Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

An analysis of public sunscreen distribution in the United States during the COVID-19 pandemic

To the Editor: The COVID-19 pandemic might have significantly affected consumer preferences and societal behavior regarding sun protection and skin cancer. We present a pandemic-era follow-up of previous research published in the *Journal of the American Academy of Dermatology*[1] on public use of sunscreen distributed by IMPACT Melanoma, a prominent nationwide sunscreen distributor and nonprofit organization for skin cancer prevention and education.

IMPACT Melanoma's distribution records from 2020 to 2021 were retrospectively analyzed and compared with those from 2018 to 2019. Health care facilities, public health departments, governmental organizations, parks or recreation centers, educational institutions, nonprofits, and private businesses ordered both sunscreen dispensers and cases of different sunscreen types for public use (Fig 1). Every sector showed decreases in the overall orders of sunscreen dispensers (−58%) and cases of sunscreen (−68%). Park or recreation center and nonprofit organization total sunscreen and dispenser orders (the most common in 2018-2019) decreased in 2020 to 2021 by 78% and 42%, respectively. Despite nationwide supply chain disruptions, sunscreens remained available for distribution, with hybrid sunscreens ordered most frequently (no chemical and physical sunscreens were ordered in 2020-2021, perhaps because of their growing unpopularity, as discussed previously by Eason et al[1]). Orders of hybrid sunscreen grew by 41%, driven primarily by hospitals, which also ordered more sunscreen dispensers and likely experienced increased volume at facilities and outreach events (eg, vaccination drives) during the COVID-19 pandemic. In total, Wyoming, Maine, South Dakota, and Massachusetts received the most dispensers and sunscreens by state population from 2020 to 2021 (Fig 2).

Organization Type	Year	Sunscreen Dispensers	Physical* Sunscreen (Cases^)	Chemical** Sunscreen (Cases)	Hybrid*** Sunscreen (Cases)	All Sunscreen (Cases)	All Items
Total	2018-2019	890	208	874	316	1398	2288
	2020-2021	372	0	0	444	444	816
	% Change	-58	-100	-100	41	-68	-64
Healthcare^^	2018-2019	36	189	13	11	213	249
	2020-2021	96	0	0	142	142	238
	% Change	167	-100	-100	1191	-33	-4
Public Health Department	2018-2019	131	2	59	101	162	293
	2020-2021	12	0	0	19	19	31
	% Change	-91	-100	-100	-81	-88	-89
Government	2018-2019	68	11	42	10	63	131
	2020-2021	40	0	0	26	26	66
	% Change	-41	-100	-100	160	-59	-50
Parks & Recreation	2018-2019	316	0	399	30	429	745
	2020-2021	82	0	0	82	82	164
	% Change	-74	0	-100	173	-81	-78
School or University	2018-2019	48	3	17	14	34	82
	2020-2021	10	0	0	10	10	20
	% Change	-79	-100	-100	-29	-71	-76
Nonprofit Organization	2018-2019	165	0	110	86	196	361
	2020-2021	88	0	0	123	123	211
	% Change	-47	0	-100	43	-37	-42
Private Business	2018-2019	126	3	234	64	35	161
	2020-2021	44	0	0	42	35	79
	% Change	-65	-100	-100	-34	0	-51

Fig 1. Comparisons of sunscreen and dispenser distribution records by IMPACT Melanoma between 2018 to 2019 and 2020 to 2021 by purchasing organization type. Color Key: Lowest % change Highest % change in 2020-2021 vs 2018-2019. *Physical (mineral) sunscreen: BrightGuard Natural Sunscreen (active ingredients: 6% titanium dioxide and 6% zinc oxide). **Chemical sunscreen: Coppertone Sport Sunscreen (active ingredients: 3% avobenzone, 8% homosalate, 4.5% octisalate, and 6% octocrylene). ***Hybrid sunscreen: Hybrid Sport Sunscreen (active ingredients: 7% octyl methoxycinnamate, 1.25% titanium dioxide, 1.25% zinc oxide, and 1.0% octyl salicylate). ^Case contains 4 individual 1-L bags of sunscreen. ^^The health care facilities included hospitals, clinics, nursing homes, and cancer centers.

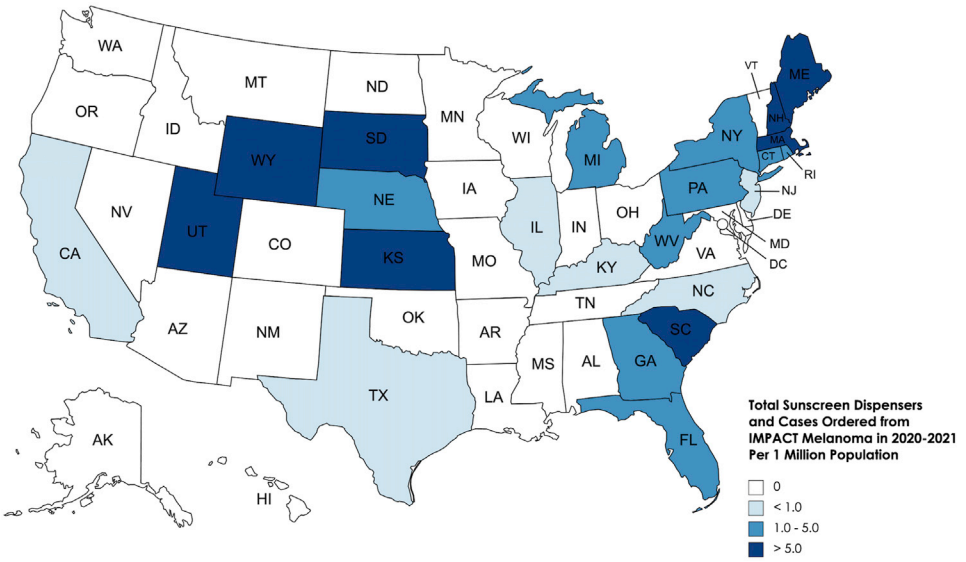

Fig 2. Total sunscreen dispensers and cases of sunscreen distributed by IMPACT Melanoma by state per 1 million individuals from 2020 to 2021. State resident population based on United States Census Bureau 2020 data.

With social distancing, mask mandates, stay-at-home orders, and popularity of outdoor activities in flux, it remains unclear how COVID-19 has affected cumulative UV exposure. However, reduced public access to sunscreen is concerning and corroborates broader pandemic patterns of falling retail consumer sunscreen sales.[2] Furthermore, declining Google search volumes for sunburns[3] and precancerous or cancerous UV exposure-related dermatologic conditions[4] could suggest a waning consumer interest in sun protection and consequent sun damage, as well as a decreased public perception of UV exposure risk. Additionally, required mask-wearing in public settings might contribute to reduced sunscreen use because combining masks with sunscreens can cause skin irritation, pruritus, and occlusion.[5] Additionally, some may equate mask use to sufficient sun protection, although masks confer unknown and variable UV protection.

Further research should directly investigate changes in individuals' sunscreen application behaviors. Although limited by our 2-year periods of organizational distribution analysis, our findings highlight worrisome trends that may be suggestive of increased sun damage risk and warrant additional investigation. Consumer research has suggested that the pandemic has eroded consumer attitudes regarding sun protection, and a large fraction now only uses sunscreen on an as-needed basis (eg, long beach vacations or special occasions).[2] Dermatologists can encourage greater awareness about sun protection for everyday outdoor experiences, for indoors, and during colder months, regardless of COVID-19–induced changes and mask-wearing. IMPACT Melanoma's touch-free automated sunscreen dispensers and extensive virtual or online outreach programs will be advantageous. However, melanoma rates continue to rise, and the pandemic's long-term effects are yet to be seen. As sunscreen application and UV exposure data become available in the near future, further examination of UV-associated skin cancer by state or region may be useful in informing outreach efforts and policy.

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Conflicts of interest

Dr Dellavalle is a Joint Coordinating Editor for *Cochrane Skin*, a dermatology section editor for *UpToDate*, a Social Media Editor for the *Journal of the American Academy of Dermatology* (*JAAD*), a Podcast Editor for the *Journal of Investigative Dermatology* (*JID*), the Editor-in-Chief of the *Journal of Medical Internet Research* (*JMIR*) *Dermatology*, a coordinating editor representative of the *Cochrane* Council, and the Co-Chair of the Colorado Skin Cancer Task Force. Dr Dellavalle receives editorial stipends (*JAAD* and *JID*), royalties (*UpToDate*), and expense reimbursement from *Cochrane Skin*. Dr Hugh participated in fundraising for IMPACT Melanoma. Drs Maghfour, Rundle, and Presley and Authors Szeto, Kokoska, Harp, Hamp, and Wegener have no conflicts of interest to declare.

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