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Getting even: occurrence of histopathological primitive melanoma diagnoses three years after the COVID-19 lockdown

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Abstract

The COVID-19 lockdown in 2020 caused a significant delay in histopathological melanoma diagnoses in Rome, Italy, leading to an increase in Breslow thickness and more aggressive tumor characteristics in the following years. Although there was a partial recovery in the number of diagnoses in 2021 and 2022, melanoma thickness remained higher than pre-pandemic levels. In 2023, our analysis of primary melanoma cases from the Histopathology Registry of Istituto Dermopatico dell'Immacolata (IDI)-IRCCS in Rome showed that Breslow thickness had finally returned to, or even improved beyond, 2019 levels – indicating a resolution of the diagnostic delay. At the same time, the proportion of ulcerated and nodular melanomas declined.

These findings underscore the long-term effects of pandemic-related diagnostic disruptions and highlight the importance of maintaining continuous screening programs, even during public health crises. Ongoing public education on melanoma awareness and early detection remains crucial to preventing future delays.

Brief Report

Due to the COVID-19 pandemic, many planned medical activities were postponed, and during the 2020 lockdown, a sharp drop in new melanoma diagnoses was observed.

The global healthcare crisis caused significant disruptions in routine screenings and non-urgent medical visits, which in turn delayed the timely detection of various cancers, including melanoma.

In our previous study,[1] we compared histopathological melanoma diagnoses from the 2020 pre-lockdown and post-lockdown period. Immediately after restrictions were lifted, while the actual number of diagnoses remained well under the rate expected from previous years, more severe and thicker melanomas were observed, particularly in male patients aged 50 and older.[1] It is interesting to note that increasing age was associated with thicker melanomas in all the time-periods we considered. In contrast, the differences by gender (*i.e.*, thinner melanomas in women) were particularly stark only right after the lockdown and in 2021. In 2021, the number of new diagnoses approached pre-pandemic levels, but the higher number of diagnoses in 2022 did not cover the total number of "lost" diagnoses in the previous two years (Figure 1). Also, in 2021, Breslow thickness remained elevated compared to the pre-lockdown period (1.40 *vs.* 0.88). Additionally, we found a higher proportion of thicker melanomas, especially nodular melanomas and superficial spreading melanomas with nodular components, along with an increased percentage of ulcerated lesions.[2] These findings suggested that patients who had deferred their check-ups during the pandemic were being diagnosed at more advanced stages. A similar trend persisted in 2022, with continued delays in

diagnosis and more aggressive melanoma features, as shown in our follow-up observations (Tables 1 and 2). These results were consistent with reports from other countries,[3-6] indicating that this was a global phenomenon rather than a localized issue.

The worldwide impact of the COVID-19 lockdown on primary melanoma diagnoses, however, varied widely, plausibly due to several factors: i) the strictness of the lockdown; ii) the severity of restrictions on access to healthcare facilities; iii) the practical and emotional toll of the pandemic on individuals and communities; iv) the reallocation of healthcare resources to COVID-19 emergency care; v) the general structure and capacity of healthcare systems; and vi) cultural differences in melanoma and cancer awareness.[3]

In this study, we analyzed data through 2023 to assess whether the diagnostic delays observed during the pandemic had persisted or been resolved.

Consecutive primary melanoma cases were collected from the Histopathology Registry of IDI-IRCCS in Rome, Italy. We examined variables including age, sex, Breslow thickness (mm), ulceration, and other key histological features. Statistical comparisons were made between 2023 and previous years, encompassing both pre-pandemic and pandemic-affected periods.

Our findings reveal a significant shift: the total number of melanomas diagnosed in 2023 increased markedly compared to 2019 (552 *vs.* 358), effectively "recovering" the cases that went undiagnosed in 2020-21 (Table 1). The proportion of *in situ* melanomas also rose steadily in 2022 and 2023, increasing from 1/4 to 1/3 of all diagnoses. Meanwhile, prognostically unfavorable features, such as ulceration and nodularity, declined markedly during this period. Specifically, the proportion of ulcerated melanomas decreased from 12.1% in 2019 to 7.5% in 2023 (peaking at 27.0% in the immediate post-lockdown period), while nodular melanomas declined from 12.5% to 6.3% over the same timeframe (down from 17.6% post-lockdown).

Interestingly, very thin melanomas were diagnosed during the lockdown period (Table 2). This may be explained by the fact that only highly motivated and health-conscious individuals sought medical attention at the time, given the widespread suspension of routine screenings. Another possible reason is the steady continuation of follow-up care for patients with previously diagnosed melanoma, as suggested by Caini *et al.*[7] In contrast, by 2023, the diagnostic delay appears to have been fully resolved, with Breslow thickness not only returning to pre-pandemic levels but even improving compared to 2019. While our data provide valuable insights into the impact of COVID-19 on melanoma diagnosis, further large-scale studies are needed to assess whether these trends are consistent across different populations and healthcare settings.

Our results suggest that the backlog of delayed melanoma diagnoses accumulated between 2020 and 2023 has now been addressed. However, this period of diagnostic delay may have had broader consequences in terms of patient outcomes, economic burden, and strain on the healthcare system.

Our findings underscore the importance of maintaining standard levels of diagnostic activity even during major public health crises. The COVID-19 pandemic highlighted significant vulnerabilities in healthcare systems worldwide, emphasizing the need for contingency plans to ensure the continuity of essential medical services, including cancer screenings. Furthermore, our study reinforces the long-term value of sustained public education on melanoma awareness and early detection.

In conclusion, the COVID-19 pandemic caused a substantial disruption in melanoma diagnoses, with an increased Breslow thickness and more aggressive tumor features observed over the three years following the lockdown. However, by 2023, these diagnostic delays had been fully resolved, with melanoma thickness reverting to or improving upon pre-pandemic levels. Moving forward, it is critical to integrate the lessons learned from this period into healthcare policy, ensuring that vital diagnostic services remain accessible even in the face of global emergencies.

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Figure 1. Cumulative number of malignant melanoma diagnoses in the first 23 weeks (January 1 to June 6) of 2019-2023 at IDI-IRCCS, Rome, Italy.

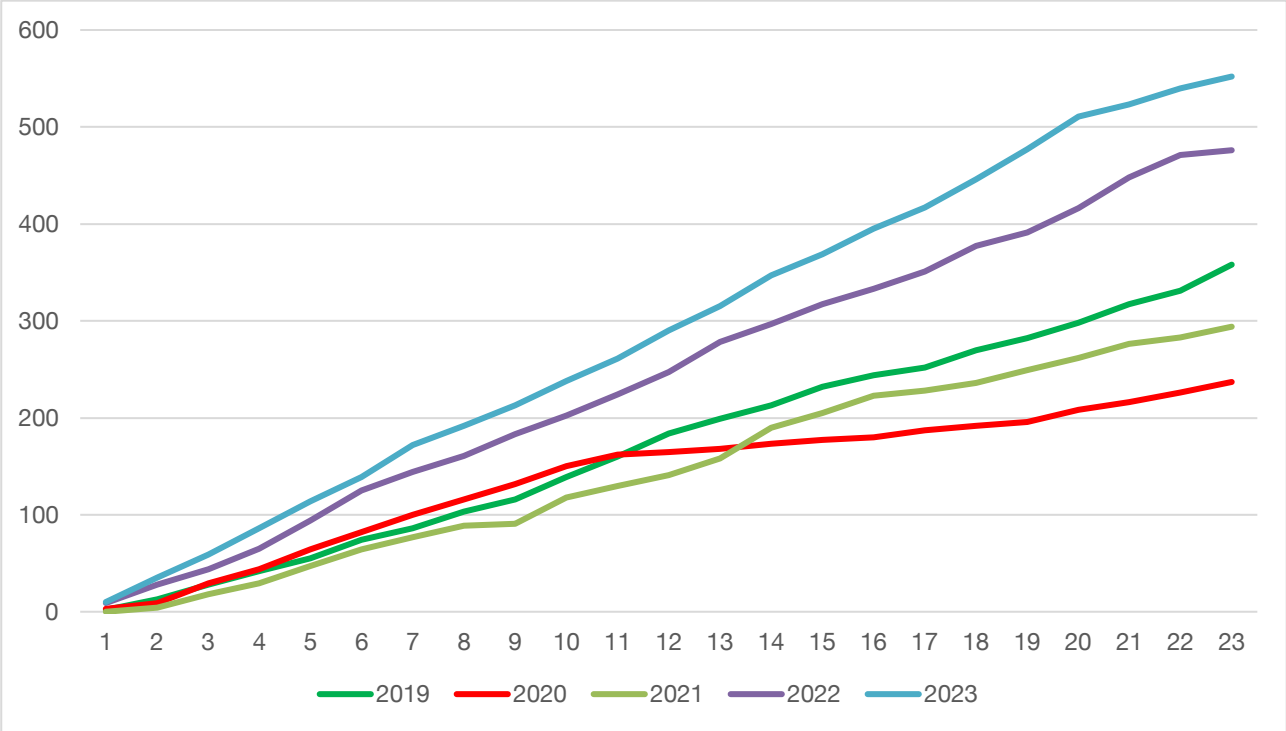

Table 1. Number of newly diagnosed melanomas and proportions of different histological characteristics across the three phases of the COVID-19 epidemic at IDI-IRCCS, Rome, Italy, from January 1 to June 6, 2020 (23 weeks), and in the same period in the years 2019-2023.

Year	**Melanomas**	***In situ***	**Nodular**	**Ulcerated**	**Superficial spreading with nodule**
	N	N (%)	N (%)*	N (%)*	N (%)*
2019	358	101 (28.2)	32 (12.5)	31 (12.1)	8 (3.1)
2020 pre-lockdown	158	39 (24.7)	5 (4.2)	7 (5.9)	6 (5.0)
2020 lockdown	34	10 (29.4)	2 (8.3)	2 (8.3)	0 (0)
2020 post-lockdown	**45**	**11 (24.4)**	**6 (17.6)**	**8 (23.5)**	**5 (14.7)**
2021	294	82 (27.9)	29 (13.7)	22 (10.4)	21 (10.0)
2022	476	162 (34.0)	44 (14.0)	34 (10.9)	28 (8.9)
2023	552	188 (34.1)	23 (6.3)	27 (7.5)	22 (6.0)

*The denominator of these percentages does not include *in situ* melanomas

Table 2. Breslow thickness of newly diagnosed melanomas in the three COVID-19 epidemic phases at IDI-IRCCS, Rome, Italy, from January 1 to June 6, 2020. Overall estimates, stratified by sex and age group.

Year	**Thickness (mm)**	**By sex**		**by age group (years)**		
	Overall	Females	Males	<50	50-64	65+
2019	1.17	1.10	1.23	0.86	0.87	1.58
2020 pre-lockdown	0.88	0.79	0.96	0.66	0.89	1.06
2020 lockdown	0.66	0.66	0.66	0.40	0.38	1.33
2020 post-lockdown	**1.96**	**1.44**	**2.70**	**1.39**	**1.82**	**2.93**
2021	1.40	1.16	1.62	0.80	1.09	2.04
2022	1.47	1.53	1.43	0.84	0.99	2.28
2023	0.87	0.91	0.82	0.62	0.66	1.21