2)	7 (5.5)	12 (7.8)	20 (13.8)	41 (7.0)
Method of education	n=163	n=127	n=154	n=145	N=589
Lecture	131 (80.4)	121 (95.3)	127 (82.5)	108 (74.5)	487 (82.7)
Small group	2 (1.2)	0	3 (1.9)	0	5 (0.8)
Physical diagnosis	1 (0.6)	1 (0.8)	4 (2.6)	3 (2.1)	9 (1.5)
Real clinical encounter	16 (9.8)	2 (1.6)	18 (11.7)	32 (22.1)	68 (11.5)
Other	13 (8.0)	3 (2.4)	2 (1.3)	2 (1.4)	20 (3.4)
No. of SCEs observed	n=163	n=127	n=154	n=145	N=589
None	130 (79.8)	88 (69.3)	77 (50.0)	39 (26.9)	334 (56.7)
1–3	24 (14.7)	33 (26.0)	41 (26.6)	54 (37.2)	152 (25.8)
≥4	9 (5.5)	6 (4.7)	36 (23.4)	52 (35.9)	103 (17.5)

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eTABLE 1. (continued)

Characteristic	First-year medical student, n (%) <sup>a-c</sup>	Second-year medical student, n (%) <sup>a-c</sup>	Third-year medical student, n (%) <sup>a-c</sup>	Fourth-year medical student, n (%) <sup>a-c</sup>	Total cohort, n (%)
No. of SCEs performed	n=163	n=127	n=154	n=145	N=589
None	156 (95.7)	111 (87.4)	102 (66.2)	69 (47.6)	438 (74.4)
1–3	5 (3.1)	15 (11.8)	37 (24.0)	52 (35.9)	109 (18.5)
≥4	2 (1.2)	1 (0.8)	15 (9.7)	24 (16.6)	42 (7.1)
Knowledge <sup>d</sup>	n=161	n=125	n=154	n=138	N=578
Yes	37 (23.0)	54 (43.2)	69 (44.8)	44 (31.9)	204 (35.3)
No	124 (77.0)	71 (56.8)	85 (55.2)	94 (68.1)	374 (64.7)
Confidence performing SCE <sup>e</sup>	n=163	n=127	n=154	n=145	N=589
Yes	3 (1.8)	13 (10.2)	31 (20.1)	35 (24.1)	82 (13.9)
No	160 (98.2)	114 (89.8)	123 (79.9)	110 (75.9)	507 (86.1)

Abbreviation: SCE, skin cancer examination.

<sup>a</sup>Values in these 4 row headings represent the total number of students in each medical school year who responded to at least 1 of the survey questions.

<sup>b</sup>Values represent the total number of students (and the corresponding percentage) in each medical school year who responded to that specific survey question. (The response rate varied from question to question.)

<sup>c</sup>Percentages for each characteristic might not total 100 due to rounding.

<sup>d</sup>Knowledge of the clinical features of melanoma was assessed by asking respondents to correctly identify at least 5 of 6 pigmented lesions as being concerning or not concerning for melanoma.

<sup>e</sup>This measure was dichotomized by collapsing a 4-point Likert-type scale (“very confident” and “moderately confident” [ie, yes] against “slightly confident” and “not at all confident” [ie, no]).

**eTABLE 2.** Odds That Any Given Survey Respondent Is Confident Performing SCE<sup>a,b</sup>

Predictor variables	Confidence		
	Adjusted odds ratio	95% CI	P value
Age			
19–24 y	1	Reference	—
25–29 y	0.64	0.276-1.488	.3
≥30 y	0.96	0.236-3.862	.9
Sex			
Male	1	Reference	—
Female	1.06	0.567-1.974	.9
Medical school <sup>c</sup>			
A	1	Reference	—
B	0.79	0.339-1.840	.6
C	0.19	0.077-0.466	.0003
Medical school year			
First	1	Reference	—
Second	8.13	1.544-42.756	.01
Third	7.98	1.449-43.990	.02
Fourth	5.40	0.941-30.949	.06
General SCE received			
<1 h	1	Reference	—
1–3 h	1.12	0.293-4.282	.9
>3 h	1.59	0.378-6.660	.5
SCE-specific education received			
<1 h	1	Reference	—
1–3 h	1.28	0.612-2.670	.5
>3 h	1.19	0.354-3.979	.8
Method of education			
Lecture	1	Reference	—
Real clinical encounter	4.14	1.601-10.701	.003
Other <sup>d</sup>	0.59	0.111-3.127	.5

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eTABLE 2. (continued)

Predictor variables	Confidence		
	Adjusted odds ratio	95% CI	P value
No. of SCEs observed			
None	1	Reference	—
1–3	2.68	1.084-6.624	.03
≥4	1.79	0.495-6.491	.4
No. of SCEs performed			
None	1	Reference	—
1–3	3.02	1.288-7.082	.01
≥4	32.25	8.957-116.098	<.0001

Abbreviation: SCE, skin cancer examination.

<sup>a</sup>All odds ratios were adjusted by the predictor variables shown here. Significance was based on an a priori *P* value of .05.

<sup>b</sup>N=589.

<sup>c</sup>The 3 participating medical schools were each randomly assigned a label (A, B, or C) to preserve their anonymity.

<sup>d</sup>Other represents 3 options on the method of education question: small group, physical diagnosis, and other.