



# Impact of the COVID-19 virus pandemic on hospitalizations for skin cancer treatment in Brazil

## *Impacto da pandemia do vírus COVID-19 nas internações para tratamento de câncer de pele no Brasil*

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### ■ ABSTRACT

**Introduction:** COVID-19 virus infection was a severe health impact in 2020. The direct repercussion is easily measured through its morbidity and mortality rates. Its indirect repercussion on health is still little measured, and this is the objective of this study. **Methods:** To determine the number of hospitalizations for general treatments, for the treatment of neoplasms and malignant skin cancer in the SUS, from 2008 to 2020, in the department of informatics of the SUS.

**Results:** The parallelism of the data referring to the three groups selected above allowed to observe a drastic reduction in the number of hospitalizations in the SUS between the same months of 2019 and 2020: a decrease of 10.60% in general hospitalizations, 58.65% in hospitalizations for neoplasia and 156% in hospitalizations for malignant skin cancer. The reduction gradually worsened in 2020 from January. In June 2020, the number of hospitalizations for skin cancer treatment reflected values from 12 years ago. **Conclusion:** The follow-up of the historical series of hospitalizations in the SUS provides a tangible value that serves as a basis for understanding the direction of health measures. The indirect implications of COVID-19 may have an outcome as tragic as its mortality, as they impact specialized health services availability. Services of great specialization such as hospital cancer treatment attend complex cases, and their unavailability may reflect an increase in mortality from these causes - an indirect impact of COVID-19.

**Keywords:** Coronavirus infections; Skin neoplasms; Melanoma; Basal cell carcinoma; Neoplasms.

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## ■ RESUMO

**Introdução:** A infecção pelo vírus COVID-19 é um impacto severo à saúde no ano de 2020. A repercussão direta é facilmente mensurada através de suas taxas de morbidade e mortalidade. Sua repercussão indireta na saúde ainda é pouco mensurada e este é o objetivo deste estudo. **Métodos:** Determinar os números de internações para tratamentos gerais, para tratamento de neoplasias e para câncer de pele malignos no SUS, de 2008 a 2020, no departamento de informática do SUS. **Resultados:** O paralelismo dos dados referentes aos três grupos acima selecionados permitiu observar uma redução drástica no número de internações no SUS entre os mesmos meses de 2019 e 2020: queda de 10,60% nas internações gerais, 58,65% nas internações por neoplasia e 156% nas internações por câncer de pele maligno. A redução agravou-se gradativamente no ano de 2020 a partir do mês de janeiro. No mês de junho de 2020, os números de internações para tratamento de câncer de pele refletem valores de 12 anos atrás. **Conclusão:** O acompanhamento da série histórica de internações no SUS fornece um valor palpável que serve como base para se compreender o direcionamento das medidas de saúde. As implicações indiretas da COVID-19 podem ter um desfecho tão trágico quanto a sua mortalidade, pois repercutem na disponibilidade de serviços de saúde especializados. Serviços de grande especialização como o tratamento de câncer em caráter hospitalar atendem casos complexos e sua indisponibilidade pode refletir em aumento de mortalidade por estas causas - um impacto indireto da COVID-19.

**Descritores:** Infecções por coronavírus; Neoplasias cutâneas; Melanoma; Carcinoma basocelular; Neoplasias.

## INTRODUCTION

Skin neoplasms are a broad group of diseases, and malignant neoplasms receive greater clinical emphasis due to their epidemiology and outcomes that are largely preventable with early treatment. Skin cancers are the most common neoplasms globally, with an estimated 2 to 3 million incidences in the non-melanoma type and 132,000 in melanoma per year<sup>1</sup>. It is estimated that 1 in 3 diagnosed cancers occurs on the skin<sup>1</sup>.

Brazil mirrors global epidemiology and has an estimated annual incidence of 185,380 cases by 2020, with 4,120 deaths in 2018. In this scenario, skin cancer is the neoplasm with the highest annual incidence<sup>2,3</sup>.

Neoplasms are the second leading cause of mortality in Brazil, but most skin cancers have a good prognosis when diagnosed and treated early<sup>2</sup>. This is why maintaining and improving cancer approach programs is important.

The year 2020 is being marked by the fatalities and changes required to cope with the COVID-19 virus. Therefore, this study's importance is justified since it is necessary that, given the impact on skin

neoplasms' treatment due to the influence of the COVID-19 pandemic, it is important to look for means that minimize its consequences.

## OBJECTIVES

This work aims to measure the evolution of hospitalizations in general for neoplasms and skin cancer in the period 2008-2020 and, from these data, quantify the impact on the number of hospitalizations for skin cancer treatment.

## METHODS

An epidemiological study was conducted in the DATASUS database (TABNET) covering Brazilian municipalities from January 2008 to June 2020 regarding hospital admissions, elective and urgent hospitalizations, for the treatment of chapters ICD-10, "malignant neoplasm of the skin," and "other malignant neoplasms of the skin"<sup>4</sup>.

This was followed by normative resolution number 510 of April 7, 2016, of the Ministry of Health, which defines the researches that use public access

information, made in databases, whose information is aggregated, without the possibility of individual identification and do not need to go through the research ethics committee (CEP)<sup>5</sup>.

The information system of the Ministry of Health has already published data for the first six months of 2020 and, for this reason, was the period of choice determined to create parallelism with previous years regarding the number of hospitalizations in the chosen groups, the character of hospitalization (elective x urgency) and percentage evolutions. These data were analyzed by the authors of this study in meetings at Santa Casa de Montes Claros.

### RESULTS

The hospitalizations performed in the Unified Health System, between January and June 2008 and 2020, were tabled and analyzed, resulting in figures 1A, 1B and 1C and Table 1. There was an increase in the total number of hospitalizations for all causes from 2008-2019: the total number of hospitalizations increased 10.60%, the number of hospitalizations for neoplasms increased 58.65%, and the total number of hospitalizations for skin cancer increased by 156.24%.

The first six months of 2020 showed a numerical reduction in hospitalizations in the three groups compared to the same months of 2019: general

hospitalizations reduced by 26.69%, hospitalizations for all neoplasms reduced by 26.12%, while malignant skin neoplasms reduced by 33.03%.

The percentage changes over the previous year, in the first six months of each year, 2008-2020, are recorded in figure 2.

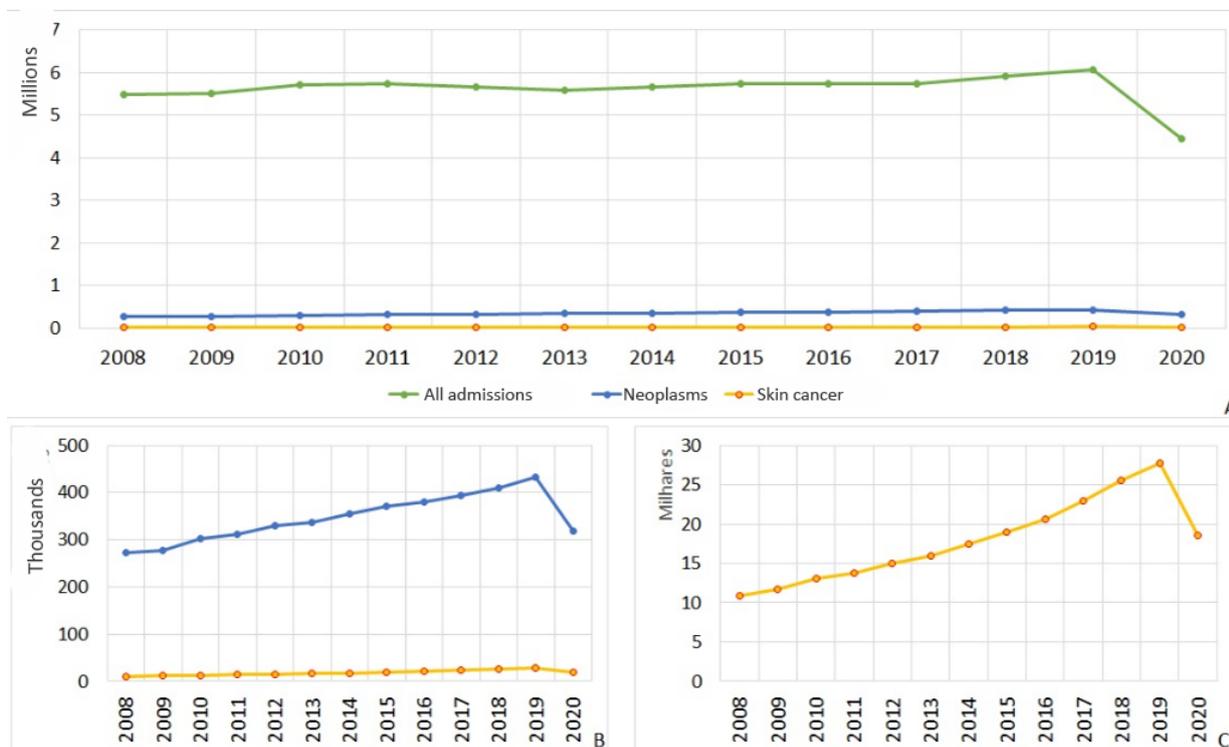
The number of hospitalizations for skin cancer studied in the first six months of the period is shown in Figure 3 and Table 2.

Figure 4 shows the evolution of elective and urgent hospitalizations for skin cancer treatment from January to June 2008 to 2020.

### DISCUSSION

The direct and indirect impact of COVID-19 infection is not yet fully known. The possible theorized indirect results are reduced hospitalizations to other diseases due to the scarcity of SUS resources or its contingency. Another French study, still in progress, confirms in its preliminary reports a similar trend, with a drastic reduction in terms of screening (-86%), diagnosis (-39%) treatment (-30%) when compared to the same period of 2019<sup>6</sup>.

The analysis of figures 1 and 2 and table 1 revealed that there was an increase in hospitalizations in the three groups from 2008 to 2019: general hospitalizations increased by 582,326 (10.60%), hospitalizations for



**Figure 1.** Annual evolution of hospitalizations in Brazil from January to June 2008 to 2020. A. Evidences the evolution of hospitalizations for all causes, neoplasms and skin cancer in the SUS, in the first 6 months of each year, in millions; B and C. Are specific of neoplasms skin cancers, respectively, in the first 6 months of each year, in thousands.

**Table 1.** Number of general hospitalizations, neoplasms and skin cancer in Brazil in the first six months (2008-2020).

Year	All admissions	Neoplasms	Skin cancer
2008	5.495.649	272.415	10.820
2009	5.518.042	278.240	11.639
2010	5.717.400	302.015	13.095
2011	5.730.321	310.662	13.702
2012	5.666.376	330.234	14.947
2013	5.596.107	335.941	16.000
2014	5.654.255	354.641	17.426
2015	5.747.574	371.718	18.954
2016	5.746.614	380.344	20.680
2017	5.747.733	393.835	22.933
2018	5.921.025	411.028	25.592
2019	6.077.975	432.190	27.725
2020	4.455.777	319.297	18.567

cancer in general increased by 159,775 (58.65%), and hospitalizations for skin cancer increased by 16,905 (156.24%).

The comparison of the first six months of 2019 and 2020 revealed a reduction in the total and the proportional number of hospitalizations: general hospitalizations decreased by 1,622,198 (26.69%), cancer

in general in 112,893 (26.12%) and skin cancer in 9,158 (33.03%).

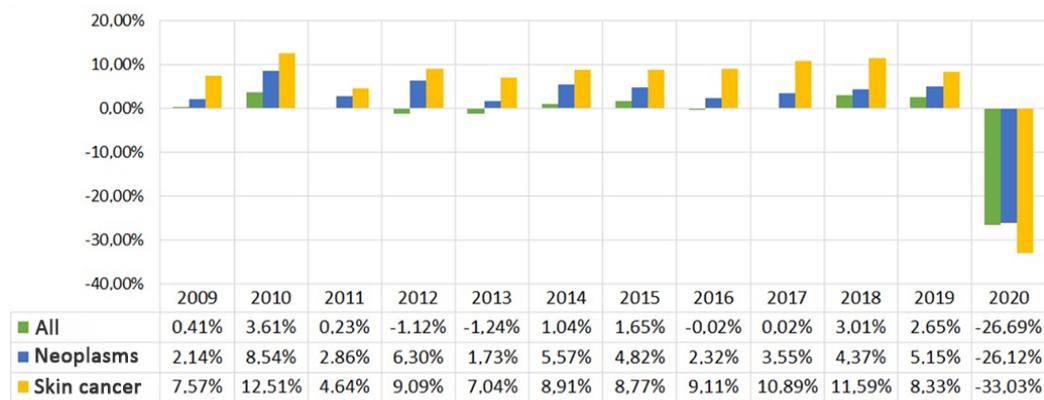
The drop in the number of hospitalizations shows how skin cancer treatment may have been affected, similar to what occurred in England, where there was a statistically significant reduction in skin cancer diagnoses of 68.61%<sup>7</sup>.

Monthly hospitalizations for skin cancer in 2020 gradually reduced. January 2020 still increased compared to 2019, while February, March, April, May and June 2020 were equivalent to the number of hospitalizations with the same months of 2019, 2016, 2010 and before 2008. The impact of this change is best understood in Figure 5.

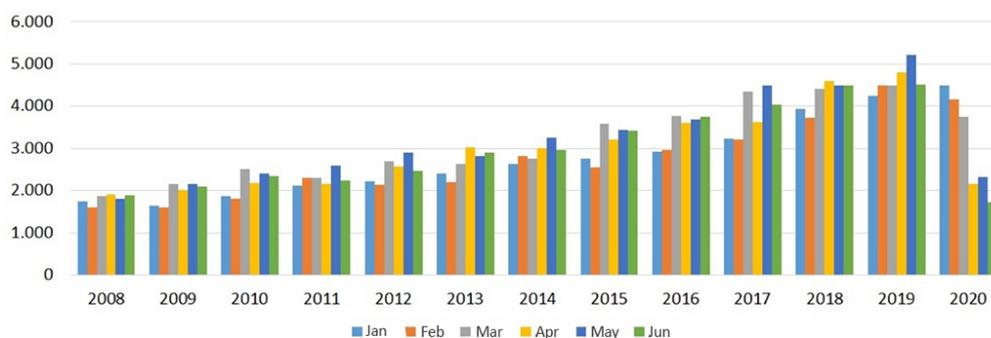
In line with other international projections, this trend in reducing the number of cases treated may lead to a late diagnosis, with a worse prognosis in this cancers<sup>8</sup>.

Figure 4 shows that the rates of elective and urgent surgeries maintained their general downward trend from 2008 (40% of urgent surgeries) until 2020 (19.88%), with small variances, which shows no change to urgency in elective cases.

Given the absence of adequate diagnosis and treatment, there can be a considerable increase in severity cases, according to studies by Tejera-Vaquero et al. (2020)<sup>9</sup>, which estimated increased size and depth



**Figure 2.** Percentage change in hospitalizations in Brazil from January to June 2008 to 2020.



**Figure 3.** Number of hospitalizations for skin cancer treatment in the first six months of each year, from 2008 to 2020, in Brazil.

**Table 2.** Hospitalizations for skin cancer treatment in Brazil in the first six months (2008-2020).

Year	January	February	March	April	May	June
2008	1.750	1.591	1.867	1.917	1.800	1.895
2009	1.638	1.591	2.155	2.017	2.149	2.089
2010	1.877	1.798	2.510	2.177	2.395	2.338
2011	2.119	2.294	2.310	2.165	2.581	2.233
2012	2.222	2.128	2.690	2.561	2.889	2.457
2013	2.409	2.200	2.640	3.027	2.821	2.903
2014	2.627	2.821	2.760	3.003	3.257	2.958
2015	2.764	2.551	3.588	3.199	3.442	3.410
2016	2.918	2.970	3.774	3.593	3.683	3.742
2017	3.234	3.214	4.336	3.619	4.490	4.040
2018	3.923	3.714	4.412	4.585	4.478	4.480
2019	4.235	4.492	4.491	4.800	5.205	4.502
2020	4.482	4.150	3.738	2.156	2.328	1.713

Source: DATASUS, 2020<sup>1</sup>.

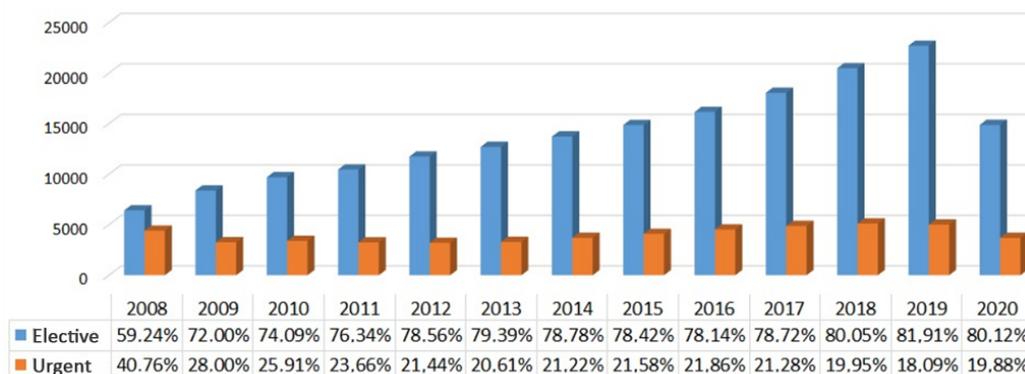
of squamous cell carcinoma and melanomas in Spain during the pandemic. It was noticed in this study when there is a delay of 3 months in the diagnosis the projection and reduction of the survival in 5 years of 5.2% for squamous cell carcinoma (SCC) and up to 30.2% months for the melanoma.

### CONCLUSION

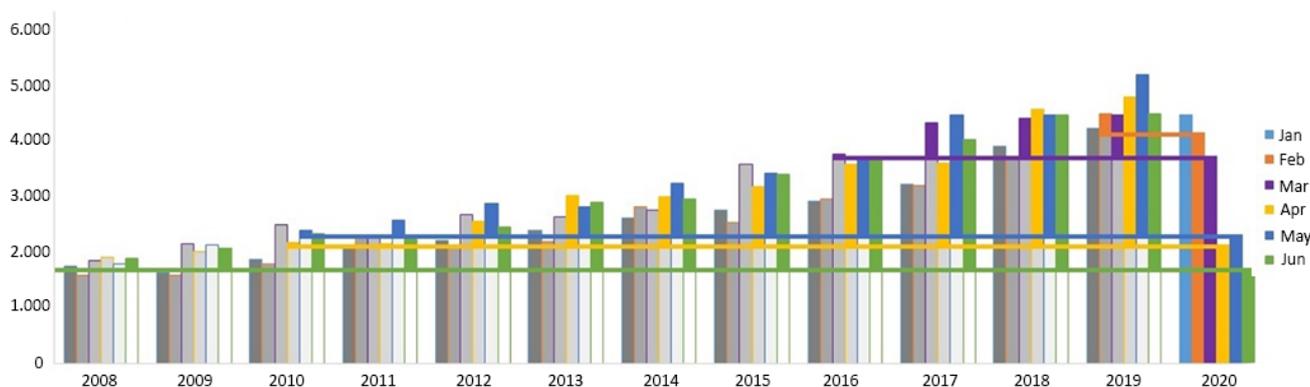
This study shows that SUS resources' contingency led to a reduction in the total number of hospitalizations, returning to lower monthly levels than 12 years ago. This isolated data is an important indication of the indirect impact of the COVID-19 pandemic, as it represents real, measurable and up-to-date data on the change of approaches to other pathologies in this particular period.

Due to the delay in the various stages of approach to skin cancers, efforts should be made to minimize the pandemic's impact. In this context, we can highlight the standardization of conducts, according to guidelines developed by institutions, such as the National Comprehensive Cancer Network<sup>10</sup>. Besides, it is necessary to facilitate the patient's access to the health system, and telemedicine, cited in several sources as a facilitator of the follow-up of these cases, is necessary<sup>7,11,12</sup>.

In the specific case of skin cancer requiring reconstruction in a hospital environment (and not just outpatient), these are patients with complex lesions. A few months may undoubtedly represent the difference between curative surgery or just



**Figure 4.** Numerical evolution of elective and urgent hospitalizations for skin cancer treatment from January to June 2008 to 2020.



**Figure 5.** Monthly variation of hospitalizations for skin cancer in the first six months, from 2008 to 2020, in Brazil.

oncological (palliative) hygiene. Due to acute and chronic diseases, the mortality curves presented in the coming years will attest to the meaning of this fall in hospitalizations.

### COLLABORATIONS

<b>IFV</b>	Analysis and/or data interpretation, Data Curation, Formal Analysis, Investigation, Project Administration, Writing - Original Draft Preparation, Writing - Review & Editing
<b>TRWC</b>	Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Formal Analysis, Investigation, Methodology, Project Administration, Resources, Supervision, Validation, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing
<b>LRS</b>	Analysis and/or data interpretation, Conceptualization, Final manuscript approval, Formal Analysis, Writing - Review & Editing
<b>LAT</b>	Conceptualization, Data Curation, Final manuscript approval, Formal Analysis, Writing - Original Draft Preparation, Writing - Review & Editing
<b>OJDM</b>	Analysis and/or data interpretation, Conceptualization, Final manuscript approval, Writing - Original Draft Preparation, Writing - Review & Editing
<b>DFS</b>	Data Curation, Formal Analysis
<b>DSR</b>	Data Curation, Formal Analysis, Resources, Writing - Review & Editing
<b>PCA</b>	Data Curation, Formal Analysis, Methodology

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