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Occupational Skin Conditions in the Emerging US Green Collar Workforce

To the Editor:

Occupational skin diseases, including contact dermatitis, rank as the most commonly reported occupational injuries worldwide.[1] Skin injuries lead to decreased worker productivity, decreased worker self-esteem, and long-term complications including skin cancer.[2] Focusing on environmental sustainability and eco-friendliness, the new "green collar" workforce includes occupations that preserve or restore the environment.[3] The green collar workforce encompasses a variety of industries and professions including organic farmers, renewable energy engineers, and recycling center attendants, in addition to numerous other occupations.[4] We report the rates of dermatological conditions, work-related dermatological injuries, and skin treatment-seeking behaviors among the emerging green collar US workforce.

Analysis was performed by linking data from the 2010 Occupational Health Supplement (OHS) of the National Health Interview Survey (NHIS) to the Occupational Information Network (O*NET). The NHIS is a nationally representative, multistage household survey of the civilian, noninstitutionalized US population that includes unique OHS questions administered to adults who were employed within the past 12 months. The O*NET is a national database with occupational classification based on respondent interviews. The linkage allowed us to classify the occupational class (green vs nongreen) of the NHIS respondents. Among the 1110 occupational job families listed in O*NET, 169 occupations are classified as green occupations.

The main study variables on occupational dermatological conditions were derived from 3 NHIS OHS questions, as follows: (1) "During the past 12 months, have you had dermatitis, eczema, or any other red, inflamed skin rash?", (2) "Have you ever been told by a doctor or other health professional that your skin condition was probably work-related?", and (3) "Have you ever seen a doctor or other health professional for your skin condition?" Prevalence estimates of sociodemographic and dermatological variables were calculated using SUDAAN 11 (Research Triangle Institute, Research Triange Park, NC), taking into account the NHIS complex sampling design.

The total study sample included 14,805 workers: 2,588 (18.7%) green collar and 12,217 (81.2%) nongreen collar workers (Table 1). Green collar workers reported similar higher rates of dermatitis, eczema, or red, inflamed skin conditions within the past year compared with nongreen (9.7% vs 9.5%). However, in terms of work-related dermatological conditions, nongreen collar had higher rates than green collar workers (6.7% vs 5.9%, respectively). Green and nongreen workers had comparable rates of seeking medical treatment for their dermatological conditions (76.5% and 76.3%, respectively).

Green workers showed similar rates of dermatitis, eczema, or red, inflamed skin conditions when compared with other occupational classes, whereas work-related dermatological injuries were higher for nongreen workers. As the green industry expands, it is important to identify workforce sectors that are at greatest risk for occupational dermatological conditions. Green and nongreen workers showed similar rates of medical treatment sought for dermatological conditions. Further research into sociodemographic subsets of both occupational classes and treatment-seeking habits is necessary to identify groups that are potentially undertreated for dermatological injuries. This study is limited by the cross-sectional design, the NHIS self-reported data, and the broadness of the dermatological conditions assessed in the survey. This study is the first to report dermatological conditions in green collar workers. As the green industry becomes an increasingly ubiquitous component of the American workforce, identifying high-risk worker groups remains an important concern to public health dermatology.

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Author contribution statement: K.J.M. and A.J.C.M. conceptualized the study design and analysis approach. C.C., D.J.L., andW.G.M. provided data management and analysis. L.E.F. and D.J.L. provided interpretation of data, drafting, and revision of the manuscript. All authors reviewed and approved the final version of this letter.

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TABLE 1. Sociodemographic Characteristics and Dermatological Conditions of Green and Nongreen Collar Workers: the 2010 National Health Interview Survey

	Total Worker Population			Green			Nongreen		
	US Estimated Population	N	Percent (95% CI)	US Estimated Population	n	Percent (95% CI)	US Estimated Population	n	Percent (95% CI)
Total	131,296,970	14,805	100	24,614,939	2588	18.7 (18.0–19.4)	106,682,031	12,217	81.2 (80.5–81.9)
Sex									
Male	69,814,890	7306	53.1 (52.1–54.1)	18,777,269	1900	76.2 (74.5–78.0)	51,037,621	5406	47.8 (46.7–48.9)
Female	61,482,080	7499	46.8 (45.8–47.8)	5,837,670	688	23.7 (21.9–25.4)	55,644,410	6811	52.1 (51–53.2)
Race									
White	107,663,727	11,224	82 (81–82.9)	20,600,991	2018	83.6 (81.8–85.4)	87,062,736	9206	81.6 (80.7–82.5)
Black	15,246,774	2349	11.6 (10.8–12.3)	2,621,791	365	10.6 (9.1–12.1)	12,624,983	1984	11.8 (11–12.5)
Other	8,386,469	1232	6.3 (5.8–6.9)	1,392,157	205	5.6 (4.6–6.6)	6,994,312	1027	6.5 (5.9–7.1)
Age, y									
18–24	16,733,678	1559	12.7 (11.9–13.5)	2,260,000	210	9.1 (7.7–10.6)	14,473,678	1349	13.5 (12.6–14.4)
25–64	109,210,100	12,552	83.1 (82.3–84)	21,453,941	2279	87.1 (85.4–88.8)	87,756,159	10,273	82.2 (81.3–83.2)
≥65	5,353,192	694	4.0 (3.7–4.4)	900,998	99	3.6 (2.8–4.4)	4,452,194	595	4.1 (3.7–4.5)
Ethnicity									
Non-Hispanic	112,465,426	11,865	85.6 (84.8–86.4)	21,076,884	2110	85.6 (84.1–87.1)	91,388,542	9755	85.6 (84.8–86.4)
Hispanic	18,831,544	2940	14.3 (13.5–15.1)	3,538,055	478	14.3 (12.8–15.8)	15,293,489	2462	14.3 (13.5–15.1)
Education									
>HS	85,961,694	9479	65.6 (64.5–66.7)	14,887,531	1537	60.7 (58.2–63.2)	71,074,163	7942	66.7 (65.6–67.9)
HS	32,367,120	3574	24.7 (23.8–25.6)	7,176,915	731	29.2 (27–31.5)	25,190,205	2843	23.6 (22.7–24.6)
<HS	12,585,494	1713	9.6 (9–10.2)	2,440,156	310	9.9 (8.7–11.1)	10,145,338	1403	9.5 (8.8–10.2)
Health Insurance									
Not insured	22,946,866	2899	17.5 (16.6–18.4)	3,569,671	437	14.5 (12.9–16.2)	19,377,195	2462	18.2 (17.2–19.2)
Insured	107,795,448	11,863	82.4 (81.5–83.3)	20,934,477	2142	85.4 (83.7–87)	86,860,971	9721	81.7 (80.7–82.7)
Worker Residence									
Northeast	23,415,050	2326	17.8 (16.7–18.9)	4,458,522	407	18.1 (16.1–20.1)	18,956,528	1919	17.7 (16.6–18.9)
Midwest	31,050,486	3295	23.6 (22.4–24.8)	5,971,088	608	24.2 (22.2–26.2)	25,079,398	2687	23.5 (22.2–24.7)
South	46,202,248	5456	35.1 (33.8–36.5)	8,365,611	923	33.9 (31.8–36.1)	37,836,637	4533	35.4 (34–36.9)
West	30,629,186	3728	23.3 (22.1–24.5)	5,819,718	650	23.6 (21.6–25.6)	24,809,468	3078	23.2 (21.9–24.5)
Dermatological Conditions									
DRMYR*									
Yes	23,305,971	2641	10.1 (9.7–10.6)	2,109,337	221	9.7 (7.8–12.0)	10,302,780	1132	9.5 (8.8–10.3)
DRMWKREL†									
Yes	848,934	98	7.0 (5.5–8.8)	121,677	11	5.9‡ (3.2–10.9)	551,417	67	6.7 (5.0–9.0)
DRMTRET§									
Yes	11,510,108	1266	76.9 (74.3–79.3)	1,549,711	162	76.3 (69.8–81.8)	7,806,008	866	76.5 (73.1–79.6)

Variables DRMYR, DRMWKREL, and DRMTRET are taken from the 2010 NHIS Occupational Health Questionnaire.

*DRMYR = During the past 12 months, have you had dermatitis, eczema, or any other, red, inflamed skin condition?

†DRMWKREL = Have you been told by a doctor or other health professional that your skin condition was probably work-related?

‡Estimate does not meet National Center for Health Statistic's standard of reliability or precision given the relative standard error was greater than 30%.

§DRMTRET = Have you ever seen a doctor or other health professional for your skin condition?

CI indicates confidence interval; and HS, high school.

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Topical Steroid Therapy Educational Video for Eczema

To the Editor:

Eczema is a common disease with a prevalence of 11%.[1] Although effective, topical steroids can cause anxiety and nonadherence because of lack of knowledge on the part of patients and caregivers.[2] Short educational interventions have been shown to diminish disease severity and improve quality of life and treatment adherence.[3–5] However, previous studies have not shown improvement in specific patient knowledge domains regarding topical steroid therapy. We constructed and evaluated the educational efficacy of an online video on topical steroid use for eczema (https://nationaleczema.org/eczema/treatment/topical-corticosteroids).

A 3-minute and 23-second video was created with input from the National Eczema Association (NEA). The video was placed on the NEA Web site, along with an embedded prevideo and postvideo survey from September 19, 2014, to December 9, 2014, administered via Constant Contact (Waltham, Mass) and advertised to patients with eczema and their caretakers through the NEA and Singapore's National Eczema Support Group mailing list. The surveys included questions on basic eczema knowledge, topical steroids, and video content. Physician experts in eczema from the NEA Scientific Review Committee reviewed the content on the video. Eczema knowledge questions and answers were designed to test knowledge that was directly covered in the video. Prevideo and postvideo knowledge were assessed using 2-sample Z tests conducted with Real Statistics Resource Pack software (release 4.3).

Four hundred twelve viewers completed the survey. Furthermore, 70.9% were female, and 77.7% had eczema; 75.5% were between ages 25 and 64 years, and 69.6% had graduated from college or had postgraduate education; and 63.6% of the participants were identified as white or Caucasian.

Knowledge significantly improved after the video for true/false questions of "steroids should be applied to affected and normal appearing skin" and "applied/topical steroids have fewer side effects than steroids taken by mouth" (Table 1) ($P < 0.05$ for both). Nonstatistically significant improvement was noted regarding the following statements: "steroids reduce itch and redness in eczema," "steroid should be used indefinitely for eczema," and "steroids are only available in cream and ointment form."

Prevideo, 32.8% of viewers had "no knowledge" of topical steroid therapy, 58.5% were "somewhat knowledgeable," and 8.7% were "very knowledgeable" at baseline. Postvideo, the proportions changed to 4.9%, 60.7%, and 34.5%, respectively (Table 1). Furthermore, prevideo, 18.5% of viewers were "not comfortable," 57.5% were "somewhat comfortable," and 24.0% were "very comfortable." Postvideo, the proportions changed to 5.3%, 40.3%, and 54.4%, respectively.

Our study demonstrates the positive impact of online video education on comfort with and knowledge of topical steroid use for eczema. One limitation of this study is the lack of clinical measurement regarding changes in disease severity, quality of life, and treatment adherence of the study participants. Selection bias—drawing on individuals already browsing the

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