

A Survey of Dermatologists' Preparedness for Natural and Manmade Disasters

Emily C. Murphy BS,^{a,b} Timur Alptunaer MD,^{c,d} Samantha Noll MD,^{c,d} James Phillips MD,^{c,d}
Adam J. Friedman MD^a

^aDepartment of Dermatology, The George Washington School of Medicine and Health Sciences, Washington, DC

^bGeorgetown University, School of Medicine, Washington, DC

^cDepartment of Emergency Medicine, George Washington University Hospital, Washington, DC

^dDisaster and Operational Medicine, The George Washington School of Medicine and Health Sciences, Washington, DC

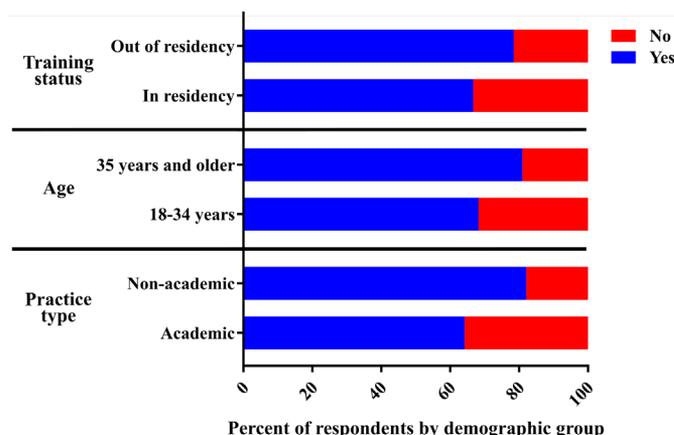
INTRODUCTION

Natural and manmade disasters cause a range of dermatologic manifestations, including secondary infections after a flood,¹ irritation from blistering agents used in chemical warfare,² or acute and chronic effects of cutaneous radiation syndrome.³ Recognizing and managing these disaster sequelae require diagnostic acumen, knowledge on reporting, and short- and long-term management strategies. However, a 2003 survey revealed that 88% of dermatologists felt unprepared to respond to a biological attack.⁴ Years later, this survey herein examines whether the dermatology field has advanced in its bioterrorism preparedness. We additionally assessed dermatologists' preparedness for natural, chemical, and radiological/nuclear disasters, as well as their perceptions about the appropriateness of disaster training in dermatology. Our IRB-approved survey was disseminated via the Orlando Dermatology Aesthetic and Clinical Conference listserv. Statistical analyses were performed using chi-square tests, with a p-value less than 0.05 considered statistically significant. The percentages reported are based on the total number of respondents per question.

Of the 1,677 emails sent, 959 opened the email, 296 clicked the link, and 256 completed the survey; 14 participants did not hold MD/DO licenses and were excluded from the analysis (N=242). Survey data on demographics and disaster preparedness are presented in Table 1. More females (61.0%) than males (38.6%) completed the survey. Dermatologists of all ages were included, with the largest group being between 25 and 34 years old (45.0%). Thirty-two percent were in residency and 67.8% were beyond residency. Forty-one percent worked in academic practices, 30.4% were employees of group practices/health systems, 26.3% were private practice owners, and 2.5% reported other/mixed practices.

Only 28.9% received training in disaster preparedness/response; the likelihood of training did not significantly vary by practice type, age, or residency status. Of the trained respondents, the majority would be comfortable caring for

FIGURE 1. Responses to survey question, "Do you think disaster preparedness should be included in dermatology training?" stratified by training (in versus out of residency), age (18-34 years versus 35 years and older), practice type (non-academic versus academic). The percentages are based on the total number of respondents per question.



patients affected by natural events (78.2%), intentional chemical exposures (52.7%), and natural biological events (50.9%). Fewer respondents reported being comfortable with unintentional chemical exposures (47.3%), intentional biological attacks (34.6%), and nuclear/radiological injuries (16.4%). Forty-one percent received training during medical school, 37.5% during residency, and 42.9% after residency; 16.1% of respondents additionally reported receiving training through the military. The most common training mediums were lectures/conferences (59.4%), self-directed learning (34.4%), and field-based training (26.6%).

Seventy-five percent thought disaster preparedness/response should be part of dermatology training, while 25.3% reported that it should not, most commonly because they felt it is not important (58.6%) or that they have other educational priorities (46.6%). Compared to non-academic dermatologists, academic

TABLE 1.

Number and Percentage of Responses [n(%)] to Survey Questions Regarding Demographic Factors and Disaster Preparedness/Response. The total number of respondents (N) and responses (for questions where multiple answers were allowed) are reported. The percentages are based on the total number of respondents per question. Examples of each disaster type were provided in the survey as described by question 6 in the table.

Question	Answer	n (%)
Demographics		
1. <i>What is your gender?</i> (N=241)	Female	147(61.00)
	Male	93(38.59)
	Non-binary	1(0.41)
2. <i>What is your age?</i> (N=242)	18-24 years	1(0.41)
	25-34 years	109(45.04)
	35-54 years	86(35.54)
	55 years or older	46(19.01)
3. <i>How many years have you been in practice after residency?</i> (N=245)	In training	79(32.24)
	1-10 years	85(34.69)
	11-20 years	28(11.43)
	21 years or more	53(21.63)
4. <i>Are you...</i> (N=240)	An owner of a solo practice?	40(16.67)
	An equity owner of a group practice?	23(9.58)
	An employee of a group practice, hospital, or health care system?	73(30.42)
	An employee of an academic institution?	98(40.83)
	Mixed practice/other type of practice: military n=2; contractor, public and private, volunteer county clinic, researcher, n=1 each	6(2.50)
Disaster Dermatology		
5. <i>Have you received training in disaster preparedness or response?</i> (N=242)	Yes	70(28.93)
	No	172(71.07)
6. <i>Based on your training, would you be comfortable caring for patients affected by... (check all that apply)</i> (N=55 respondents who received training, 154 responses)	Natural events (e.g. earthquakes, tsunamis, or floods)?	43(78.18)
	Unintentional chemical exposures (industrial or environmental accidents)?	26(47.27)
	Intentional chemical exposures (e.g. blistering agents or caustic/acidic agents)?	29(52.73)
	Natural biological events (e.g. viral or bacterial outbreaks)?	28(50.91)
	Intentional biological attacks (e.g. anthrax spores, smallpox virus, or plague)?	19(34.55)
	Nuclear/radiological injuries?	9(16.36)
7. <i>When did you receive training in disaster preparedness or response (check all that apply)?</i> (N=56 respondents who received training, 77 responses)	During medical school	23(41.07)
	During residency	21(37.50)
	After residency	24(42.86)
	Other time: military n=9	9(16.07)
8. <i>How were you trained on disaster preparedness or response (check all that apply)?</i> (N=64 respondents who received training, 108 responses)	Lecture or conference	38(59.38)
	Webinar	12(18.75)
	Field-based training	17(26.56)
	Self-directed learning	22(34.38)
	Research/review articles	3(4.69)
	Textbooks	8(12.50)
	Other type of training: course n=3; government work, military, n=2 each; decontamination team n=1	8(12.50)
9. <i>Do you believe disaster preparedness and response should be part of dermatology training?</i> (N=233)	Yes	174(74.68)
	No	59(25.32)
10. <i>Why do you believe disaster preparedness and response should not be included in dermatology training?</i> (N=58 respondents who answered "No" to question 9, 89 responses)	I feel adequately prepared on this topic.	5(8.62)
	I do not feel it is an important topic for dermatologists to learn about.	34(58.62)
	I do not feel dermatologists should be involved in disaster responses.	16(27.59)
	I have other educational priorities.	27(46.55)
	Other reason: no interest among dermatologists n=3; intern year topic n=2; topic for first responders, topic for emergency medicine residents n=1 each	7(12.07)

FIGURE 2. Word cloud based on respondents' free response answers to the question, "Please enter any comments." The comments were summarized into general themes and a word cloud was created based on the number of times each theme was discussed, with larger text reflecting more common themes. Irrelevant comments, such as not applicable or none, were excluded from the word cloud. There were 44 relevant comments leading to 24 themes. The word cloud was created using Matlab R2018a (MathWorks, Natick, MA). Abbreviations: American Academy of Dermatology (AAD); Continuing Medical Education (CME).



practitioners were less likely to report that disaster preparedness should be included in dermatology training (64.2% versus 82.1%; $P=0.0022$; Figure 1). Dermatologists under 35 years of age were also less likely to feel that disaster preparedness should be part of their training compared to older practitioners (68.3% versus 80.1%; $P=0.0266$; Figure 1). A similar trend existed for dermatology residents, with only 66.7% reporting that disaster preparedness should be part of their training compared to 78.5% of dermatologists beyond residency, but the p -value did not reach significance ($P=0.0527$; Figure 1).

A common theme discussed in participants' comments was that dermatologists should be prepared for bioterrorism-related cutaneous disease ($n=4$), especially for anthrax- or smallpox-related disease (Figure 2). Others discussed that disaster preparedness would be a useful addition to dermatology training ($n=5$), possibly via the American Academy of Dermatology ($n=3$); yet, some respondents expressed reservations about dermatologists' willingness to participate in a disaster response ($n=3$) (Figure 2).

Similar to the 2003 survey which showed that few dermatologists received adequate bioterrorism preparedness training,⁴ our survey found that a large percentage of dermatologists still have not received any type of disaster training. To examine training adequacy, we further evaluated dermatologists' ability to manage the outcomes of specific disasters. We found that even with training, many dermatologists feel ill-prepared to manage patients affected by disasters, especially biological attacks and nuclear/radiological events. Given over 70% have not received training and the trained practitioners are still uncomfortable, the dermatology community is likely inadequately

prepared for a disaster. Encouragingly, though, 75% reported that disaster preparedness should be part of dermatology training, thus a formal training program is sorely needed to meet this demand.

DISCLOSURES

The authors have no conflicts of interest to declare.

REFERENCES

1. Tempark T, Lueangrun S, Chatproedprai S, Wanankul S. Flood-related skin diseases: a literature review. *Int J Dermatol*. 2013;52(10):1168-1176. doi:10.1111/ijd.12064
2. Farmer K, Proano L, Madsen JM, Partridge R. Introduction to Chemical Disasters. In: *Ciotone's Disaster Medicine*. 2nd ed. Philadelphia, PA: Elsevier; 2016:639-643. <https://www-clinicalkey-com.proxy1.library.jhu.edu/#!/content/book/3-s2.0-B9780323286657001102>. Accessed October 6, 2018.
3. Molé DM. Introduction to Nuclear and Radiological Disasters. In: *Ciotone's Disaster Medicine*. 2nd ed. Philadelphia, PA: Elsevier; 2016:615-620. <https://www-clinicalkey-com.proxy1.library.jhu.edu/#!/content/book/3-s2.0-B9780323286657001059>. Accessed October 9, 2018.
4. Carroll C, Balkrishnan R, Khanna V, Feldman S. Bioterrorism preparedness in the dermatology community. *Arch Dermatol*. 2003;139(12):1657-1658.

AUTHOR CORRESPONDENCE

Adam J. Friedman MD FAAD

E-mail:..... ajfriedman@mfa.gwu.edu