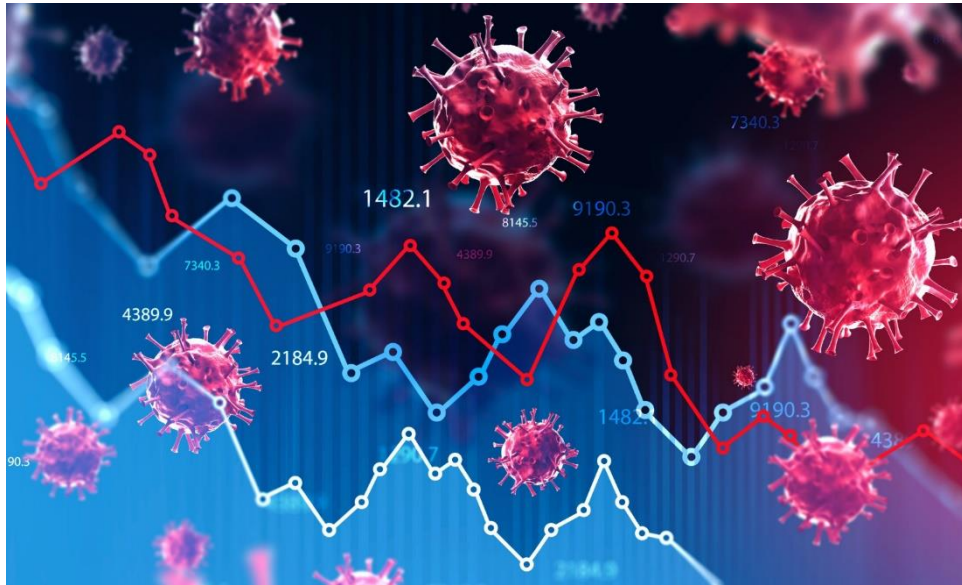# Covid-19 Report

By Yvonne Mwangi, Adaora Uzochukwu, Ashel Munemo and Kaviya Balasubramaniam

Introduction:

This report delves into trends observed through meticulous analysis of data concerning confirmed cases, deaths, and recoveries attributed to COVID-19. Collected daily from diverse locations across the globe, this data provides valuable insight into the pandemics evolution and its multifaceted repercussions on the global health systems and societies. By elucidating these trends, this report aims to scrutinize the trajectory of confirmed cases, mortality rates, recovery rates and regional disparities. In particular, the report will focus on:

- Discussing the patterns in the UK and the US from 01 January 2023 to 31 January 2023 an comparing them.
- Exploring the patterns of Mainland China during the early of the pandemic, from 22 January 2020 to 1 March 2020.
- The UK for the following dates: 1-31 January 2023, 1-31 January 2022, 1-31 January 2021, and discuss the difference between those dates whilst also exploring the potential reasons behind any differences, such as different social rules and different variants (alpha, delta, omicron)
- Discussing the seasonal patterns in Finland during the winter and summer.

The data for this report was sourced from Novel Coronavirus COVID-19 (2019-nCoV) Data Repository by John Hopkins CSSE. The python code that generated the graphs seen in this report can be found at: https://github.com/ashelm/COVID19/tree/main/Analysis%20Code

**Daily COVID-19 Data for the UK and the US (01 Jan 2023 - 31 Jan 2023)**

In January 2023, both the UK and the US reported an increase in confirmed and death cases. The recorded number of recovered cases remained constant at 0, as they were not documented.

In the US, both confirmed and death cases showed varying increases with fluctuations, possibly influenced by the emergence of new variants and the availability of vaccines. Similarly, the UK experienced an increase, but with a different trend and variation.

While confirmed cases in the UK showed a steady upward trend, with occasional dips suggesting days with few or no reported cases, death cases exhibited a consistent rise. These fluctuations reflect the complex dynamics of the COVID-19 pandemic and underscore the importance of ongoing surveillance and public health measures.
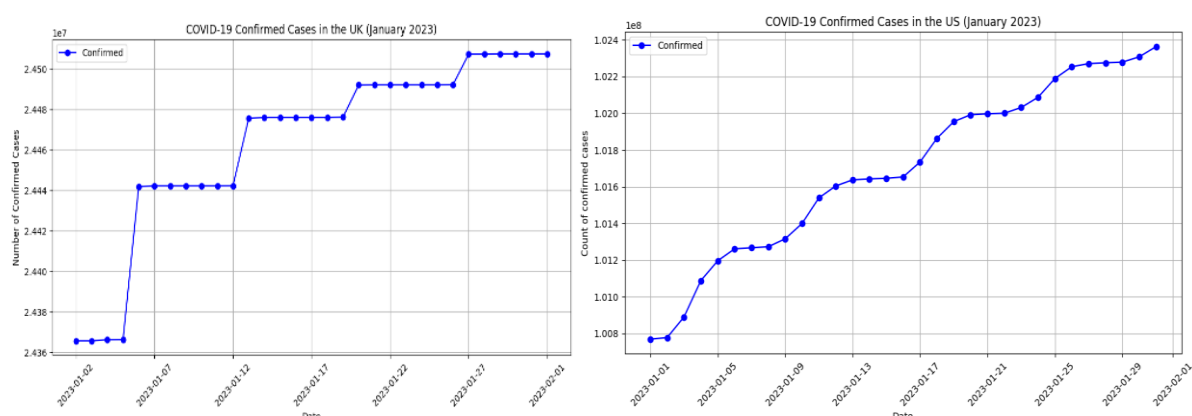
(Figure 1&2 above shows graphs of recorded confirmed cases in the UK and US in January 2023 respectively)
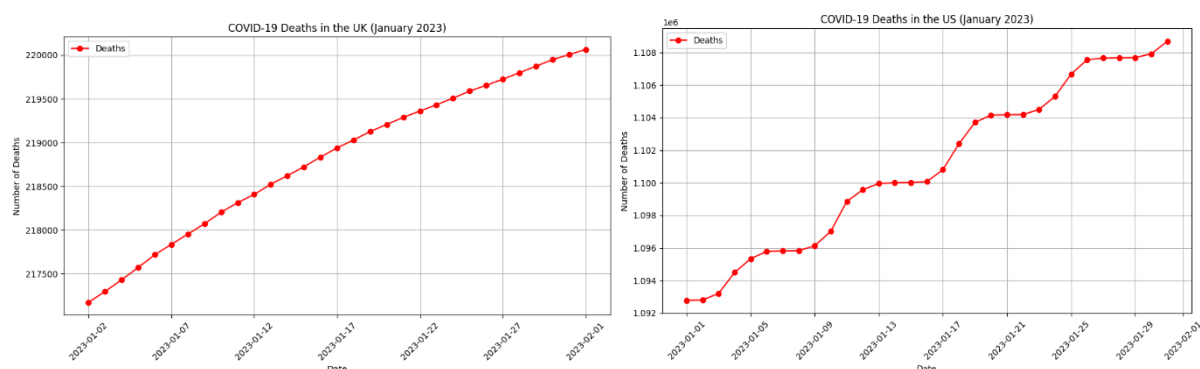

(Figure 3&4 above shows graphs of recorded death cases in the UK and US in January 2023 respectively)

Mainland China's Early Pandemic Data (22 Jan 2020 - 01 Mar 2020)

In late January 2020, Mainland China experienced a sharp increase in the number of confirmed cases as the virus spread rapidly within the country. Alongside the rise in

confirmed cases, there was a steady increase in the number of deaths in Mainland China during this period. Despite the increase in the number of confirmed cases, there was a gradual increase in the number of recovered cases. Eventually, the number of recovered cases surpassed the number of death cases in Mainland China.

The figures below represent the number of confirmed cases, death cases, and recovery cases in Mainland China.
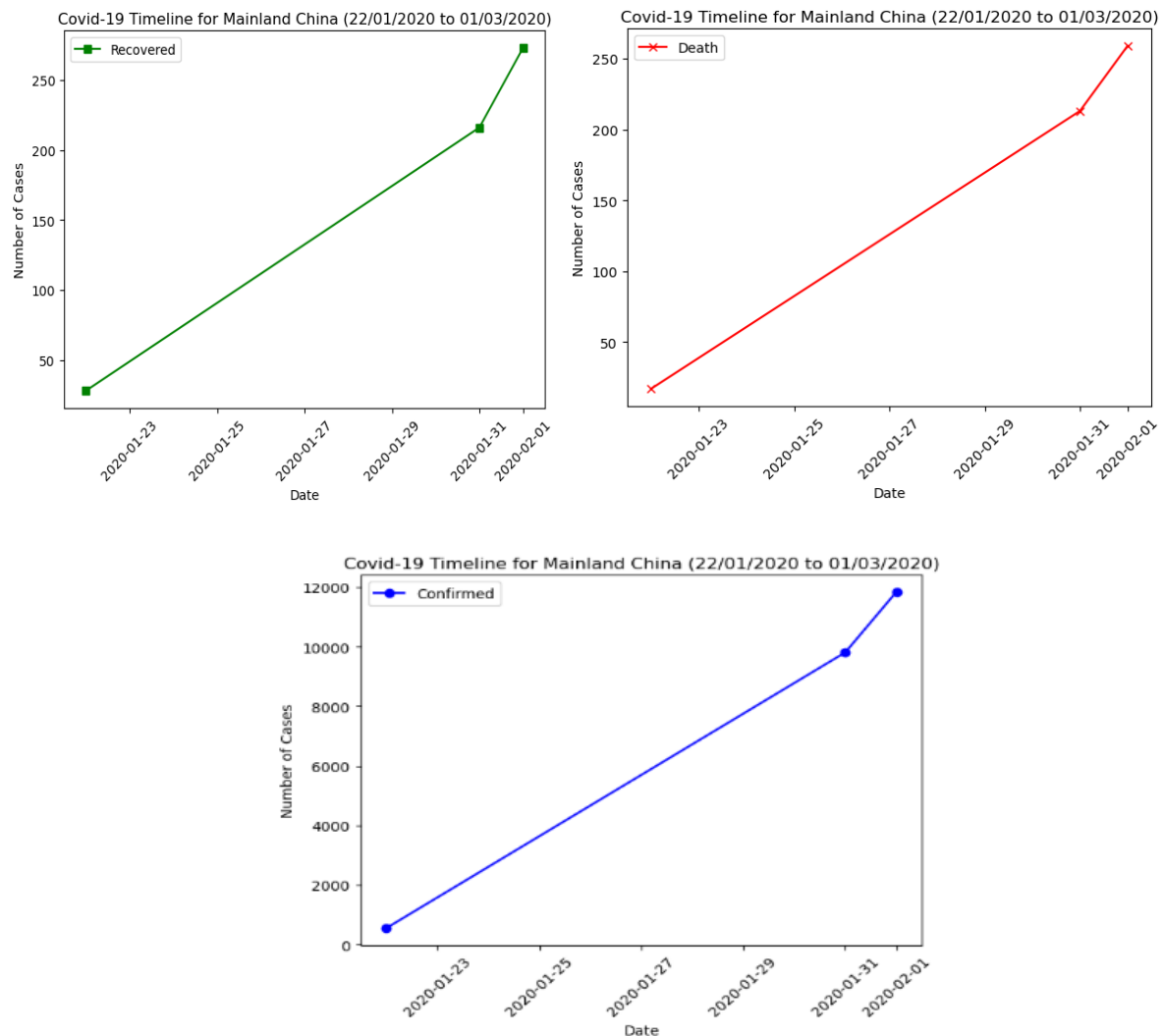

**Comparative Analysis of UK's Monthly Data (01-31 Jan for 2023, 2022, 2021)**

In this section, we look at the direction COVID-19 took by looking at the number of confirmed cases, deaths, and recoveries in the month of January 2021-2023. We will analyse this data and discuss what may have caused the difference in trends over the years.

To the right of this paragraph are 3 graphs showing the number of confirmed cases that occurred during the month of January for the respective years. The first of these graphs allows us to see that nearly 1.3 Million cases were recorded over the month of 2021. In 2022 there were a total of around 4.3 million cases recorded which is 3 million more than the previous year. However, in 2023 there were significantly fewer confirmed cases as seen in the third graph where only 140,000 cases were positive.

For the first 2 years that we studied, it is evident that there were more cases at the start of the month than at the end, as shown by the graphs as the gradient at the start is larger in the beginning compared to the end. This spike was caused as it was right after the holiday period when gatherings occurred, and people were able to meet each other which increased the spread of COVID-19. Furthermore, the return of going back to workplaces and schools vectored the surge of the spread of the virus as circles mixed more. 2022 has a larger infection rate compared to 2021 as in 2021 there were tier systems and lockdowns put in place to reduce the spread but in 2022 the restrictions were much more lenient. The drop in 2023 cases suggests that there is less reinfection, and more people are becoming immune or testing less as their body reacts better to the infection.


The mutations of the virus could also be a reason for the increase in cases. In particular, at the end of 2020, we had the emergence of the first mutation of the virus, the alpha variant, which became a dominant strain in the country and led to increased transmission rates and stricter rules in place to help counteract the spread. This is shown through the high rates of confirmed cases in early 2021. Similarly, at the end of 2021, the omicron variant appeared which rapid spread throughout the country hence the 4 million cases in the January following.

COVID-19 Confirmed Deaths in the UK (Jan 1, 2023 - Jan 31, 2023)
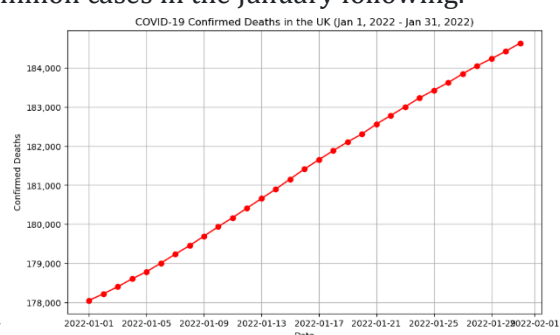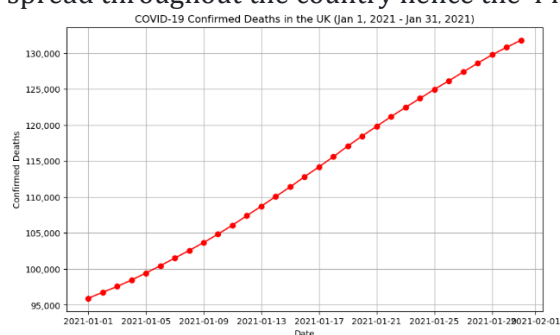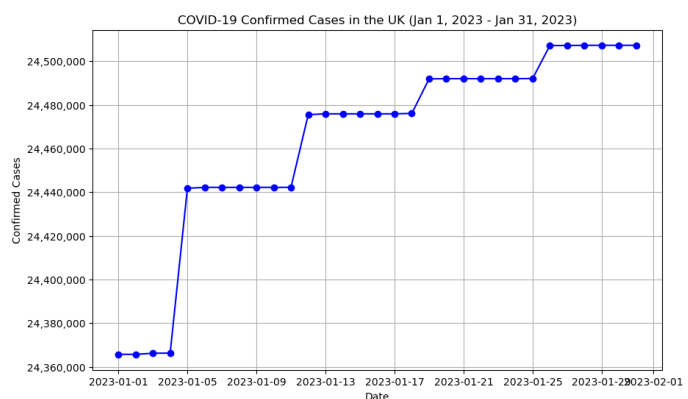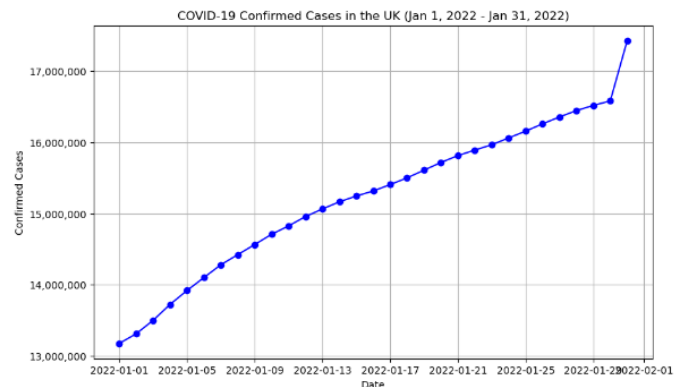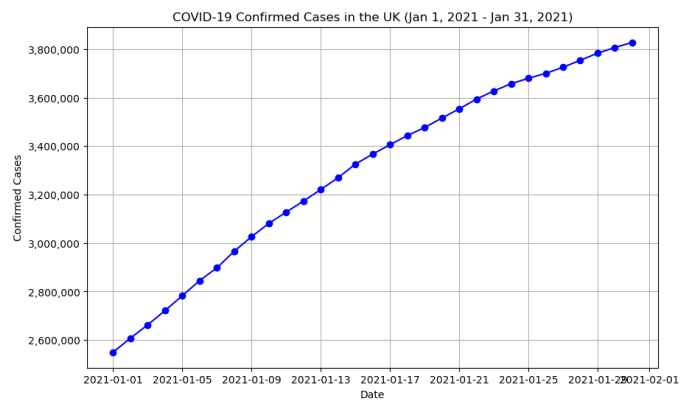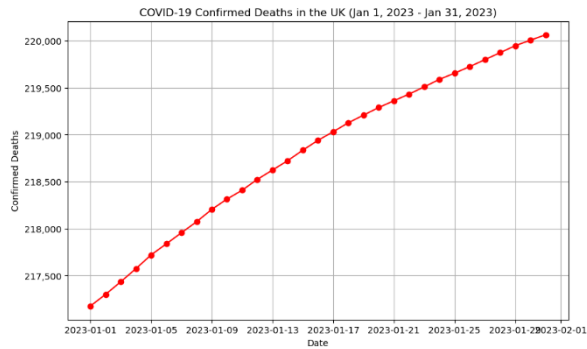
The figures above show the number of deaths that were caused as a result of COVID-19. The first of these figures is 2021 when there were almost 40,000 deaths caused within the space of the month. However, the other 2 years, 2022 and 2023 have a fraction of the number of people, around 6,500 people and 3,500, who have passed. This decrease in deaths was mainly due to the successful vaccination program that the country rolled out. This is proven because increased vaccination rates have led to a greater level of immunity which helped reduce the spread of the virus and the effects of the illness. Furthermore, hospitals and healthcare services were able to adapt and improve their capacity and also had better treatment plans with increased access to ventilators. This ultimately helped bring down the death rate.

COVID-19 Recoveries in the UK (Jan 1, 2021 - Jan 31, 2021)
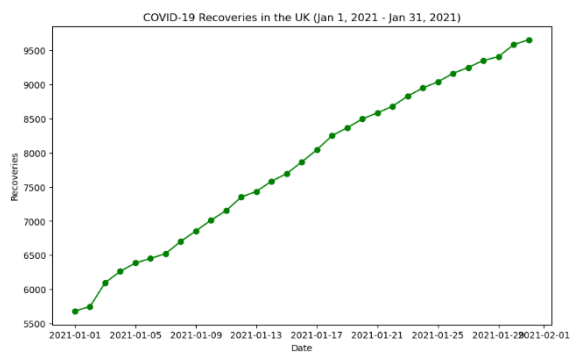
This graph helps us understand the recovery rate of COVID-19 in 2021. The recovery rate was not in line with the infection rate. The years 2022 and 2023 have no data recorded for the recovery rate but through research, the recovery was much better for these years as people are more immune to the virus and if they did catch it was less severe making the time to get back to normal health a smoother process.

Seasonal Patterns in Finland

In this analysis, we will examine the COVID-19 data for Finland in 2021, aiming to compare the daily numbers of confirmed cases, recovered cases, and deaths during a typical month in winter and a typical month in summer. For this report, a "typical month during winter" refers to December, while a "typical month during summer" corresponds to July.
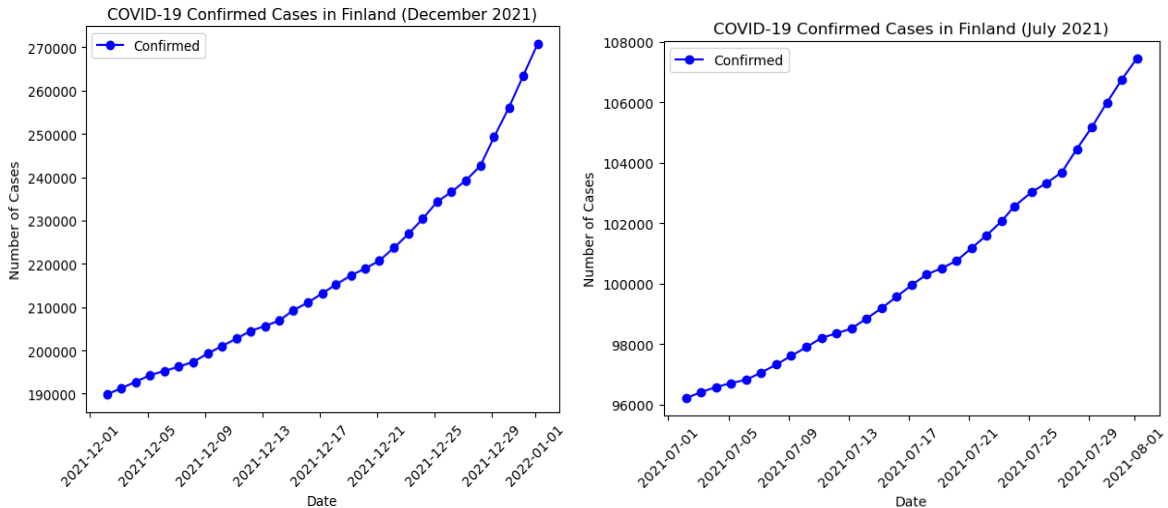
A dynamic pattern may be seen in the July COVID-19 cases that were on the confirmed cases. The month started off with comparatively low case numbers, which was indicative of the cautious optimism that comes with summertime. However, as the month continues, we see that there was a noticeable rise in the number of verified cases.
Increased social gatherings, customary summer celebrations, and outdoor activities being made available may all have contributed to the spike in viral transmission of covid-19.

In contrast, different conditions arose in December 2021. Compared to July, this winter month's graph shows a different pattern. The risk of virus transmission increased as the festive period approached, and people gathered indoors to celebrate lower temperatures. The data indicates that the number of confirmed cases increased more sharply in December, peaking near the end of the month.
The jump in December could be said to have been caused by the holiday season, more indoor parties, and travel. The trajectory of confirmed cases during this winter month may have been influenced by the effects of the colder weather as well as the introduction of novel variations.

COVID-19 Deaths in Finland (July 2021) / COVID-19 Deaths in Finland (December 2021)
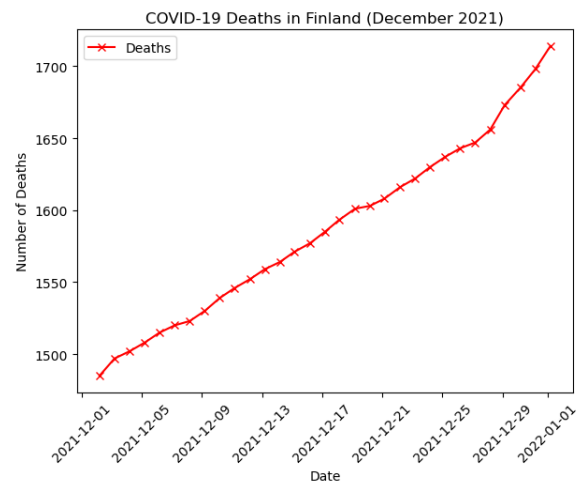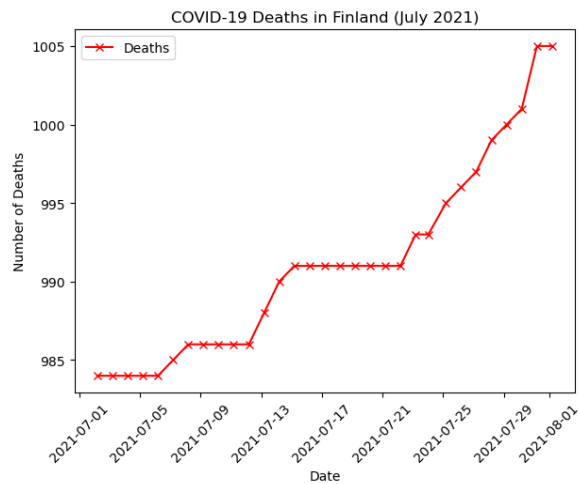
The graph showing the number of confirmed COVID-19 deaths in July shows a rather steady trend at the start of the month. But as July wore on, the number of deaths each day noticeably climbed, suggesting a possible link with the elevated infection rates that were noted at this time. Numerous factors, including the introduction of unknown variations, vaccination rates, and the efficiency of healthcare systems in handling severe cases, may have an impact on the graph's swings.

 In contrast, a new set of conditions emerged in December 2021. In comparison to July, the graph for this winter month shows a significantly sharper rise in the number of confirmed deaths every day. A higher death rate could have resulted from an increased risk of virus transmission brought on by the colder weather, indoor gatherings and the Christmas season.

The peak of the December graph might represent the burden on the health care systems, the severity of the cases, and the difficulties in handling a spike in wintertime mortality. In addition, the graph's trajectory can have been impacted by the introduction of additional varieties, like the Delta variant.

Trend of Confirmed cases between Winter 2020 and the winter 2021