



## Behavior of the Incidence of COVID-19 and Vaccination against SARS-CoV-2 in Colombia

By Jorge Enrique Díaz-Pinzón

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**Objective:** To show the behavior of the incidence of COVID-19 and vaccination against SARS-CoV-2, between the period between February 17 and September 30, 2021.

**Methodology:** This research was carried out under a cross-sectional study, as a source of information, it was obtained from the national vaccination plan against COVID-19 from the website of the Ministry of Health and Social Protection.

**Results:** An increase in incidence was evidenced over time, the number of vaccines also increased, until June 2021. From July 2021 to September 2021, there was a decrease in the incidence of SARS-CoV-2, as well as the decrease in the application of the number of vaccines.

**Conclusion:** There is a demand for more studies predestined to evaluate the efficacy of vaccination in reducing the transmission of SARS-CoV-2 in Colombia, both at the individual level and at the population level, with a greater longitudinal tracing and in additional populations.

**Keywords:** incidence, COVID-19, SARS-CoV-2, pandemic, vaccines.

**GJMR-F Classification:** NLMC Code: WA 115



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## I. INTRODUCTION

SARS (severe acute respiratory syndrome) is the severe stage of COVID-19 caused by massive alveolar damage and progressive respiratory failure; caused by SARS-CoV-2 (SARS coronavirus 2)<sup>1</sup>.

SARS-CoV-2 belongs to the family Coronaviridae, subfamily Orthocoronaviridae. It is a single-stranded RNA virus, whose genome is around 27-32 kb, which encodes non-structural proteins, such as proteases, helicases, and RNA polymerases: and structural proteins<sup>2,3</sup>

COVID-19 can be divided into three phases: asymptomatic with or without detectable virus; non-severe symptomatic with the presence of virus and severe respiratory symptomatic with high viral load<sup>4</sup>. An unresolved question is why some develop serious illness and others do not. Aspects based on the immune response are not enough to explain it, but they will help to understand the behavior of this new pathogen<sup>5</sup>.

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The rapid obligation of vaccines against COVID-19 has forced the use of proteomics to search for exclusive antigens of the pathogen in protein S. Thanks to bioinformatics, 933 pentapeptides absent in the human proteome have been recognized, of which 107 peptides are located around protein S and of these 66 peptides are more immunogenic and can be used in the production of a vaccine<sup>6</sup>. The WHO has up to 52 alternative vaccine candidates between platforms based on proteins, RNA, DNA, non-vectors. replicants, replicating vectors, inactivated viruses, attenuated viruses, and virus-like particles. Of all these vaccine inserts, only vaccines made up of RNA and non-replicating vector have initiated safety studies in humans<sup>7,8</sup>.

To achieve a continued reduction in infection cases<sup>9</sup> multiple countermeasures are needed, including distancing, testing, and tracing, especially considering the recent emergence of new variants of SARS-CoV-2<sup>10</sup>, such as B.1.1.7 and B.1.351, which are reported to have higher transmissibility<sup>11,12</sup> and are likely to cause more severe disease<sup>13</sup> compared to the parent strain. Vaccination alone is not expected to counteract the spread of infection, and a carefully planned vaccination campaign needs to be regulated<sup>14,15</sup>

The objective of this research is to show the behavior of the incidence of COVID-19 and vaccination against SARS-COV-2, between the period between February 17 to September 30, 2021.

## II. METHODOLOGY

This research was carried out under a cross-sectional study<sup>16-18</sup>, the information was obtained from the website of the Ministry of Health and Social Protection<sup>19</sup> of the daily reports of contagion by COVID-19, between the period between January 1, 2021, and September 30, 2021, to calculate the incidence, and from February 17 to September 30, 2021, for vaccination.

## III. RESULTS

Table 1 shows the months between January and September 2021, the new cases of infection by SARS-CoV-2, the vaccines, and the population in Colombia. With the information in columns 2 and 3, the incidence rate was calculated in percentage terms for COVID-19.

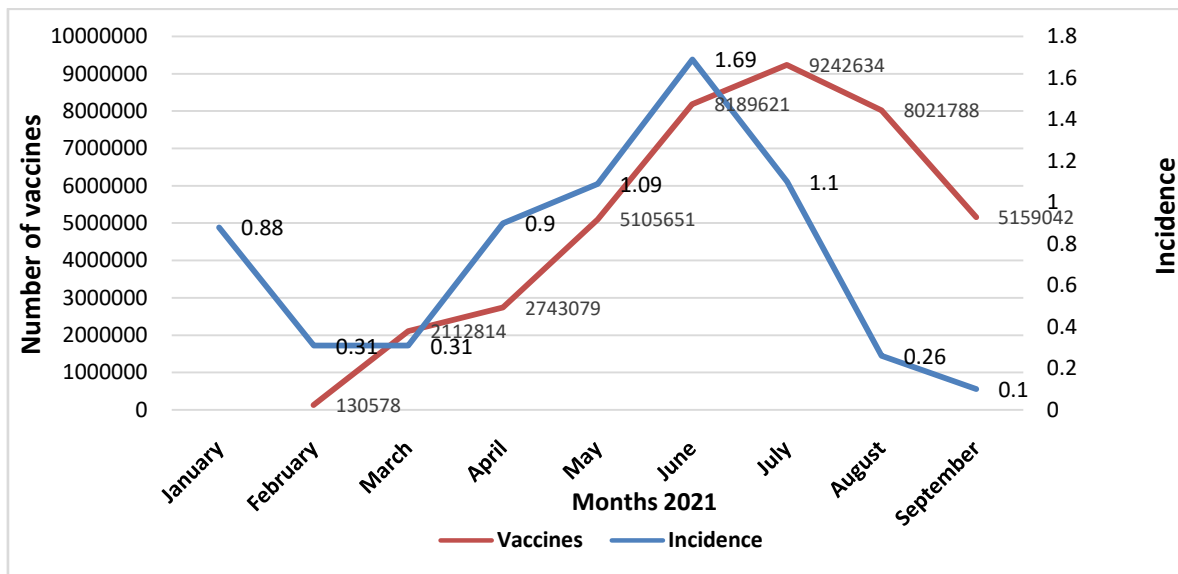
Table 1: Incidence and Vaccination against SARS-CoV-2

Months	New cases	Population	Incidence	Vaccines
January	451609	51049498	0,88	
February	156856	50597889	0,31	130578
March	154687	50441033	0,31	2112814
April	453347	50286346	0,9	2743079
May	543805	49832999	1,09	5105651
June	834526	49289194	1,69	8189621
July	533290	48454668	1,1	9242634
August	123766	47921378	0,26	8021788
September	48191	47797612	0,10	5159042

Source: the autor

Figure 1 shows the incidence by months for SARS-CoV-2, between the months of January to September 2021 and the vaccination against COVID-19, between the months of February to September 2021. It describes a similarity in the trend of the incidence lines (blue), and vaccination (orange), that is, while the

incidence increases over time, the number of vaccines also increases, this trend is maintained until June. From the month of July to September there is a decrease in the incidence of SARS-CoV-2, as well as the decrease in the application of the number of vaccines.



Source: the autor

Figure 1: Vaccination and incidence.

#### IV. CONCLUSIONS

From the data analyzed, it is concluded that the incidence of COVID-19 is related to vaccination until June 2021 against SARS-COV-2, that is, as vaccination values increase, Incidence cases due to COVID-19 also increase and a contrary situation from July to September, that is, as vaccination values decrease, incidence cases due to COVID-19 also decrease.

There is a demand for more studies predestined to evaluate the efficacy of vaccination in reducing the transmission of SARS-CoV-2 in Colombia, both at the

individual level and at the population level, with greater longitudinal screening and in additional populations<sup>20</sup>.

Monitoring the results of vaccinations is essential to understand efficacy, possible decline in immune response over time, and possible adverse effects. Monitoring the effects of these vaccines is possible and much needed. The publication of these data, duly verified, is a priority. For this, it would be very important to follow the vaccinated and check if they suffer from COVID-19 infections, and sequence where appropriate.

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