

---

# Dermatologic Surgery Practice and Skin Cancer Treatment in Canada: Results of a National Survey

ANATOLI FREIMAN, MD,\* NATHAN ROSEN, MD,\* DENIS SASSEVILLE, MD,\* BEATRICE WANG, MD,\* WAYNE CAREY, MD,\* AND CHANNY Y. MUHN, MD†

\*Division of Dermatology, McGill University, Montreal, Quebec; and †Division of Dermatology, McMaster University, Hamilton, Ontario

---

**BACKGROUND.** Although traditionally considered a medical subspecialty, dermatology has rapidly evolved over the past two decades to encompass a wide variety of cutaneous surgical procedures.

**OBJECTIVE.** The study was carried out to evaluate the status of dermatologic surgery practice and skin cancer treatment in Canada.

**METHODS.** In 2003, 550 practicing Canadian dermatologists were surveyed.

**RESULTS.** Two hundred fifty-one dermatologists responded to the questionnaire, with the majority practicing in an urban part-

time academic, part-time private setting. Statistics are presented on the types and demographics of dermatosurgical and cosmetic procedures performed, as well as on the specific dermatosurgical therapies used in the treatment of various cutaneous malignancies.

**CONCLUSIONS.** The survey provides a current picture of dermatologic surgery practice and skin cancer treatment in Canada. The data suggest that Canadian dermatologists are further embracing surgical and cosmetic procedures.

ANATOLI FREIMAN, MD, NATHAN ROSEN, MD, DENIS SASSEVILLE, MD, BEATRICE WANG, MD, WAYNE CAREY, MD, AND CHANNY Y. MUHN, MD, HAVE INDICATED NO SIGNIFICANT INTEREST WITH COMMERCIAL SUPPORTERS.

---

THE CLINICAL practice of dermatology has changed tremendously over the past 20 years. Traditionally, the specialty was considered a division of internal medicine, and surgery in dermatology consisted mostly of curettage, electrodesiccation, skin biopsies, and simple excisions. However, with the dramatically increasing incidence of skin cancer,<sup>1-3</sup> the discipline of dermatologic surgery has expanded and evolved to include procedures such as complicated excisions, Mohs' micrographic surgery, and reconstruction of surgical defects with flaps and grafts. Furthermore, as patient demand for cosmetic enhancement has soared,<sup>4-6</sup> procedures such as acne surgery, dermabrasion, hair transplants, botulinum toxin injections, liposuction, laser therapy, and blepharoplasty are becoming commonplace in everyday dermatology practice. The history of the development of dermatologic surgery in North America was recently reviewed in *Dermatologic Surgery*.<sup>7-10</sup>

Although the scope of dermatology practice is perceived to be changing, few data are available on

the actual prevalence and nature of dermatosurgical procedures currently being performed by dermatologists. This study was undertaken to determine the present status of dermatologic surgery practice in Canada. With this purpose in mind, a detailed survey was designed to assess the types of dermatosurgical and cosmetic procedures performed and the demographics of such procedures. Given that the discipline of dermatologic surgery plays a basic and essential role in the management of skin cancer, a second important goal of the survey was to examine the specific dermatosurgical therapies used by dermatologists in the treatment of various cutaneous malignancies.

## Materials and Methods

The study was conducted by the McGill University Skin Cancer Group, Montreal, Canada. In February 2003, questionnaires were sent out to 550 practicing Canadian dermatologists. To ensure the best response rate, the survey was conducted anonymously, and physicians were given 3 months to respond. Questions raised included the following: (1) demographic information, including physicians' age, gender, time in practice, practice location, type of practice, and access to a Mohs' surgeon; (2) types of dermatosurgical and cosmetic

---

Address correspondence and reprint requests to: Anatoli Freiman, MD, Division of Dermatology, McGill University Health Centre, 687 Pine Avenue West, Room A4.17, Montreal, QC H3A1A1, Canada, or e-mail: anatoli.freiman@sympatico.ca.

procedures performed; and (3) specific dermatosurgical therapies used in the treatment of various cutaneous malignancies. All collected data were entered into a *Microsoft Access* (Microsoft Corporation, 2002) statistical database and were subsequently analyzed.

## Results

### Demographics

Of the 550 practicing dermatologists in Canada, 251 completed the survey, for a response rate of 46%. The demographic data of respondents are shown in Table 1. One hundred seventy (68%) were male and 81 (32%) were female, the mean age was 53 years, and the mean time in practice was 25 years. Geographically, all provinces were represented, although the majority of returned surveys came from Ontario and Quebec. To examine regional differences in practice, three main divisions were arbitrarily considered: Ontario (90 [36%] of respondents), Quebec (84 [33%] of respondents), and three western provinces (Alberta, British Columbia, and Manitoba) combined (48 [19%] of respondents). The low number of surveys returned from the other provinces, reflective of the fewer number of practicing dermatologists in those areas, precluded them from inclusion in this geographic aspect of the analysis.

Almost all of the respondents reported practicing in an urban setting (96%), and the majority were either in private practice (49%) or in a part-time academic, part-time private practice (41%). Overall, 209 (83%) dermatologists reported having access to a Mohs' surgeon. Ninety-four percent of dermatologists in Quebec had access to a Mohs' surgeon compared with 79% in Ontario and 92% in the western provinces.

### Dermatosurgical and Cosmetic Procedures Performed

Table 2 outlines the profile of dermatosurgical and cosmetic procedures performed by dermatologists in

**Table 2.** Profile of Dermatologic Surgery Procedures Performed by Respondents, % (n)

Procedure	Regularly	Occasionally	Never
Curettage and electrodesiccation	83(208)	13 (32)	4 (11)
Elliptical excisions	55 (137)	28 (71)	18 (43)
Shave excisions	80 (201)	16 (39)	4 (11)
Punch biopsies	88 (221)	7 (17)	6 (13)
Mohs' surgery	4 (11)	2 (6)	94 (234)
Flaps	8 (19)	14 (36)	78 (196)
Skin grafts	5 (12)	8 (19)	87 (220)
Dermabrasion	6 (14)	5 (12)	89 (225)
Lasers	27 (67)	10 (25)	63 (159)
Soft tissue augmentation	23 (58)	7 (18)	70 (175)
Botulinum toxin injections	25 (64)	10 (25)	65 (162)
Varicose vein injections	14 (36)	8 (21)	78 (194)
Liposuction	4 (9)	1 (3)	95 (239)
Hair transplants	4 (10)	2 (6)	94 (235)

Canada. Punch biopsies, curettage and electrodesiccation, and elliptical and shave excisions were most frequently performed, whereas liposuction, hair transplants, and Mohs' micrographic surgery were the least common. Canadian dermatologists who were less than 10 years in practice carried out a wider array and more complex dermatosurgical and cosmetic procedures on a regular basis than those who were in practice for over 30 years.

The breakdown of regularly performed procedures by physician gender is shown in Figure 1. Although the profile of routine cosmetic procedures, such as botulinum toxin injections, soft tissue augmentations, varicose vein injections, and laser surgery, performed by female dermatologists closely followed that of their male counterparts, more extensive dermatosurgical techniques, such as Mohs' micrographic surgery, grafts, flaps, dermabrasions, hair transplants, and liposuctions, were predominantly carried out by males.

Figure 2 depicts the use of Mohs' surgery as a first choice of therapy for various cutaneous malignancies.

**Table 1.** Demographics of Respondents % (n)

Gender	Male	Female								
	68 (170)	32 (81)								
Age (years)	<35	36-45	46-60	>60	N/A					
	6 (16)	21 (53)	48 (120)	24 (60)	1 (2)					
Years in practice	<10	11-20	21-30	>30	N/A					
	18 (44)	26 (66)	29 (73)	26 (66)	1 (2)					
Province of practice	AB	BC	Man	NB	NF	NS	ON	QC	SK	N/A
	4 (10)	12 (31)	3 (7)	1 (2)	1 (3)	3 (8)	36 (90)	33 (84)	1 (2)	5 (13)

AB = Alberta; BC = British Columbia; Man = Manitoba; NB = New Brunswick; NF = Newfoundland; NS = Nova Scotia; ON = Ontario; QC = Quebec; SK = Saskatchewan; N/A = no answer.

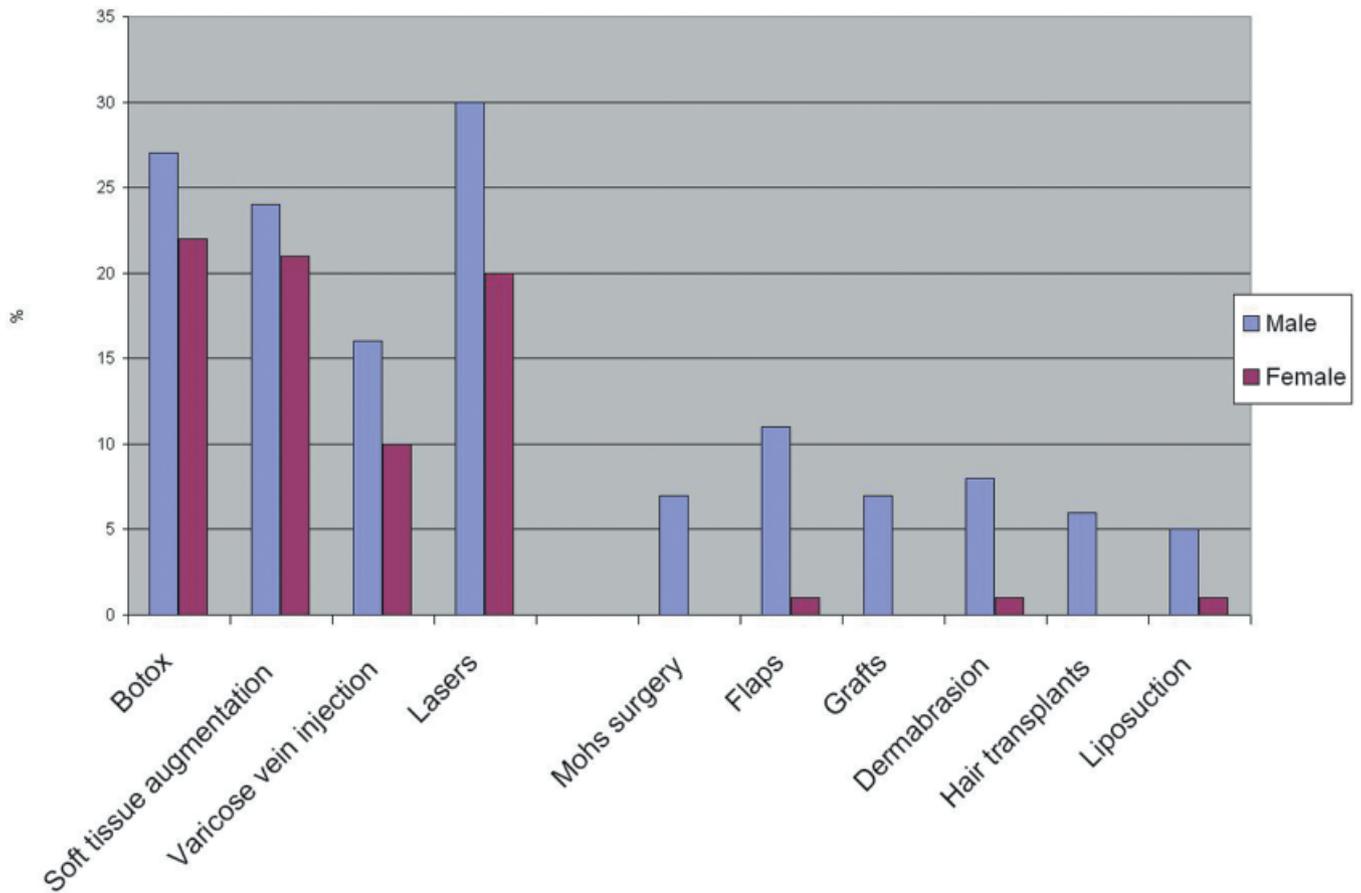


Figure 1. Breakdown of regularly performed procedures by physician gender.

Compared by province, it was regularly performed by 6% of dermatologists in Quebec, 2% in Ontario, and 7% in the western provinces. Furthermore, Mohs' surgery was the treatment of choice, on average, for

11% of all skin cancers in Quebec, 4% in Ontario, and 10% in the western provinces.

In the field of cosmetic procedures, 10% of dermatologists in Quebec regularly performed esthetic procedures, such as soft tissue augmentation, botulinum toxin injections, varicose vein injections, dermabrasions, liposuction, and hair transplants, compared with 17% in Ontario and 19% in the western provinces.

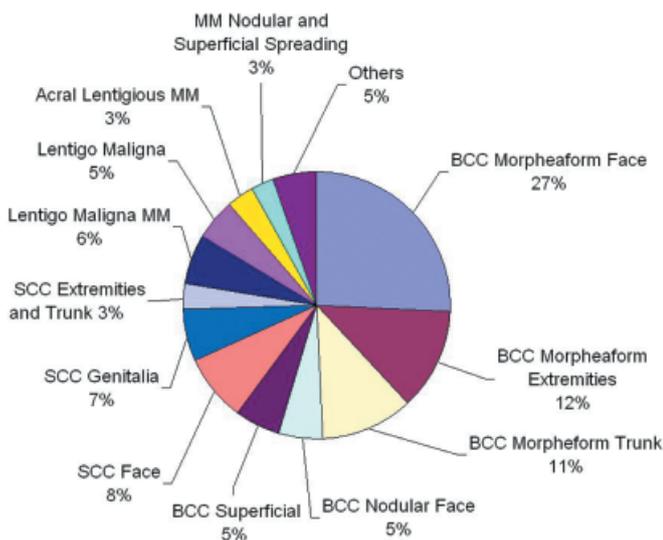


Figure 2. Repartition of Mohs' surgery use as a first choice of therapy for cutaneous malignancies.

### *Dermatosurgical Procedures Used in the Treatment of Cutaneous Malignancies*

#### **Basal Cell Carcinoma**

Sixty-one percent of respondents used Mohs' surgery as their first choice of treatment for morpheaform basal cell carcinoma (BCC) of the face, and an additional 16% used it as their second-line therapy, with local excision most commonly used by the rest. Of those physicians who reported having access to a Mohs' surgeon, 67% indicated that Mohs' surgery was their procedure of choice for this tumor. By region, facial morpheaform BCCs were preferentially treated with Mohs' surgery by 79% of respondents in Quebec,

48% in Ontario, and 67% in the western provinces. Local excision was the procedure of choice for morpheaform BCCs of the trunk (58%) and of the extremities (55%), followed by Mohs' surgery (26% and 29%, respectively).

Nodular BCCs of the face were predominantly treated with local excision (42%), whereas those of the trunk (56%) and of the extremities (53%) were treated with curettage and electrodesiccation. Superficial BCCs were preferentially treated by curettage and electrodesiccation irrespective of their location (42% of lesions of the face, 57% of the trunk, and 55% of the extremities). Eleven percent of dermatologists used imiquimod 5% cream to treat superficial BCCs of the face, and 14% used it to treat superficial genital BCCs.

### **Squamous Cell Carcinoma**

Local excision was the treatment of choice of Canadian dermatologists for squamous cell carcinomas (SCCs) of the face (57%), trunk (69%), extremities (69%), and genitalia (60%). Mohs' surgery was used for 19% of facial SCCs and 16% of genital SCCs. Curettage and electrodesiccation was most commonly used as a second-line therapy. By region, SCC of the face was primarily treated with Mohs' surgery by 30% of dermatologists in Quebec, 7% in Ontario, and 27% in the western provinces.

### **Bowen's Disease**

Great variability was observed among Canadian dermatologists in the treatment of Bowen's disease, with curettage and electrodesiccation being the most popular therapeutic modality (31% of all lesions), followed by local excision (23%), cryotherapy (20%), and topical imiquimod (10% of all lesions and 15% of all genital lesions).

### **Actinic Keratoses**

Cryotherapy was by far the modality of choice in the treatment of actinic keratoses. A small number of dermatologists used topical 5-fluorouracil (8% for lesions of the face, 6% of the trunk, and 6% of the extremities), which was more commonly used as second-line therapy (38% of tumors), closely followed by topical imiquimod application (22% of tumors).

### **Malignant Melanoma**

The first choice of therapy for all types of melanoma was wide local excision: it was used for 73% of lentigo maligna, 75% of lentigo maligna melanoma, 86% of nodular melanoma, 86% of superficial spreading melanoma, and 80% of acral lentiginous melanoma. Mohs' surgery was used to treat 12% of lentigo maligna, 14% of lentigo maligna melanoma, 4% of nodular melanoma, 3% of superficial spreading melanoma, and 8% of acral lentiginous melanoma.

## **Discussion**

The recent trend in dermatology is the continued growth of the discipline of dermatologic surgery and its increasing role in the treatment of many skin diseases, especially cutaneous malignancies. As office-based surgery continues to gain acceptance as a safe and legitimate practice,<sup>11-13</sup> it seems only natural that dermatologists, the specialists most familiar with skin pathology, acquire the surgical skills necessary to provide the total care for their patients. Obtaining basic surgical skills and knowledge is now an important requirement of dermatology programs throughout North America, and this emphasis has encouraged graduates to become more surgically oriented in their practices.<sup>14-16</sup> Our study provides the quantitative data to capture a precise picture of the current status of dermatologic surgery practice in Canada. It also establishes a reference point from which future trends can be gauged.

It is, however, important to consider the limitations of the survey at the outset. First, the response rate of 46% is not optimal yet not unexpected, given that the survey was mailed to busy physicians, no second attempts were made to contact nonresponders because of the anonymity of the survey, and no remuneration was offered. It is, in fact, similar to the average response rates of mailed physician surveys published in the medical literature.<sup>17,18</sup> Second, potential responder and recall biases are inherent to a survey of this kind. Particularly, it is possible that those who are more interested and involved in dermatosurgical procedures preferentially responded to the survey. Although the fact that the majority of the surveys came back from Ontario and Quebec may seem to have affected the generalizability of the study, the majority of Canadian dermatologists (69%), in fact, practice in these two provinces. Also, a male predominance of responders (68%) likely represents an accurate gender breakdown of the dermatologic workforce in the country<sup>19</sup>: at the time of the survey, of 550 dermatologists in Canada, approximately 353 (64%) were men. Finally, it must be recognized that the choice of treatment for each type of skin cancer is based not only on the tumor type but also on specific tumor characteristics (histology, size, and location of the lesion), patient variables (age, general health, preference, and compliance), and the availability and cost of the procedure. Such nuances are hard to capture in an initial survey and provide a subject for future research.

The data from our study suggest that Canadian dermatologists are embracing surgical and cosmetic procedures. According to a broad dermatology workforce survey conducted by the Canadian Dermatology Association in 2001, 12% of dermatologists in the

country reported performing flaps, 15% used lasers, and 4% performed Mohs' micrographic surgery at the time.<sup>19</sup> In our detailed survey, approximately 25% of all respondents performed botulinum toxin injections and soft tissue augmentation and used lasers on a regular day-to-day basis in their practice, 22% of dermatologists regularly or occasionally used flaps, 13% used grafts, 6% performed Mohs' micrographic surgery, 6% performed hair transplants, and 22% gave varicose vein injections (see Table 2). In addition, newly graduated dermatologists (ie, those less than 10 years in practice) performed more diverse and complex dermatosurgical and cosmetic procedures than those who were in practice for over 30 years, which, may, however, also be a result of changing practice patterns over time. In Canada, where a significant shortage of dermatologists is apparent,<sup>19</sup> the emergence and rapid growth of the surgical and cosmetic arm of dermatology mount pressure on other dermatologists to accommodate patients with medical problems.<sup>6</sup> It will be important to address this changing picture of the dermatologic workforce in future workforce planning.

In dermatology, the work style of women has traditionally been considered different from that of their male counterparts, particularly with respect to men being more surgically oriented. An interesting finding from our survey is that the proportion of women involved in laser surgery, as well as cosmetic procedures, such as soft tissue augmentation, botulinum toxin injections, and varicose vein injections, rivaled that of male dermatologists. However, more extensive dermatosurgical techniques, such as Mohs' micrographic surgery, grafts, flaps, dermabrasions, hair transplants, and liposuctions, were predominantly performed by males.

With the increasing incidence of skin cancer and an aging population, the demand for Mohs' micrographic surgery is growing. Important insight into the practice of Mohs' surgery in Canada can be gained by examining the treatment decisions made by the dermatologists. For instance, Mohs' surgery is widely recommended as first-line surgical therapy for morpheaform BCCs and SCCs of the face.<sup>20-23</sup> In our survey, it was the treatment of choice for facial morpheaform BCCs by 79% of respondents in Quebec, 67% in the western provinces, and only 48% in Ontario. Similarly, SCCs of the face were primarily treated with Mohs' surgery by 30% of dermatologists in Quebec, 27% in the western provinces, and 7% in Ontario. The major impact factor for choosing a treatment modality thus seems to be access to a Mohs' surgeon rather than the standard of care: 94% of Quebec dermatologists have access to a Mohs' surgeon compared with 92% in the western provinces and 79% in Ontario. This difference is paralleled in the treatment choices made in Ontario, where Mohs'

surgery was consistently chosen less frequently than in the other regions: it was the treatment of choice, on average, for 11% of all skin cancers in Quebec, 10% in the western provinces, and only 4% in Ontario.

Although 83% of dermatologists reported that they had access to a Mohs' surgeon, it is important to point out that "access to a Mohs' surgeon" does not reflect the number of surgeons serving a particular geographic region, nor does it take into account the issue of timely access or ease of access to Mohs' surgery. To illustrate this point, in Ontario, for instance, 79% of respondents stated that they had access to a Mohs' surgeon. However, at the time of the survey, there was only one active Mohs' surgeon for approximately 188 practicing dermatologists serving a population of 12 million. Therefore, it is not unreasonable for dermatologists to opt for suboptimal treatment modalities for their patients if the risk of waiting for treatment outweighs the advantage of increased cure rates achieved with Mohs' surgery. In fact, the majority of Canadian dermatologists (58%) chose to treat morpheaform BCCs of the trunk with a simple excision. The issue of inadequate access may explain why of the dermatologists who had access to a Mohs' surgeon, only 67% chose Mohs' surgery as their first choice of treatment of facial morpheaform BCCs.

In conclusion, the survey captures the current picture of dermatologic surgery practice and skin cancer treatment in Canada. The presented comprehensive data will be important for workforce planning and can serve as a basis for future studies.

*Acknowledgment* We gratefully acknowledge all of the physicians who took time out of their busy schedules to complete the survey.

## References

1. Miller DL, Weinstock MA. Nonmelanoma skin cancer in the United States: incidence. *J Am Acad Dermatol* 1994;30(5 Pt 1):774-8.
2. Diepgen TL, Mahler V. The epidemiology of skin cancer. *Br J Dermatol* 2002;146 Suppl 61:1-6.
3. Bevona C, Sober AJ. Melanoma incidence trends. *Dermatol Clin* 2002;20:589-95; vii.
4. Marcoux D, Gratton D. The changing face of Canadian dermatology. *J Cutan Med Surg* 2002;6:430-3.
5. Dubertret L. [Dermatology, cosmetology and aesthetic medicine]. *Rev Prat* 2000;50(1):6-7.
6. Kerr A. The siren call of cosmetic dermatology. *The Globe and Mail* 2003;Sept 1:B12.
7. Coleman WP III, Hanke CW, Orentreich N, et al. A history of dermatologic surgery in the United States. *Dermatol Surg* 2000;26:5-11.
8. Unger WP. The history of hair transplantation. *Dermatol Surg* 2000;26:181-9.
9. Zelac DE, Swanson N, Simpson M, Greenway HT Jr. The history of dermatologic surgical reconstruction. *Dermatol Surg* 2000;26:983-90.

10. Kuflik EG, Gage AA, Lubritz RR, Graham GF. Millennium paper: history of dermatologic cryosurgery. *Dermatol Surg* 2000;26:715-22.
11. Balkrishnan R, Hill A, Feldman SR, Graham GF. Efficacy, safety, and cost of office-based surgery: a multidisciplinary perspective. *Dermatol Surg* 2003;29:1-6.
12. Balkrishnan R, Gill IK, Vallee JA, Feldman SR. No smoking gun: findings from a national survey of office-based cosmetic surgery adverse event reporting. *Dermatol Surg* 2003;29:1093-9; discussion 1099.
13. Cook JL, Perone JB. A prospective evaluation of the incidence of complications associated with Mohs micrographic surgery. *Arch Dermatol* 2003;139:143-52.
14. Jansen GT. Dermatologic surgery. Its influence on dermatology. *Arch Dermatol* 1994;130:1122-4.
15. Alam M. Dermatologic surgery training during residency: room for improvement. *Dermatol Surg* 2001;27:508-9.
16. Callen JP. Should dermatologic surgery training in residency be expanded? *Dermatol Surg* 2001;27:509-10.
17. Asch DA, Jedrzewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol* 1997;50:1129-36.
18. Cummings SM, Savitz LA, Konrad TR. Reported response rates to mailed physician questionnaires. *Health Serv Res* 2001;35:1347-55.
19. Maguiness S, Searles G, From L, Swiggum S. The Canadian Dermatology Workforce Survey: examining the face of Canadian dermatology. Presented at the 78th Canadian Dermatology Association Meeting; 2003 July; Ottawa, ON.
20. Drake LA, Dinehart SM, Goltz RW, et al. Guidelines of care for Mohs micrographic surgery. American Academy of Dermatology. *J Am Acad Dermatol* 1995;33(2 Pt 1):271-8.
21. Lawrence CM. Mohs' micrographic surgery for basal cell carcinoma. *Clin Exp Dermatol* 1999;24:130-3.
22. Thissen MR, Neumann MH, Schouten LJ. A systematic review of treatment modalities for primary basal cell carcinomas. *Arch Dermatol* 1999;135:1177-83.
23. Vuyk HD, Lohuis PJ. Mohs micrographic surgery for facial skin cancer. *Clin Otolaryngol* 2001;26:265-73.

## Commentary

This survey is an interesting evaluation of the changing dynamics of dermatologic surgery in Canada. Canadian dermatologists are a unique group because of the uniformity of their training, with a standardized certification, which must be preceded by a medical degree, a 5-year residency, and the successful completion of a nationally administered examination. For more than 30 years, Canada has had a universal medical care program. It is important to know this because most of the dermatologists who responded have never practiced in a nonsocialized system. The survey was sent to 550 Canadian dermatologists who provide care for a population in excess of 30 million people. Five to eight new dermatologists are certified in Canada each year. Recent workforce evaluations by the Canadian Dermatology Association show that the average age of dermatologists is 54 years and that by 2015, there may be less than half of the current number in practice. A response rate of 46% of dermatologists participating in the survey is an adequate reflection of the demographics of current practice.

The survey shows a change in the attitude toward practice and demonstrates the increasing need of dermatologists' involvement in the active surgical management of patients, in particular, those with nonmelanoma skin cancer. There are only

11 fellowship-trained Mohs' micrographic surgeons in the entire country. According to the survey, this fact does not appear to change the desirability or proper selection of this technique. In addition to routine dermatologic therapy, the popularity of esthetic treatments, such as botulinum toxin, soft tissue augmentation, and sclerotherapy, has been taken on by Canadian dermatologists as part of the provision of care for their patients' entire skin well-being. The use of lasers to treat a wide variety of dermatologic and esthetic processes is identified with evidence that 20 to 30% of those practicing in Canada use these instruments in patient therapy. There has also been a shift in the training of dermatologists within Canada toward increased surgical exposure during their education. This enhanced surgical ability is seen more in newer graduates and will continue to expand the choice of treatment options available to the Canadian patient population.

Although this is a Canadian survey, the changes likely underlie similar movements in the pattern of practice in other countries. Dermatologists are advancing in their surgical prowess in an appropriate and necessary way to provide patients with optimal care.

JOHN ARLETTE, MD, FRCPC  
Calgary, AB