

1 **Title:** An Analysis of Public Sunscreen Distribution in the United States During the COVID-19
2 Pandemic

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58 *To the Editor:* The COVID-19 pandemic may have significantly affected consumer preferences
59 and societal behavior regarding sun protection and skin cancer. We present a pandemic-era
60 follow-up to previous research in the *Journal of the American Academy of Dermatology*¹ on
61 public-use sunscreen from IMPACT Melanoma, a prominent nationwide sunscreen distributor
62 and nonprofit organization for skin cancer prevention/education

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64 IMPACT Melanoma's 2020-2021 distribution records were retrospectively analyzed and
65 compared to 2018-2019. Healthcare facilities, public health departments, governmental
66 organizations, parks/recreation centers, educational institutions, nonprofits, and private
67 businesses ordered both sunscreen dispensers and cases of different sunscreen types for public
68 use (**Table 1**). Every sector showed decreases in overall orders of sunscreen dispensers (-58%)
69 and cases of sunscreen (-68%). Total parks/recreation and nonprofit organization orders (the
70 most common in 2018-2019) decreased in 2020-2021 by 78% and 42%, respectively. Despite
71 nationwide supply chain disruptions, sunscreen remained available for distribution, with hybrid
72 sunscreen most frequently ordered (no chemical and physical sunscreens were ordered in 2020-
73 2021, perhaps due to their growing unpopularity as discussed previously by Eason et al¹). Total
74 hybrid sunscreen orders grew by 41%, driven primarily by hospitals, which also ordered more
75 sunscreen dispensers and like y experienced increased volume at facilities and outreach events
76 (e.g. vaccination drives) during COVID-19. In total, Wyoming, Maine, South Dakota, and
77 Massachusetts received the most dispensers and sunscreen by state population in 2020-2021
78 (**Figure 1**).

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80 With social distancing, mask mandates, stay-at-home orders, and popularity of outdoor activities
81 in flux, it remains unclear how COVID-19 has affected cumulative ultraviolet (UV) exposure.
82 However, reduced public access to sunscreen is concerning, and corroborates broader pandemic
83 patterns of falling retail consumer sunscreen sales.² Furthermore, declining Google search
84 volumes for sunburns³ and precancerous/cancerous UV exposure-related dermatologic
85 conditions⁴ could suggest waning consumer interest in sun protection and consequent sun
86 damage, as well as decreased public perception of UV exposure risk. Required mask-wearing in
87 public settings may contribute to reduced sunscreen use, as combining masks with sunscreens
88 can cause skin irritation, pruritus, and occlusion.⁵ Additionally, some may equate mask use to
89 sufficient sun protection, although masks confer unknown and variable UV protection.

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91 Further research should directly investigate changes in individuals' sunscreen application
92 behaviors. While limited by our 2-year periods of organizational distribution analysis, our

93 findings highlight worrisome trends that may be suggestive of increased sun-damage risk, and
 94 warrant additional investigation. Consumer research has suggested that the pandemic has eroded
 95 consumer attitudes around sun protection, and a large fraction now only use sunscreen on an as-
 96 needed basis (e.g. long beach vacations or special occasions).² Dermatologists can encourage
 97 greater awareness about sun protection for everyday outdoor experiences, indoors, and during
 98 colder months, regardless of COVID-19-induced changes and mask-wearing. IMPACT
 99 Melanoma’s touch-free automated sunscreen dispensers and extensive virtual/online outreach
 100 programs will be advantageous. Even so, melanoma rates continue to rise and the pandemic’s
 101 long-term effects are yet to be seen. As sunscreen application and UV exposure data becomes
 102 available in the near future, further examination of UV-associated skin cancer by state or region
 103 may be useful in informing outreach efforts and policy.

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Table 1: Comparisons of Sunscreen and Dispenser Distribution Records from IMPACT Melanoma between 2018-2019 and 2020-2021 by Purchasing Organization Type.

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

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Table 1 Notes:

110 Color Key: Lowest % Change Highest % Change in 2020-2021 vs 2018-
 111 2019.

112 * Physical (Mineral) Sunscreen: BrightGuard Natural Sunscreen (Active Ingredients: Titanium
 113 Dioxide 6% and Zinc Oxide 6%).

114 ** Chemical Sunscreen: Coppertone Sport Sunscreen (Active Ingredients: Avobenzone 3%,
115 Homosalate 8%, Octisalate 4.5%, and Octocrylene 6%).

116 ***

117 Hybrid Sunscreen: Hybrid Sport Sunscreen (Active Ingredients: Octyl Methoxycinnamate
118 7%, Titanium Dioxide 1.25%, Zinc Oxide 1.25%, and Octyl Salicylate 1.0%).

119 ^ Case contains 4 individual 1-liter bags of sunscreen.

120 ^^ Healthcare facilities included hospitals, clinics, nursing homes, and cancer centers.

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123 **Figure 1: Total Sunscreen Dispensers and Cases of Sunscreen Distributed by IMPACT**
124 **Melanoma by State Per 1 Million Population in 2020-2021.**

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126 Figure 1 Note: State resident population based on United States Census Bureau 2020 data.

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