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Article abstract

Implication Statement: Melanoma is a potentially deadly type of skin cancer that has been increasing in incidence but is curable if found in the early stages. Family physicians are in an ideal situation to examine the skin during routine visits, but studies indicate they are not well trained to detect or treat skin cancers. We piloted a structured, longitudinal, hands-on procedural curriculum to improve family medicine residents' ability to identify and manage skin cancers. Family medicine residency programs wishing to improve the diagnosis and management of skin cancer by family physicians might consider trialing our structured curriculum and procedure clinic.

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## A structured curriculum and procedure clinic to help family medicine residents diagnose and treat skin cancer

Un programme d'enseignement clinique structuré pour aider les résidents en médecine familiale à diagnostiquer et à traiter le cancer de la peau

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### Implication Statement

Melanoma is a potentially deadly type of skin cancer that has been increasing in incidence but is curable if found in the early stages. Family physicians are in an ideal situation to examine the skin during routine visits, but studies indicate they are not well trained to detect or treat skin cancers. We piloted a structured, longitudinal, hands-on procedural curriculum to improve family medicine residents' ability to identify and manage skin cancers. Family medicine residency programs wishing to improve the diagnosis and management of skin cancer by family physicians might consider trialing our structured curriculum and procedure clinic.

### Énoncé des implications de la recherche

Le mélanome est un type de cancer de la peau potentiellement mortel qui est de plus en plus fréquent, mais qui est guérissable sous réserve d'une détection précoce. La visite de routine chez le médecin de famille est l'occasion idéale pour examiner la peau. Les études indiquent toutefois que les médecins de famille n'ont pas le niveau de formation nécessaire pour détecter et traiter les cancers de la peau. Nous avons piloté un programme structuré longitudinal axé sur la pratique visant à améliorer la capacité des résidents en médecine familiale à identifier et à traiter ce type de cancer. Nous invitons les responsables de programmes de résidence en médecine familiale qui souhaitent améliorer le diagnostic et la prise en charge des cancers cutanés par les médecins de famille à expérimenter notre programme structuré sur les procédures cliniques.

### Introduction

Procedures to diagnose and treat skin cancers are important for family physicians (FPs), as they are in an ideal situation to examine the skin during visits for other problems. Yet, studies show that FPs are not well trained in skin cancer diagnosis and treatment compared to other specialists.<sup>1,2</sup> Several studies have looked at educational interventions to improve diagnosis and treatment of skin cancers by FPs; however, most offered limited intervention durations from 12 minutes to six hours, including seminars, presentation slides, and booklets.<sup>3-6</sup> Retention of knowledge was not often studied. Expanding on this past research, the objective of the present pilot study was to assess whether a longer duration educational training

consisting of an eight-month biweekly procedure clinic and structured procedural curriculum better prepared Family Medicine residents to identify and manage skin cancers by the end of their residency compared to the usual opportunistic training. There is no validated questionnaire in the medical education literature about skin cancers, but there is some literature about the general topics of the surveys that focus around the three types of skin cancer (basal cell carcinoma, squamous cell carcinoma and melanoma) and benign skin lesions most often mistaken for skin cancer. Our survey and colour photo quiz were reviewed and tested by a staff dermatologist at The Ottawa Hospital, and two independent family physicians with specialisations in a dermatology.

## Methods: a structured curriculum

This was a non-randomized, quasi-experimental design. At the beginning and end of residency, all Family Medicine residents at the University of Ottawa were asked to complete a photo quiz consisting multiple choice questions regarding diagnosis and/or treatment of skin lesions in sight unseen photos taken by a dermatologist. Photo quizzes were manually scored. One point was awarded for each correct answer and percentage scores were calculated based on the total number of questions for each quiz. Components of two-part questions were scored separately; participants could answer the first part incorrectly and still receive credit for the second part of the question. Participants were provided with the answers to the photo quiz 2-4 weeks after completion of the quiz. The photo quizzes and answers can be found as supplemental material.

The intervention group in this study comprised residents at a single teaching site, the control group residents at any of the other teaching sites. The study group received a biweekly half-day educational intervention throughout the eight months of Family Medicine residency, consisting of interactive teaching sessions, assessment of photos of typical skin lesions, videos of appropriate treatments, practise procedures on skin models, discussion of patient referrals to a procedure clinic, and supervised examination of these same patients. Supervisors were the study investigators, who directly observed residents while they performed the skin procedure, gave immediate feedback, and wrote field notes on residents' procedural skills. The study group thus had a hands-on experience replicating real life clinical experience. Information on the teaching sessions can be found as Appendix A.

This study was funded by the Program for Innovation in Medical Education at the University of Ottawa. Ethics approval was obtained from the Ottawa Health Science Network Research Ethics Board; protocol # 20140451-01H.

## Results

At the beginning of residency, a convenience sample of 25 of the 60 total family medicine residents completed the photo quiz ( $n = 4$  in the study group and  $n = 21$  in the control group); this number dropped to eight total participants by the end of residency ( $n = 4$  in both groups). Knowledge was similar for both study and control groups at the beginning of residency (61% and 58% test scores respectively), but by the end of residency the study group

performed somewhat better (76% versus 57%). By the end of residency, the two groups had identical scores for melanoma diagnosis (100%) and management of non-melanoma skin cancers (basal cell carcinoma and squamous cell carcinoma) (75%). In contrast, for diagnosis of the latter, the study group scored 75% whereas the control group scored 38%, and for management of the former, the study group scored 65% whereas the control group scored 25% (Table 1).

Table 1. Photo quiz results

	Study Group		Control Group	
	Beginning of residency ( $N = 4$ )	End of residency ( $N = 4$ )	Beginning of residency ( $N = 21$ )	End of residency ( $N = 4$ )
Overall Results	61%	76%	58%	57%
Melanoma				
Diagnosis	69%	100%	72%	100%
Management	40%	65%	37%	25%
Basal cell carcinoma and squamous cell carcinoma				
Diagnosis	25%	75%	48%	38%
Management	25%	75%	50%	75%

Despite intentions to use statistical measures including pairwise and independent samples t-tests to compare the degree of statistically significant within-group and between-group variation, limited recruitment and response rates negatively influenced the power requirements to conduct formal statistical tests. Accordingly, in the absence of statistically significant findings within this pilot study, caution is advised when interpreting findings. In complement to the literature, this research provides preliminary findings in support of the benefit of structured educational initiatives; however, future research offering a more rigorous, randomized, and double-blinded evaluation of this causal association is warranted.

## Conclusion

Although underpowered to detect statistically significant differences, observational findings from this pilot study may support the hypothesis that Family Medicine residents receiving longitudinal curriculum and hands-on procedure clinic demonstrate improved diagnosis and management of skin cancers compared to residents who did not receive this training. Furthermore, this knowledge and performance-based education model could be readily adapted to future medical residency programs as a means to improve the diagnosis and management of skin cancer by family physicians and reduce reliance on specialists.

**Conflicts of Interest:** None to Declare

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## Appendix A. Information on the teaching sessions

**Overall aim:** To improve diagnosis and treatment of skin cancers by family medicine residents.

**Description:** Residents receive 16 30-minute interactive teaching sessions scheduled every 2 weeks during the 8 months of family medicine; they are presented with photos of patients with typical skin lesions which are skin cancers or skin cancer look-alikes

**Teaching sessions:** (number of sessions: 16)

- Accurate description of skin lesions including skin cancers using appropriate nomenclature (1) -Skin cancer biopsy techniques with video of procedures (1)
- Review of clean and sterile technique for skin biopsies (1)
- Pigmented lesions and melanoma (2)
- Non-melanoma skin cancers: basal cell and squamous cell carcinomas (2)
- Appropriate use of liquid nitrogen for pre-malignant skin lesions (1)
- Use of chemical agents for extensive actinic keratosis (pre-malignant lesions) (1) -Examination of the skin and follow-up of patients with skin cancer (1)
- Nail abnormalities: benign and malignant (1)
- Review of photos from selected previous cases of skin cancers and cancer look-alikes (2) -Review of patient skin cancer pathology reports and their interpretation (1)
- Vulvar and genital lesions: benign and malignant lesions (1)
- White lesions of the skin: benign, pre-malignant and malignant (1)