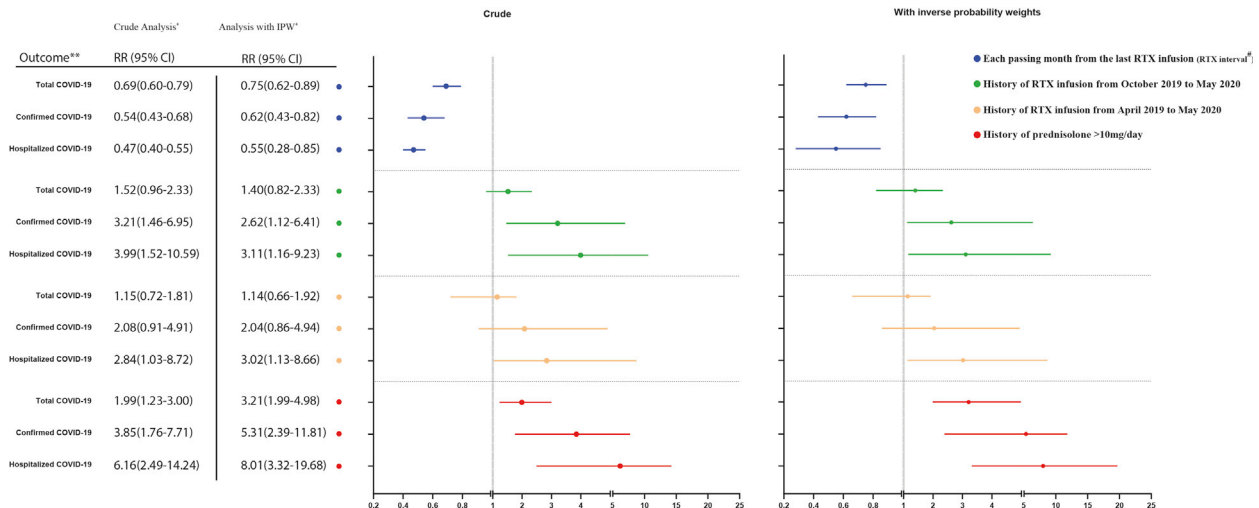




Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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**Fig 1.** Univariate and multivariate analysis with IPW. Association between prednisolone and rituximab infusion with COVID-19 in patients with autoimmune bullous diseases. Asterisk indicates all 704 patients were included in the total COVID-19 analysis. For the diagnosed COVID-19 analysis, highly suspicious cases were excluded from the cohort. Likewise, both highly suspicious and nonhospitalized COVID-19 cases were excluded from the cohort in the hospitalized COVID-19 analysis. Double asterisk indicates outcomes: Total COVID-19 including diagnosed and highly suspicious cases; diagnosed COVID-19 cases; hospitalized COVID-19 cases. Hashtag indicates RTX interval was analyzed for patients who received RTX after April 2019 and was defined as the interval from the last dose of RTX to either the date of contracting COVID-19 or May 2020. The blue line shows the relative risk of outcomes with each passing month from the last RTX infusion with a 95% CI.

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**Conflicts of interest**

None disclosed.

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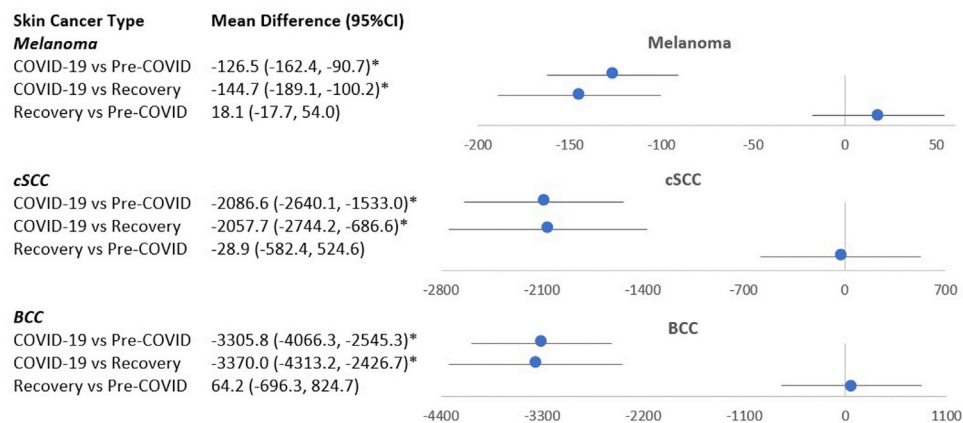
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**The magnitude of COVID-19's effect on the timely management of melanoma and nonmelanoma skin cancers**



*To the Editor:* The coronavirus disease 2019 (COVID-19) pandemic substantially reduced patient volumes or caused full closings of many US dermatology practices.<sup>1,2</sup> Given reduced access to care and National Comprehensive Cancer Network guidelines to defer surgical management,<sup>3</sup> concerns have been raised that patients with potential skin cancers had



**Fig 1.** Mean difference in skin cancer diagnoses owing to COVID-19. Across the different types of skin cancers, there was a significant decrease in average number of diagnoses from the initial to peak COVID-19 pandemic (March to May 2020) compared with pre-COVID-19 (before March 2020) and the immediate COVID-19 recovery period (June to August 2020). *BCC*, Basal cell carcinoma; *CI*, confidence interval; *COVID-19*, coronavirus disease 2019; *cSCC*, cutaneous squamous cell carcinoma. \*Analysis of variance with post hoc Tukey-Kramer,  $P < .01$ .

**Table I.** Percentage changes in skin cancers diagnosed by month in 2020 versus 2019

Period	Month	Cutaneous melanoma			cSCC			BCC		
		2019, n = 2228	2020, n = 1944	Change, no. (%)	2019, n = 38,432	2020, n = 32,164	Change, no. (%)	2019, n = 51,991	2020, n = 42,958	Change, no. (%)
Pre-COVID-19	January	292	262	-30 (-1.0)	5135	5047	-88 (-1.7)	6385	6824	439 (6.9)
	February	298	323	25 (8.4)	4790	4610	-180 (-3.8)	6164	6606	442 (7.2)
	Total	590	585	-5 (-0.9)	9925	9657	-268 (-2.7)	12,549	13,430	881 (7.0)
Initial to peak COVID-19	March	293	240	-53 (-18.1)	4575	3073	-1502 (-32.8)	6103	4271	-1832 (-30.0)
	April	257	78	-179 (-69.6)	5069	1154	-3915 (-77.7)	6952	982	-5970 (-85.9)
	May	271	149	-122 (-45.0)	4959	3940	-1019 (-20.5)	6834	4456	-2378 (-34.8)
	Total	821	467	-354 (-43.1)	14,603	8167	-6436 (-44.1)	19,889	9709	-10,180 (-51.2)
COVID-19 recovery	June	276	301	25 (9.1)	4442	5164	722 (16.3)	6171	7163	992 (16.1)
	July	289	339	50 (17.3)	4685	4595	-90 (-1.9)	6584	6442	-142 (-2.2)
	August	261	261	0	4777	4581	-196 (-4.1)	6798	6214	-584 (-8.6)
	Total	817	892	75 (9.2)	13,904	14,340	436 (3.1)	19,553	19,819	266 (1.4)
March-August	1647	1368	-279 (-16.9)	28,507	22,507	-6000 (-21.0)	39,442	29,528	-9914 (-25.1)	

*BCC*, Basal cell carcinoma; *COVID-19*, coronavirus disease 2019; *cSCC*, cutaneous squamous cell carcinoma.

Analysis of the data found a backlog of 279 cutaneous melanomas, 6000 cSCC, and 9914 BCCs that would have been expected to be diagnosed but have not yet been observed.

material delays in care. This study assessed the magnitude of delays in initial skin cancer diagnosis and management owing to COVID-19.

With institutional review board approval, data from January 2019 to August 2020 were analyzed from available outpatient-chart reviews of 143 US dermatology practices (350 providers) covering 4.7 million patients across 13 geographically distributed states. The number of diagnosed cutaneous melanomas, cutaneous squamous cell carcinomas (cSCCs), and basal cell carcinomas (BCCs) was determined. Data from 2020 were aggregated into

pre-COVID-19 (January to February), initial to peak COVID-19 (March to May), and COVID-19 recovery (June to August). Analysis of variance with Tukey-Kramer testing was performed for multiple comparisons.

Average monthly number of skin cancers diagnosed significantly decreased during March to May 2020 compared with both before March 2020 (cutaneous melanoma mean difference -126.5, cSCC -2086.6, and BCC -3305.8) and the immediate recovery period (cutaneous melanoma -144.7, cSCC -2057.7, and BCC -3370.0) (Fig 1). Skin

cancers diagnosed in March to May 2020 were materially lower than from March to May 2019, with diagnoses decreased by 43.1% in cutaneous melanomas, 44.1% in cSCCs, and 51.2% in BCCs (Table I). The largest decreases were observed during April 2020 (cutaneous melanomas –69.6%, SCCs –77.7%, and BCCs –85.9%). As COVID-19's effect on dermatology practices decreased, the number of skin cancers diagnosed from June to August 2020 was only slightly higher than during June to August 2019 (cutaneous melanomas 9.2%, cSCCs 3.1%, and BCCs 1.4%). However, total 2020 skin cancer diagnoses continued to trail that of 2019, with 279 fewer cutaneous melanomas, 6000 fewer cutaneous SCCs, and 9914 fewer BCCs detected. Extrapolating these findings to the full US population ( $\approx 330$  million), an estimated 19,600 cutaneous melanomas, 421,300 cSCCs, and 696,100 BCCs have had materially delayed initial diagnosis or treatment.

This study demonstrates COVID-19's ongoing effect on skin cancer diagnosis and management. Although skin cancer diagnoses have returned to the same-month 2019 baseline, our findings suggest that a large backlog of skin cancers remains undiagnosed. Assuming a best-case scenario wherein all delayed cancers were diagnosed at the first opportunity during the recovery period, there would still be an average diagnostic delay of 1.8 months for cutaneous melanomas, 2.1 months for cSCCs, and 1.9 months for BCCs. These delays in initial diagnosis and treatment may lead to skin cancers presenting at more advanced stages,<sup>4</sup> with potential increased morbidity and worse cutaneous melanomas survival outcomes.<sup>5</sup>

Limitations include data homogenization because US regions were temporally differentially affected by the COVID-19 pandemic. Sampling or ascertainment bias could affect these findings, but the patient base represented a large, diverse group (4.7 million persons). Given lacking socioeconomic data, results may not capture the pandemic's full magnitude and effect. Furthermore, although our findings suggest material delays existed in initial skin cancer diagnosis and management, further large-scale studies may be necessary to quantify the effect on health care costs, morbidity, and survival.

Our findings suggest that COVID-19 has materially delayed diagnosis and care for patients with skin cancer. Although the number of diagnoses returned to the approximate June to August 2019 baseline, a substantial backlog of undiagnosed cases still remains, with associated delay

implications. Further studies may determine whether these delays will materially affect the stage at which subsequent skin cancers present and the potential associated increases in morbidity and mortality that may occur.

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#### **Conflicts of interest**

None disclosed.

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### The synchronized gene expression of retrotransposons and type I interferon in dermatomyositis



To the Editor: Dermatomyositis (DM) is an autoimmune, multiorgan disease. The type I interferon

signature is characteristic in DM, and viral infection may be a contributing factor.<sup>1</sup> Retrotransposons are divided into 2 groups: non-long terminal repeat retrotransposons include long interspersed nuclear element-1 (LINE-1), Alu, and short interspersed nuclear elements (SINE)-variable number of tandem repeats (VNTR)-Alu (SVA), whereas long terminal repeat retrotransposons include endogenous retroviruses.<sup>2</sup> LINE-1 is a representative retrotransposon that regulates the expression of type I interferon through the MDA5 pathway.<sup>3</sup> The expression of

**Table I.** Clinical characteristics of DNA and RNA virus detection in patients with posttreatment dermatomyositis

Patient	Age, y	Sex	Antibody	Therapy (per day)	DNA and RNA virus detection			
					After treatment		Before treatment	
					Serum	Extracted RNA	Serum	Extracted RNA
1	55	F	ARS	PSL 10 mg, CyA 50 mg	ND	-	ND	ND
2	55	F	MDA5	PSL 30 mg, Tac 3 mg, IVCY	ND	CMV	ND	ND
3	41	F	TIF1 $\gamma$	PSL 8 mg	-	-	ND	ND
4	55	F	Mi2	PSL 40 mg	-	CMV	ND	ND
5	51	F	MDA5	Unknown	-	-	ND	ND
6	50	M	MDA5	PSL 10 mg, Aza 100 mg	-	-	ND	ND
7	75	F	negative	PSL 5 mg	-	-	ND	ND
8	43	M	negative	PSL 5 mg	-	-	ND	ND
9	72	F	negative	PSL 5 mg	-	EBV	ND	ND
10	54	F	negative	PSL 5 mg	-	-	ND	ND
11	45	F	negative	PSL 4 mg	-	-	ND	ND
12	40	F	ARS	PSL 10 mg	-	-	ND	ND
13	66	M	TIF1 $\gamma$	-	-	-	ND	ND
14	52	M	Mi2	PSL 3 mg	-	-	ND	ND
15	76	F	TIF1 $\gamma$	PSL 5 mg	-	-	ND	ND
16	46	F	ARS	PSL 5 mg	-	-	ND	ND
17	68	F	TIF1 $\gamma$	PSL 6 mg	-	-	ND	ND
18	68	F	negative	PSL 1 mg	-	-	ND	ND
19	63	F	negative	PSL 1 mg	-	HHV7	ND	ND
20	38	M	negative	PSL 4 mg	-	-	ND	ND
21	51	M	TIF1 $\gamma$	PSL 5 mg	-	-	ND	ND
22	53	M	Mi2	PSL 6 mg	-	-	ND	ND
23	63	F	negative	PSL 5 mg	-	-	ND	ND
24	60	F	negative	PSL 4 mg	-	-	ND	ND
25	43	M	negative	PSL 5 mg	-	-	ND	ND
26	59	F	MDA5	Unknown	-	CMV, EBV	ND	ND
27	54	F	MDA5	Unknown	-	-	ND	ND
28	52	F	MDA5	Unknown	ND	EBV	ND	ND
29	58	M	negative	-	ND	ND	-	-
30	60	M	unknown	-	ND	ND	-	-
31	71	M	unknown	-	ND	ND	-	-
32	44	F	MDA5	-	ND	ND	-	ND
33	10	F	MDA5	-	ND	ND	-	ND
34	45	M	MDA5	-	ND	ND	-	ND
35	57	F	MDA5	-	ND	ND	-	ND

The detected viruses were rhino/enterovirus, enterovirus 68, parechovirus, coronavirus, HSV, CMV, parvovirus B19, VZV, HHV6, HHV7, HHV8, and EBV.

Aza, Azathioprine; CMV, cytomegalovirus; CyA, cyclosporine A; EBV, Epstein-Barr virus; F, female; HHV, human herpesvirus; HSV, herpes simplex virus; IVCY, intravenous cyclophosphamide; M, male; ND, not described; PSL, prednisolone; Tac, tacrolimus; VZV, varicella zoster virus; -, negative.