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COVID-19 DAILY (WHO) DATASET VISUALISATION IN TABLEAU

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Abstract: **The COVID-19 pandemic has profoundly disrupted global health systems, economies, and societal norms since its emergence in late 2019. With millions of cases and deaths reported worldwide, the need for timely, interpretable, and actionable epidemiological data has become critical for evidence-based public health response. This study leverages the comprehensive time-series dataset published by the World Health Organization (WHO), which documents daily confirmed cases and deaths across countries, to investigate the temporal and spatial evolution of the pandemic.**

Recognizing the challenges of extracting insights from large-scale raw numerical data, this research employs Tableau, a leading data visualization platform, to transform complex pandemic statistics into intuitive, interactive dashboards.

The resulting interactive dashboards enable stakeholders to explore pandemic dynamics at multiple granularities, facilitating faster pattern recognition and more informed decision-making. By prioritizing clarity, interactivity, and accessibility, this work demonstrates how visual analytics can bridge the gap between complex epidemiological data and practical public health strategy. The study concludes that integrating robust visualization tools with authoritative global health data significantly enhances situational awareness and supports proactive, data-driven pandemic management.

Keywords: **COVID-19, WHO dataset, data visualization, Tableau, time-series analysis, interactive dashboards, public health informatics, pandemic monitoring**

I. INTRODUCTION

The COVID-19 pandemic has had a significant impact on global health, economies, and daily life. Since its emergence in late 2019, the virus has rapidly spread across countries, leading to millions of confirmed cases and deaths worldwide. Monitoring and analyzing pandemic data has therefore become essential for understanding the spread of the virus and supporting effective public health decision-making.

The World Health Organization (WHO) provides a global dataset that records daily COVID-19 cases and deaths reported by different countries. This time-series data allows researchers to study how the pandemic evolved over time and how infection trends varied across regions. By analyzing daily statistics, it is possible to identify patterns such as peaks in infections, growth trends, and changes in the spread of the disease.

However, large-scale datasets can be difficult to interpret using raw numerical data alone. Data visualization tools help transform complex datasets into meaningful graphical representations that make patterns easier to understand. Visualization platforms such as Tableau enable the creation of interactive dashboards that allow users to explore trends, compare country-level statistics, and observe changes in pandemic patterns over time.

Therefore, this study focuses on analyzing the global COVID-19 dataset provided by the World Health Organization and developing interactive visualizations using Tableau to better understand the temporal and geographical trends of the pandemic.

II. LITERATURE REVIEW

Several researchers have examined the spread and impact of COVID-19 using various data analytics and computational approaches. Hamzah et al. introduced CoronaTracker, a platform designed to collect, monitor, and analyze global COVID-19 outbreak data in real time. Their system integrates worldwide epidemiological datasets to track infection trends and provide predictive insights about the development of the pandemic. The study highlights the importance of centralized and real time data tracking systems, as they allow researchers and public health authorities to better understand how the virus spreads across regions and support timely decision-making during global health emergencies [1].

To further understand the relationships among key pandemic indicators, Ramadan et al. applied a multivariate data analysis approach to examine daily COVID-19 statistics across different countries. Their work focused on analyzing the relationships between confirmed cases, recoveries, and deaths, demonstrating how statistical techniques can reveal important correlations within pandemic datasets. The study showed that analyzing multiple variables together can provide deeper insights into the dynamics of disease progression and help researchers understand how different countries experience and respond to the pandemic [2]. Similarly, Eltoukhy et al. utilized data analytics techniques to study the growth of COVID-19 cases in several highly affected countries. Their research emphasized the role of predictive modeling in identifying infection trends and forecasting future case growth, which can assist policymakers and healthcare authorities in planning effective response strategies and allocating medical resources efficiently [3].

Since COVID-19 data is recorded continuously over time, time-series analysis has become an important tool for studying pandemic trends. Dash et al. explored the use of intelligent computing techniques, including machine learning models, for analyzing COVID-19 time-series data. Their findings demonstrated that computational approaches can effectively capture temporal patterns in infection data and improve the accuracy of predictions related to future outbreaks. Such approaches are particularly useful for understanding how the pandemic evolves over time and for identifying potential future surges in infections [4]. In addition to predictive modeling, Dey et al. focused on visual exploratory data analysis to investigate the epidemiological characteristics of COVID-19. Their research showed that visualization techniques can help uncover hidden patterns, growth trends, and geographical variations in infection rates that might not be easily observed through traditional statistical methods alone [5].

Mondal et al. also highlighted the importance of applying data analytics methods to study COVID 19 datasets. Their work demonstrated that analytical techniques can be used to monitor the progression of the disease, detect emerging trends, and extract meaningful insights from large volumes of pandemic data. The study emphasized that combining statistical analysis with computational tools can help researchers better understand the scale and impact of the pandemic [6]. Furthermore, Hoque et al. analyzed the progression of COVID-19 by examining the first and second waves of the pandemic in several of the most affected countries. By applying time-series analysis techniques, their research provided insights into how infection patterns changed over time and how different phases of the pandemic affected countries in varying ways [7].

In addition to epidemiological analysis, researchers have also explored the broader societal effects of the pandemic. Sadowski et al. investigated global mobility patterns during COVID-19 lockdown periods using big data analytics. Their study revealed significant changes in human movement behavior during lockdowns and demonstrated how mobility data can be used to understand the impact of government restrictions on social activity and disease transmission patterns [8]. Visualization tools have also played a major role in making pandemic data easier to interpret. Akhtar et al. demonstrated how Tableau can be used for COVID 19 data analytics and visualization, enabling the development of interactive dashboards that allow users to explore pandemic statistics more effectively. Their work highlights how visualization platforms can transform complex datasets into clear graphical representations that help researchers and policymakers identify trends and patterns quickly [9]. Similarly, Healey et al. emphasized the importance of visual analytics in analyzing large and complex COVID-19 datasets. Their research discussed how combining analytical techniques with interactive visual interfaces enables users to explore data more intuitively and gain deeper insights into pandemic dynamics, ultimately supporting informed decision-making during public health crises [10].

Building on these visualization approaches, Shuja et al. demonstrated how machine learning algorithms combined with data visualization techniques can enhance COVID-19 outbreak prediction and analysis. Their study showed that integrating predictive models with visual analytics provides a more comprehensive understanding of pandemic trends and enables more accurate forecasting of infection trajectories [11]. The development of interactive dashboards has also been a focus of comparative research. Batra et al. conducted a comprehensive evaluation of major visualization platforms including Tableau, Power BI, and Qlik for real-time COVID-19 monitoring. Their findings indicated that each platform offers unique strengths in terms of interactivity, data refresh capabilities, and user experience, with Tableau demonstrating particular advantages in creating geospatial visualizations and complex multi-dimensional analyses [12].

Geospatial visualization has emerged as a critical component of pandemic surveillance. Gupta et al. developed a Tableau-based approach for COVID-19 surveillance that emphasizes the importance of geographic indicators in tracking disease spread. Their research demonstrated how choropleth maps and spatial analytics can reveal regional variations in infection rates and help identify geographic hotspots requiring targeted interventions [13]. The effectiveness of such dashboards depends heavily on thoughtful design. Chen et al. established design principles for effective public health dashboards based on lessons learned from COVID-19 data visualization. Their study emphasized that clear visual hierarchy, appropriate color encoding, intuitive navigation, and well-designed tooltips are essential for creating dashboards that support rapid comprehension and decision-making during health emergencies [14].

Beyond technical implementation, effective communication of pandemic data requires strong storytelling capabilities. Knaflic highlighted the importance of storytelling with data in public health contexts, demonstrating how narrative visualization strategies can make complex pandemic information more accessible to diverse audiences. The research showed that combining data visualization with clear narrative structures helps stakeholders understand not just what the data shows, but why it matters and what actions should be taken in response [15].

Overall, previous studies demonstrate that data analytics, time-series modeling, and visualization techniques play a crucial role in understanding the spread and evolution of the COVID-19 pandemic. While many studies have focused on predictive modeling or statistical analysis, the integration of interactive visualization tools provides additional opportunities for exploring large-scale pandemic datasets in a more intuitive and insightful manner. Recent research has further emphasized the importance of platform selection, geospatial analysis, design principles, and data storytelling in creating effective public health dashboards. Therefore, this study focuses on analyzing global COVID-19 time-series data and developing interactive visualizations using Tableau to better understand the temporal trends and geographical patterns of COVID-19 across different WHO regions, while applying best practices in dashboard design and visual storytelling.

Methods: Tableau

Tableau served as the cornerstone of this analytical journey, functioning as a powerful interactive visual analytics platform designed to transform raw epidemiological data into actionable insights. Throughout the project, it facilitated the creation of dynamic dashboards that allowed stakeholders to explore the complexities of the COVID-19 pandemic beyond static reports. By leveraging its robust geographic mapping capabilities, we visualized the spatial distribution of cases across WHO regions, pinpointing hotspots with precision. Simultaneously, the platform enabled detailed temporal trend analysis, tracking the virus's evolution from 2020 through 2026.

Material

This study utilizes the WHO COVID-19 Global Daily Data, a comprehensive real-time dataset maintained by the World Health Organization and publicly accessible through the official WHO Coronavirus Dashboard (https://covid19.who.int/) in CSV format. The dataset comprises over 525,000 rows of daily records spanning from January 2020 onwards, covering more than 230 countries and territories worldwide, with regular updates reflecting the evolving nature of the pandemic.

The dataset contains eight key columns: Date_reported (Date type), Country_code and Country (String/Dimension types), WHO_region (String/Dimension), and four numeric fields—New_cases, Cumulative_cases, New_deaths, and Cumulative_deaths (Integer/Measure types with SUM or MAX aggregation in Tableau). Geographic analysis is enabled through the Country field (assigned Geographic Role: Country) as the primary indicator, Country_code (ISO 2-digit format) as a secondary identifier for data joins, and WHO_region as a categorical dimension for supra national regional grouping.

Data collection follows a rigorous protocol under the International Health Regulations (IHR 2005), which legally mandate 196 countries to report public health data to WHO. Information is sourced directly from national health authorities through official communications, government websites, public situation reports, and verified updates, then aggregated through WHO regional offices and headquarters. Since 2023, the reporting framework has evolved to include weekly submissions of confirmed cases, deaths, hospitalizations, ICU admissions, testing data, and variant surveillance.

The dataset's reliability is ensured through continuous validation, verification, and retrospective corrections, making it one of the most authoritative and globally consistent epidemiological resources available. Its legitimacy is widely recognized, with extensive citation and use by leading organizations including the European Centre for Disease Prevention and Control (ECDC), Johns Hopkins University, Our World in Data, and numerous peer-reviewed research studies.

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WHO-COVID-19-GLOBAL-DAILY DATA:

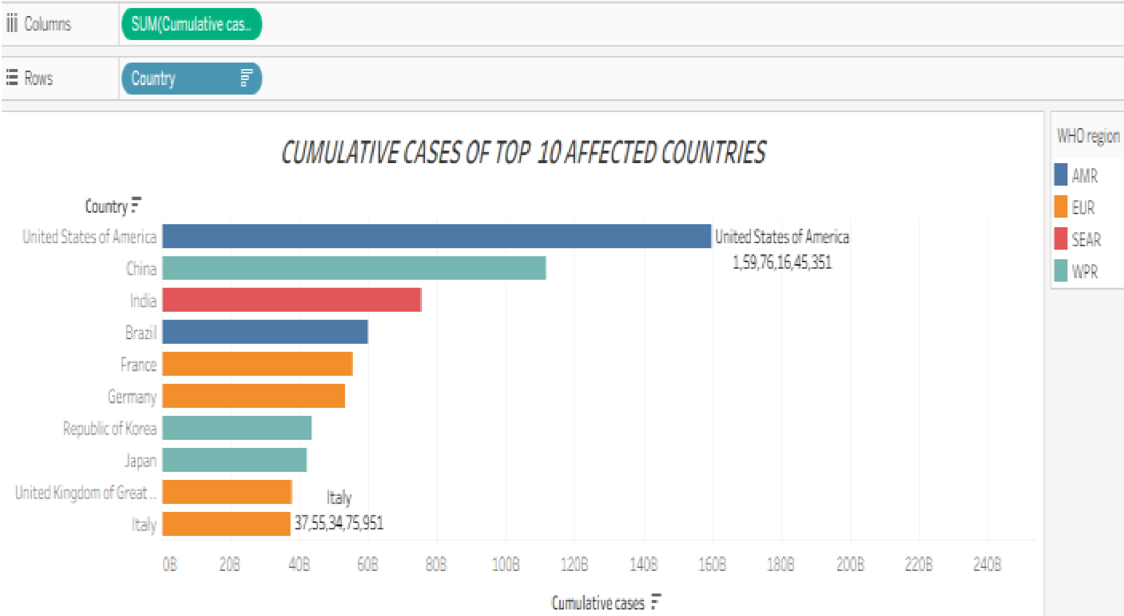

Fig: 1

Chart Description: This is a horizontal bar chart titled "CUMMULATIVE CASES OF TOP 10 AFFECTED COUNTRIES" displaying COVID-19 data. The Y-axis lists 10 countries: United States of America, China, India, Brazil, France, Germany, Republic of Korea, Japan, United Kingdom, and Italy. The X-axis represents Cumulative cases measured in billions (ranging from 0B to 240B). Bars are color-coded by WHO region (AMR-blue, EUR-orange, SEAR-red, WPR-teal) as shown in the legend. The United States leads with 159.76 billion cases, followed by China and India, while Italy shows 37.55 billion cases. The chart uses a horizontal bar layout to compare total case burden across the most affected nations globally.

Covid Trend Over Time(WHO-Region Wise):

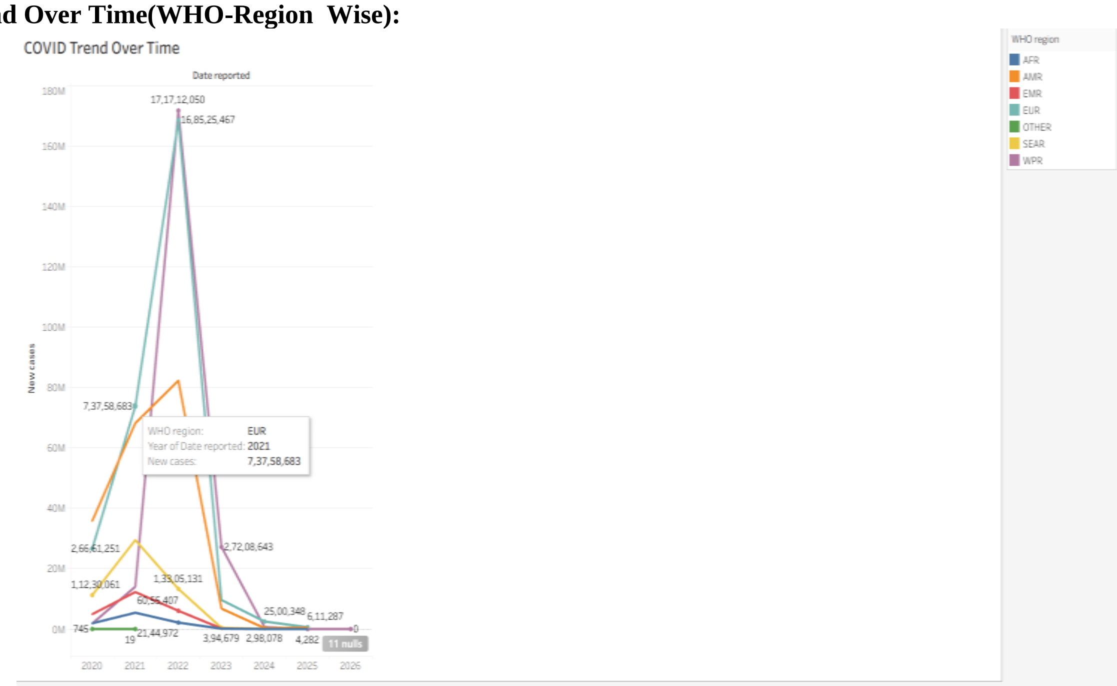

Fig: 2

Chart Description:
This is a multi-line chart titled "COVID Trend Over Time" tracking pandemic progression. The Y-axis represents New cases (scaled from 0M to 180M), while the X-axis displays years from 2020 to 2026. Colored lines correspond to WHO regions (AFR, AMR, EMR, EUR, OTHER, SEAR, WPR) as defined in the legend on the right. A visible tooltip highlights the EUR region in 2021 with 7,37,58,683 new cases. Specific data labels mark values across the timeline, showing a sharp peak around 2022 (reaching over 17 million) before declining toward 2026. A "11 nulls" indicator appears at the bottom right near the 2026 mark.

GeoMap (Cases By Country):

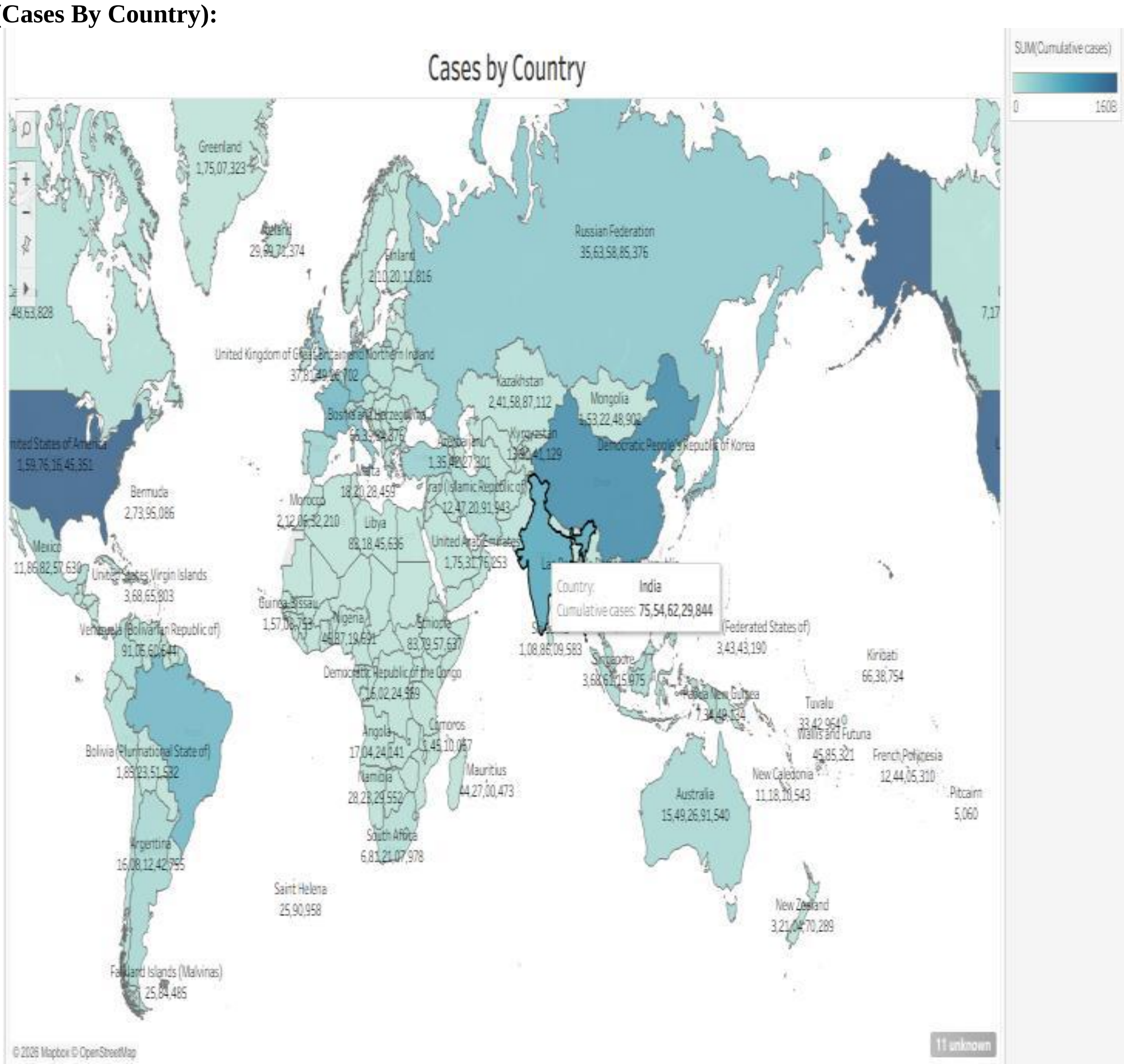

Fig: 3

Chart Description:
This is a world choropleth map titled "Cases by Country" visualizing global pandemic data. The color scale represents SUM(Cumulative cases) ranging from 0 to 160B (legend top right), with darker blue indicating higher values. Text labels across the map show country names and specific case counts (e.g., United States: 1,59,76,16,45,351; Russian Federation: 35,63,58,85,376). A tooltip is active over India, displaying 75,54,62,29,844 cumulative cases. Navigation controls appear top left, while the bottom footer cites © 2026 Mapbox © OpenStreetMap and indicates 11 unknown regions bottom right.

Heat Map (Cummulative Deaths):

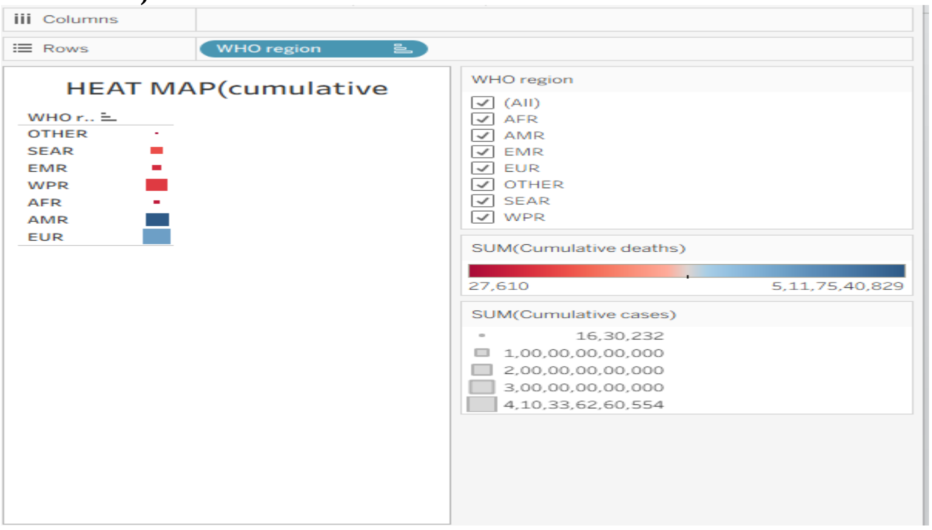

Fig: 4

Chart Description:
This is a Tableau worksheet titled "HEAT MAP(cumulative deaths)" visualizing pandemic statistics. The Rows shelf lists WHO regions (OTHER, SEAR, EMR, WPR, AFR, AMR, EUR) next to small colored squares representing data points. The right panel displays a filter with all WHO regions selected, a color scale for SUM(Cumulative deaths) ranging from 27,610 (red) to 5,11,75,40,829 (blue), and a size legend for SUM(Cumulative cases) where square sizesncorrespond to values from 16,30,232 up to 4,10,33,62,60,554.

Highlight Table-WHO region wise CUMULATIVE CASES:

Fig: 5 Chart Description:

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This is a highlight table titled "HIGHLIGHT TABLE-WHO region wise CUMULATIVE CASES". The Y-axis lists WHO regions (AFR, AMR, EMR, EUR, OTHER, SEAR, WPR), while the cells display specific SUM(Cumulative cases) values (e.g., EUR: 4,10,33,62,60,554; SEAR: 90,36,49,61,552). A color legend on the right indicates intensity based on case counts, ranging from 16,30,232 (light) to 4,10,33,62,60,554 (dark blue). Tableau interface elements show WHO region on the Rows shelf at the top.

Line Chart- Global daily new covid-19 cases over time

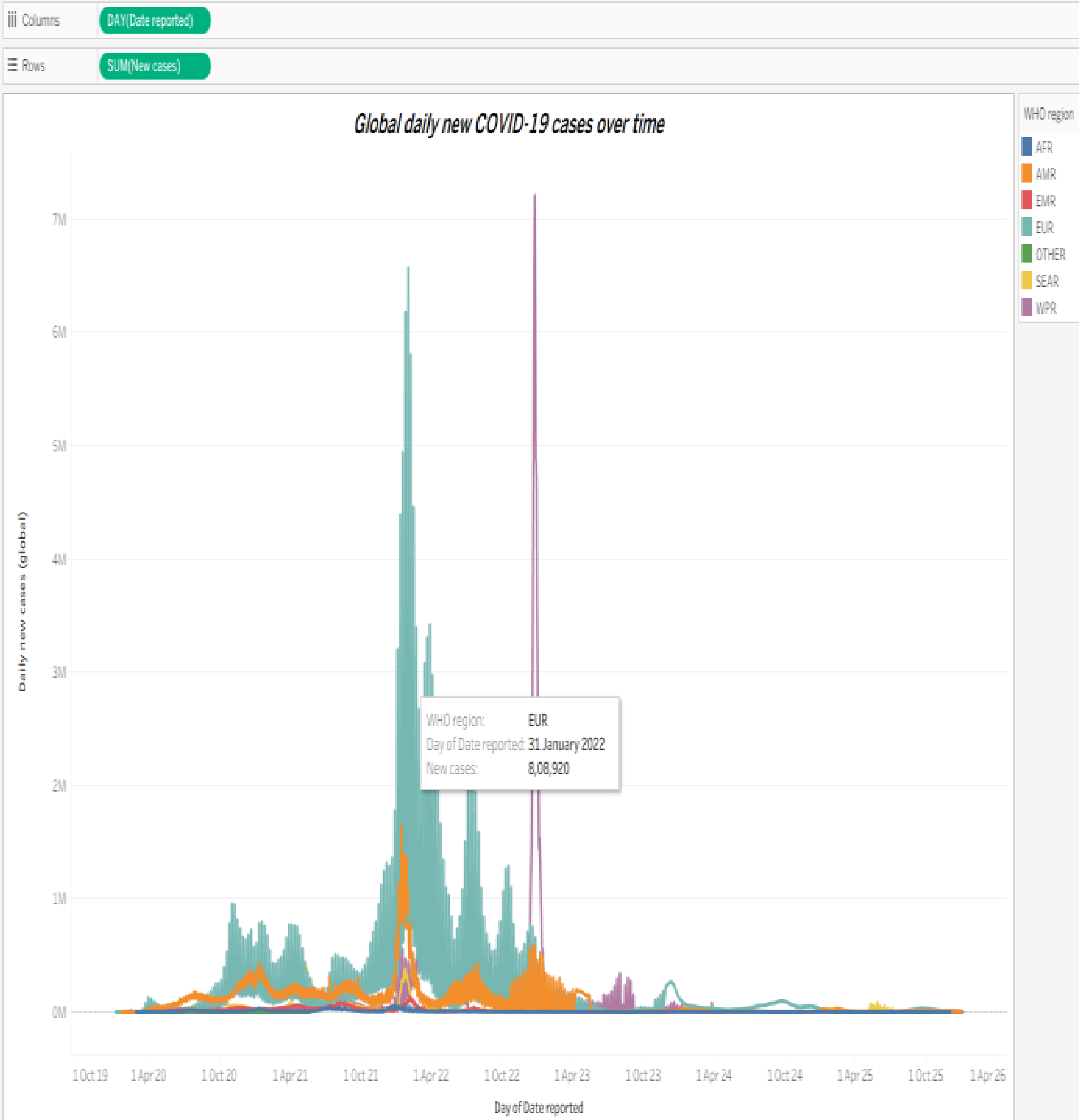

Fig: 6

Chart Description: This is a stacked area chart titled "Global daily new COVID-19 cases over time". The Y-axis displays Daily new cases (global) ranging from 0M to 7M, and the X-axis tracks the Day of Date reported from October 2019 to April 2026. Data is color-coded by WHO region (AFR, AMR, EMR, EUR, OTHER, SEAR, WPR) per the legend on the right. A visible tooltip highlights the EUR region on 31 January 2022 with 8,08,920 new cases. The chart features significant peaks, notably a large teal surge in early 2022 and a sharp purple spike in late 2022. The top interface shows DAY(Date reported) on the Columns shelf and SUM(New cases) on the Rows shelf.

Line chart Dashboard layout- all countries (WHO REGIONS)
Global daily new COVID-19 cases over time:

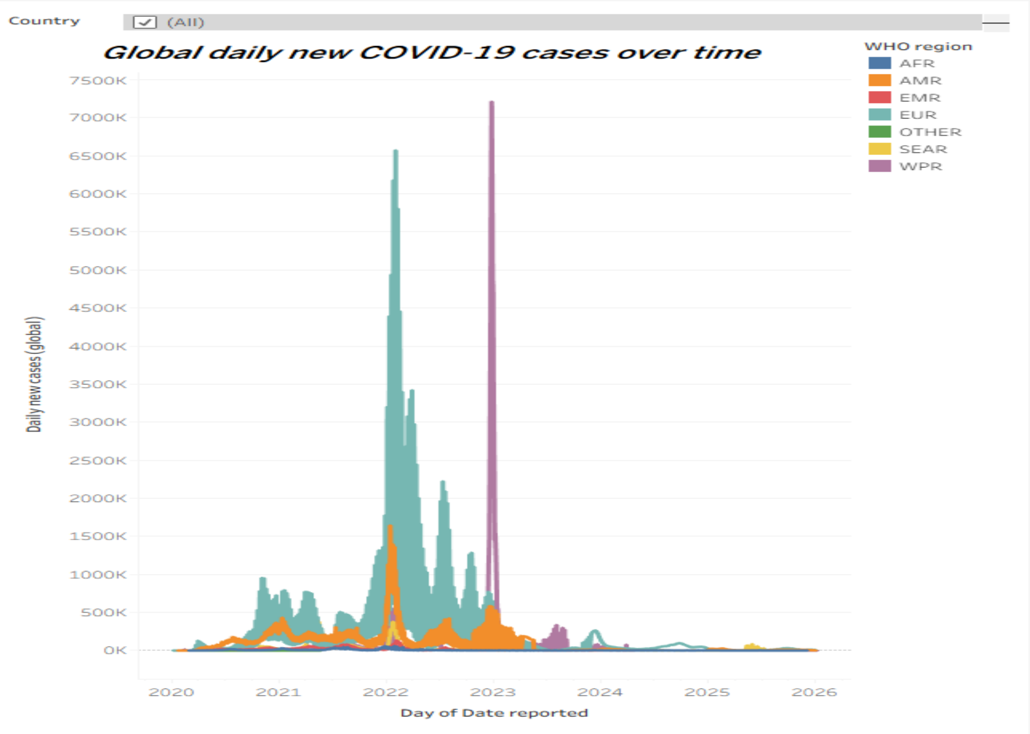

Fig: 7

Chart Description: This is a stacked area single panel dashboard titled "Global daily new COVID-19 cases over time". The Y-axis displays Daily new cases (global) ranging from 0M to 7M, and the X axis tracks the Day of Date reported from October 2019 to April 2026. Data is color-coded by WHO region (AFR, AMR, EMR, EUR, OTHER, SEAR, WPR) per the legend on the right. A visible tooltip highlights the EUR region on 31 January 2022 with 8,08,920 new cases. The chart features significant peaks, notably a large teal surge in early 2022 and a sharp purple spike in late 2022. The top interface shows DAY(Date reported) on the Columns shelf and SUM(New cases) on the Rows shelf.

ASSEMBLING A DASHBOARD LAYOUT :

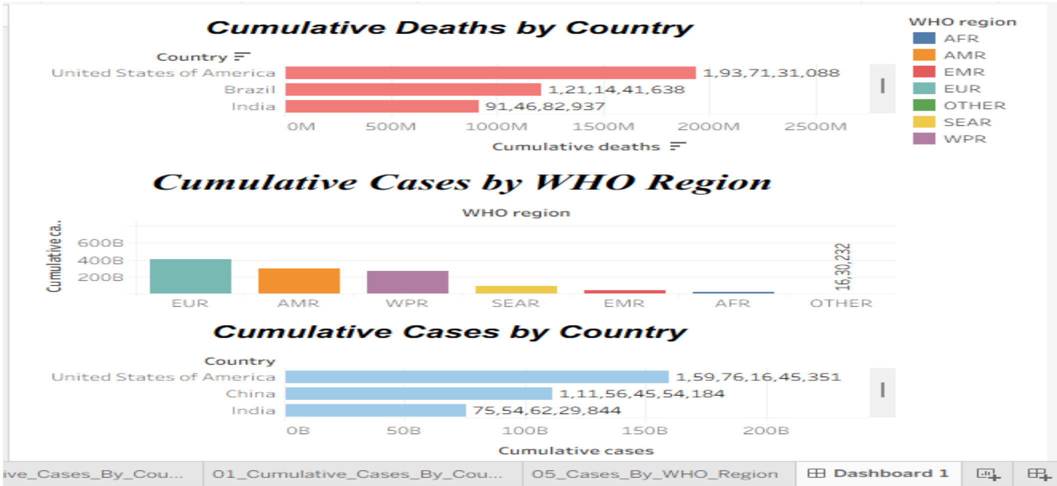

Fig: 8

Chart Description: This is a Tableau dashboard containing three distinct visualizations. The top chart is a horizontal bar chart titled "Cumulative Deaths by Country" with Country on the Y-axis and Cumulative deaths (0M-2500M) on the X-axis, displaying data for United States (1,93,71,31,088), Brazil, and India. The middle chart is a vertical bar chart titled "Cumulative Cases by WHO Region" with WHO region on the X-axis and Cumulative cases (200B-600B) on the Y-axis. The bottom chart is a horizontal bar chart titled "Cumulative Cases by Country" with Country on the Y-axis and Cumulative cases (0B-200B) on the X-axis, highlighting United States (1,59,76,16,45,351), China, and India. A WHO region legend appears top right, and dashboard tabs are visible at the bottom.

Death Rate By Country:

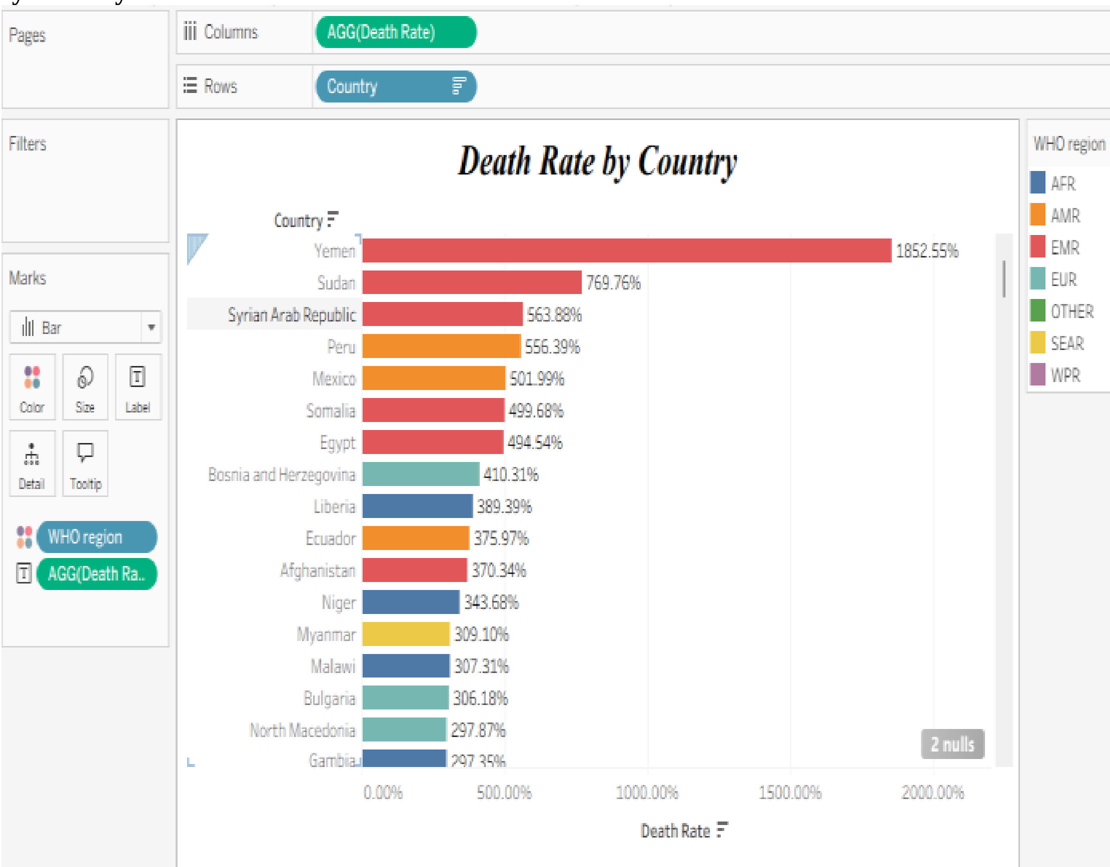

Fig: 9

Chart Description: This is a Tableau dashboard containing three distinct visualizations. The top chart is a horizontal bar chart titled "Cumulative Deaths by Country" with Country on the Y-axis and Cumulative deaths (0M-2500M) on the X-axis, displaying data for United States (1,93,71,31,088), Brazil, and India. The middle chart is a vertical bar chart titled "Cumulative Cases by WHO Region" with WHO region on the X-axis and Cumulative cases (200B-600B) on the Y-axis. The bottom chart is a horizontal bar chart titled "Cumulative Cases by Country" with Country on the Y-axis and Cumulative cases (0B-200B) on the X-axis, highlighting United States (1,59,76,16,45,351), China, and India. A WHO region legend appears top right, and dashboard tabs are visible at the bottom.This is a horizontal bar chart titled "Death Rate by Country". The Y-axis lists Country names (Yemen, Sudan, Syrian Arab Republic, Peru, etc.), while the X-axis represents Death Rate ranging from 0.00% to 2000.00%. Bars are color-coded by WHO region (AFR, AMR, EMR, EUR, OTHER, SEAR, WPR) as shown in the legend on the right. Yemen has the highest rate at 1852.55%, followed by Sudan at 769.76%. Tableau interface elements include AGG(Death Rate) on the Columns shelf, Country on the Rows shelf, a Marks card on the left showing Bar type and Color by WHO region, and a "2 nulls" indicator at the bottom right.

Running Total Cases:

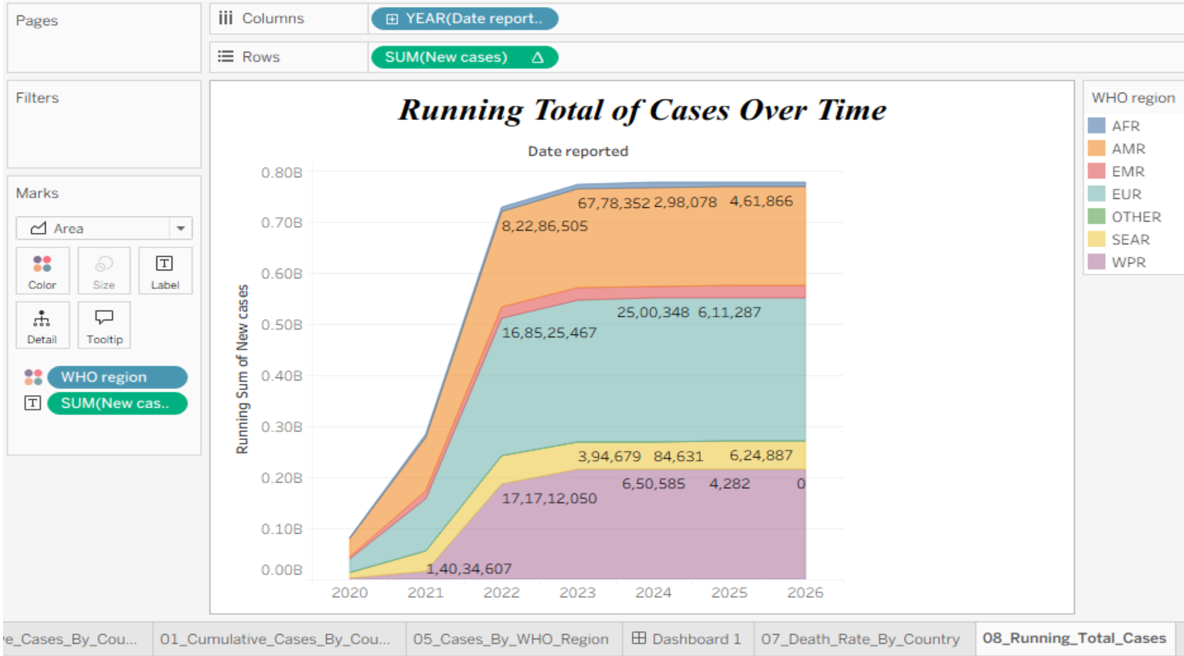

Fig: 10

Chart Description: This is a stacked area chart titled "Running Total of Cases Over Time". The Y axis represents Running Sum of New cases (scaled 0.00B to 0.80B), while the X-axis shows Date reported by year from 2020 to 2026. Data areas are color-coded by WHO region (AFR, AMR, EMR, EUR, OTHER, SEAR, WPR) as per the legend on the right. Specific values are labeled on the chart (e.g., 16,85,25,467, 67,78,352). Tableau interface elements include YEAR(Date reported) on Columns, SUM(New cases) on Rows, and the Marks card set to "Area". Bottom tabs indicate sheet navigation, highlighting " 08 _Running_Total_Cases".

Dashboard with Filters - Country Filter:

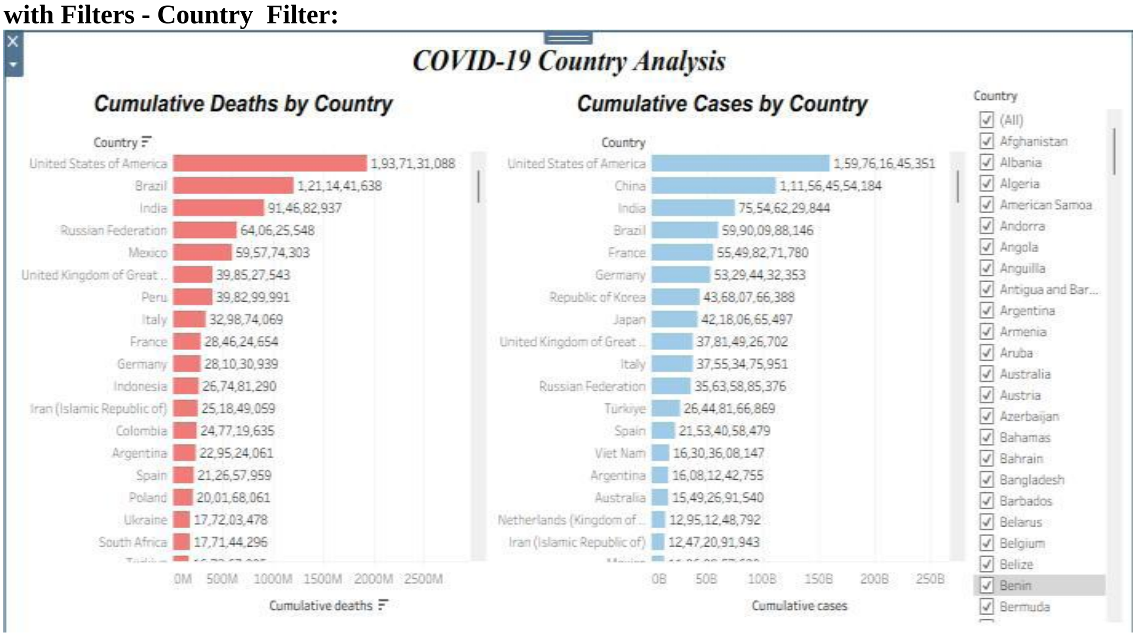

Fig: 11

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Chart Description: This is a Tableau dashboard titled "COVID-19 Country Analysis" containing two horizontal bar charts. The left chart, "Cumulative Deaths by Country", plots Country on the Y-axis against Cumulative deaths (0M-2500M) on the X-axis, displaying red bars with values like United States (1,93,71,31,088). The right chart, "Cumulative Cases by Country", plots Country on the Y-axis against Cumulative cases (0B-250B) on the X-axis, showing blue bars with values like United States (1,59,76,16,45,351). A Country filter panel on the far right features a checkbox list for nation selection (e.g., Afghanistan, Algeria), with Benin highlighted.

Interactive Tooltips:

Area map (yearly total deaths occured):

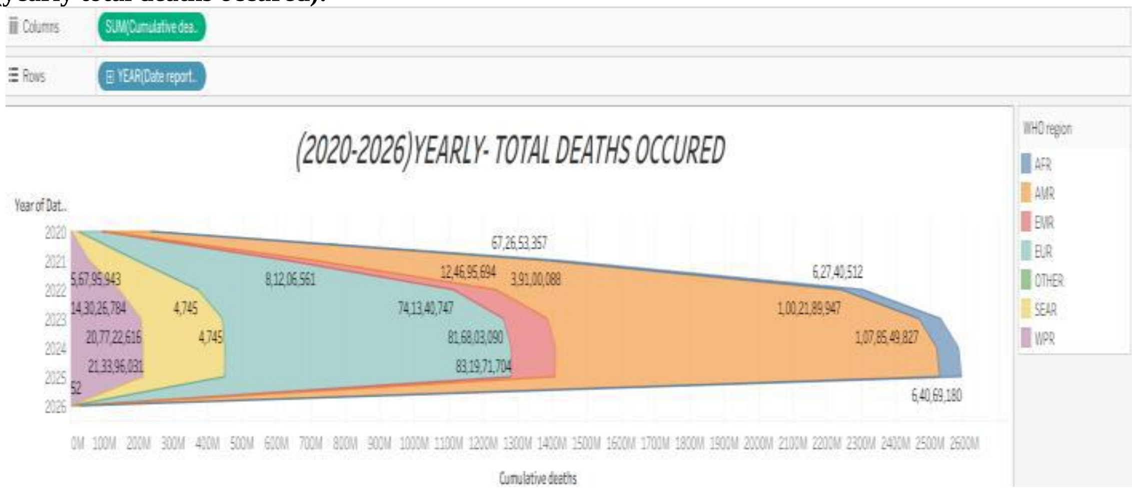

Fig: 12

Chart Description: This is a horizontal stacked area chart titled "(2020-2026)YEARLY- TOTAL DEATHS OCCURED". The Y-axis lists Year of Date reported (2020-2026), while the X-axis represents Cumulative deaths ranging from 0M to 2600M. Colored areas correspond to WHO regions (AFR, AMR, EMR, EUR, OTHER, SEAR, WPR) as shown in the legend on the right. Specific data labels are embedded within the regions (e.g., 1,00,21,89,947, 67,26,53,357). Tableau interface elements show SUM (Cumulative deaths) on Columns and YEAR (Date reported) on Rows.

World map chart New cases Country Wise:

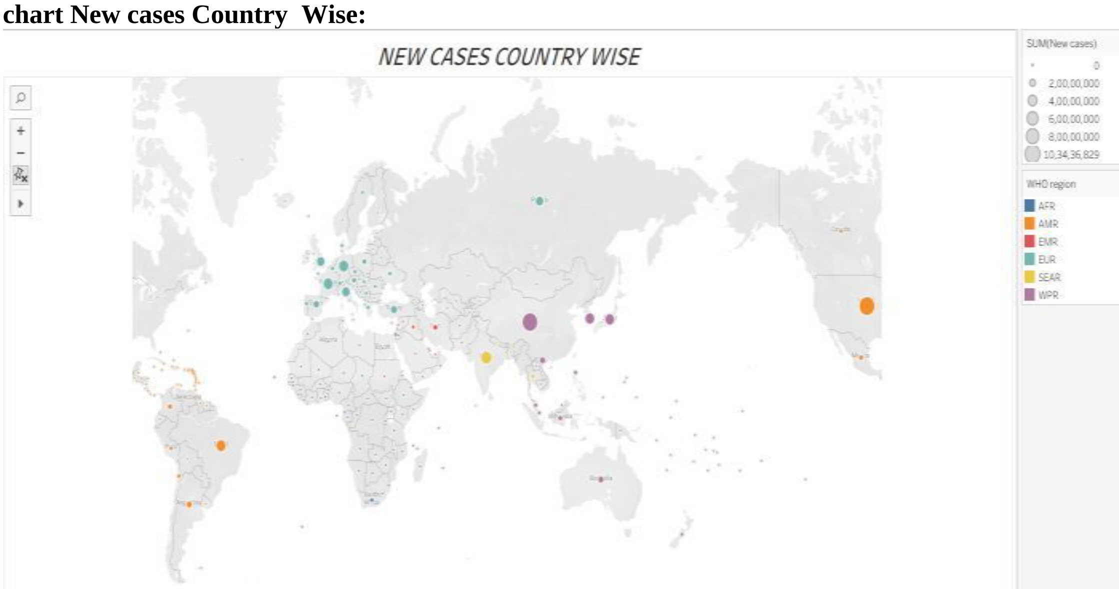

Fig: 13

Chart Description: This is a symbol map visualization titled "NEW CASES COUNTRY WISE". The map uses Longitude (X-axis) and Latitude (Y-axis) for geographic positioning, with circle size representing SUM(New cases) (legend range 0 to 10,34,36,829) and color indicating WHO region (AFR, AMR, EMR, EUR, SEAR, WPR). Navigation tools (search, zoom, fit) appear on the top left, while legends for size and region are positioned on the right. Prominent orange and teal circles indicate higher case volumes in the Americas and Europe respectively.

DASHBOARD - (WITH HIGHLIGHT ACTIONS AND URL ACTION): (WHO REGION -WISE New Cases): Top-3 Regional Pandemic Trajectories :

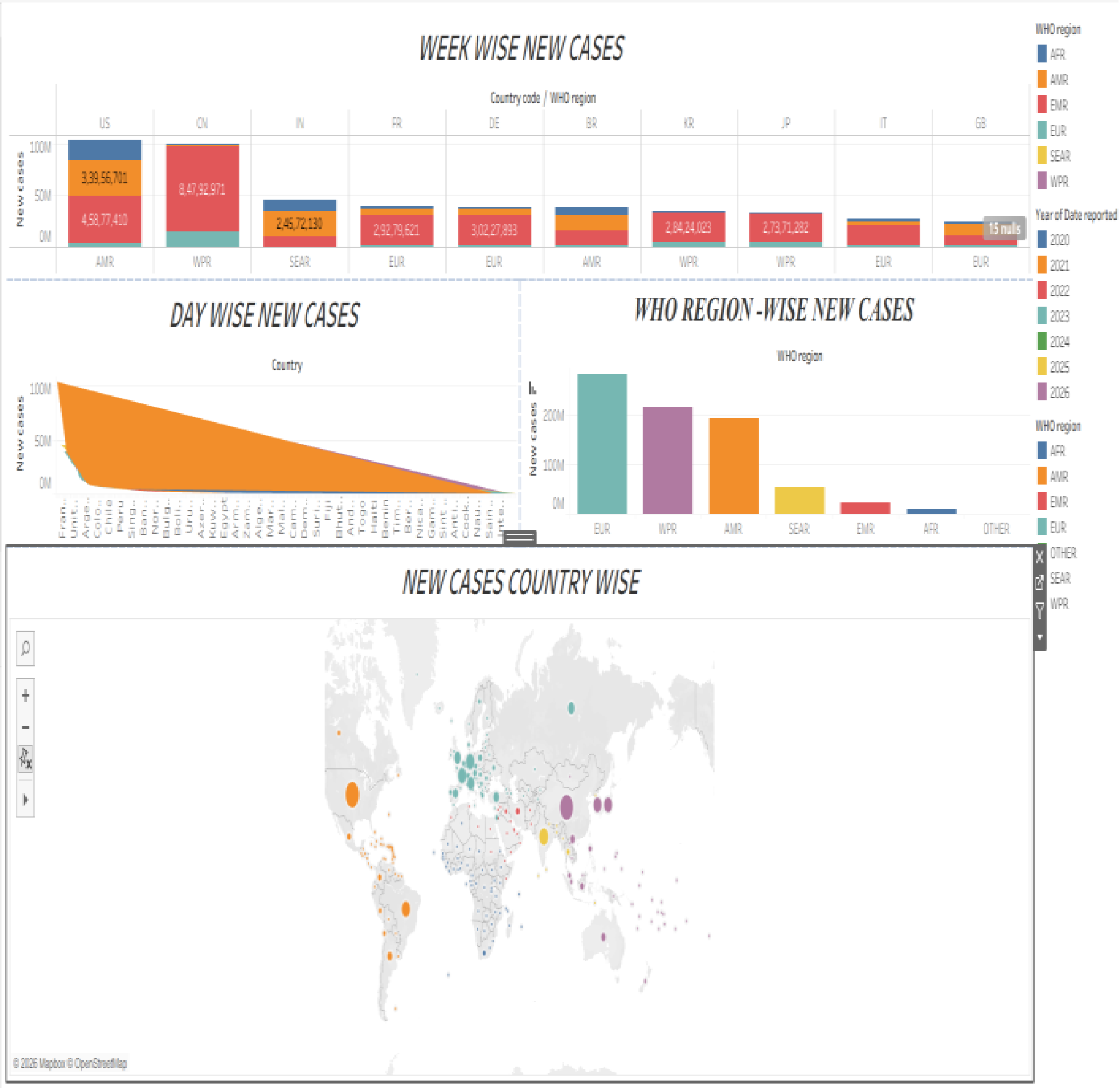

Fig: 14

Chart Description: This is a Tableau dashboard containing four distinct visualizations. The top chart, "WEEK WISE NEW CASES", is a stacked bar chart with Country code / WHO region (US, CN, IN, etc.) on the X-axis and New cases (0M 100M) on the Y-axis, color-coded by WHO region and Year (2020-2026). The middle left chart, "DAY WISE NEW CASES", is an area chart with Country on the X-axis and New cases (0M-100M) on the Y axis. The middle right chart, "WHO REGION - WISE NEW CASES", is a vertical bar chart with WHO region on the X-axis and New cases (0M 200M) on the Y-axis. The bottom chart, "NEW CASES COUNTRY WISE", is a symbol map displaying global data with navigation controls on the left and filters on the right. Legends for WHO region and Year are positioned on the far right, and the footer cites © 2026 Mapbox © OpenStreetMap.

Dashboard Tutorial:
https://drive.google.com/file/d/1ALmerB1l mOY4iFqr8k5APEc5XKCtsSkQ/view?usp= sharing

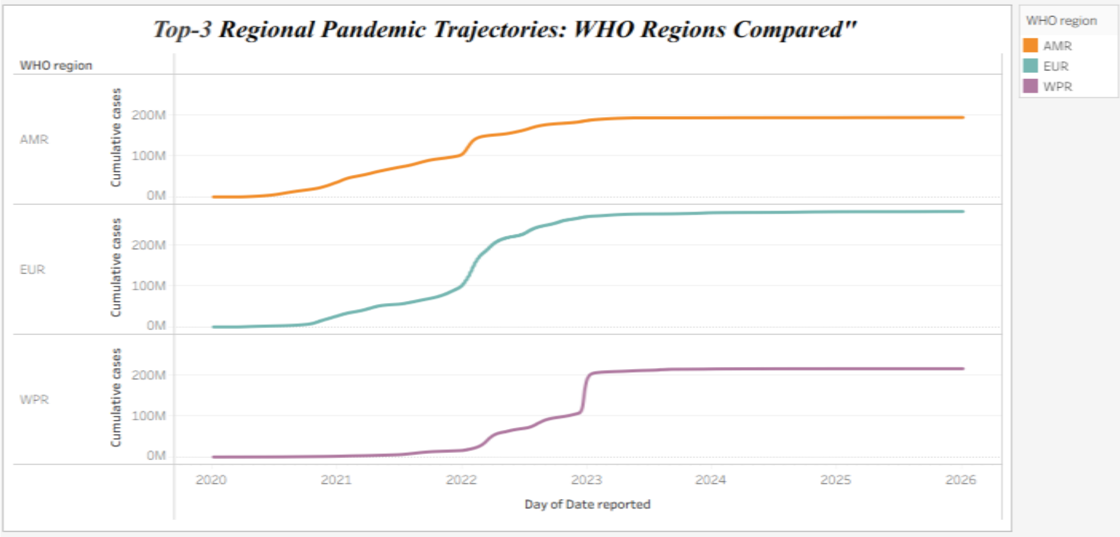

Fig: 15

Chart Description: This is a small multiples line chart titled "Top-3 Regional Pandemic Trajectories: WHO Regions Compared" with a subtitle on best practices for visual clutter. The Y-axis displays Cumulative cases (0M-200M) across three separate rows labeled by WHO region (AMR, EUR, WPR), while the shared X-axis tracks Day of Date reported from 2020 to 2026. A legend on the top right color codes regions (AMR-Orange, EUR-Teal, WPR Purple). A visible tooltip highlights the EUR region on 24 February 2021 with 3,74,94,888 cumulative cases. The AMR line shows the highest trajectory, followed by EUR and WPR.

Dashboard: Who Regional and cumulative cases dashboard:

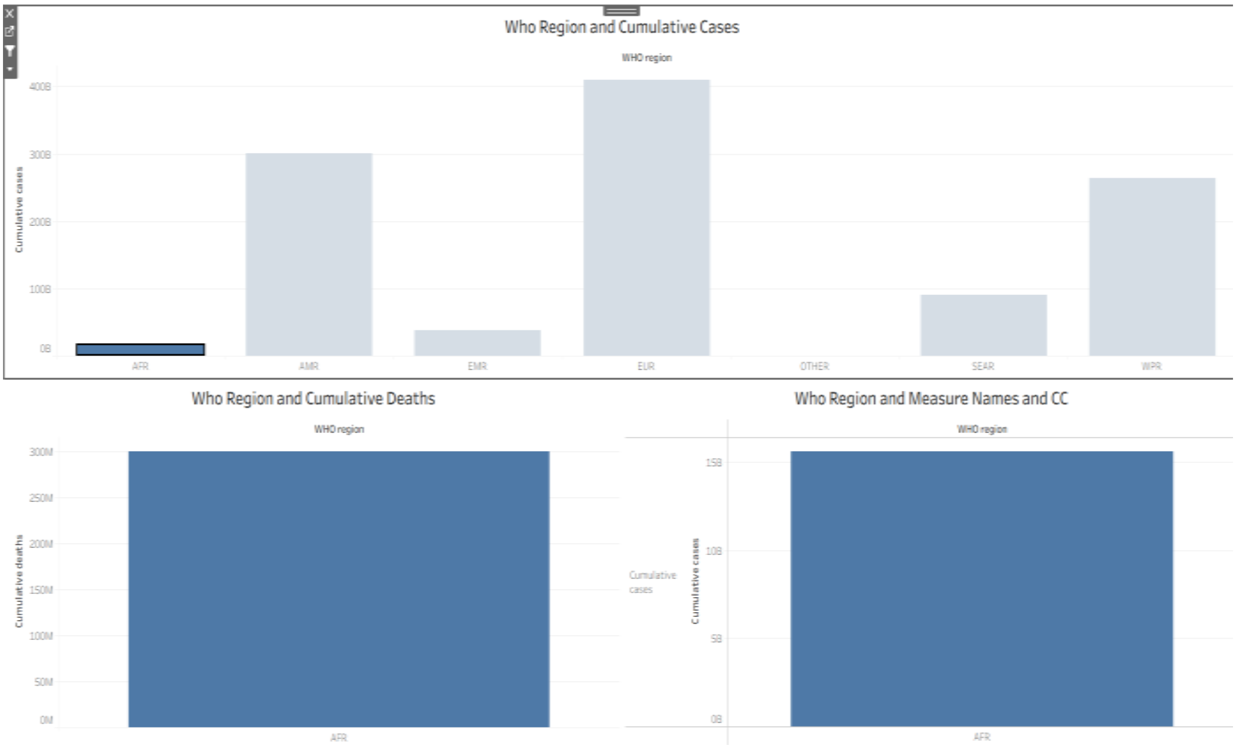

Fig: 16

Chart Description: This is a Tableau dashboard featuring three vertical bar charts. The top chart, titled "Who Region and Cumulative Cases", plots WHO region (AFR, AMR, EMR, EUR, OTHER, SEAR, WPR) on the X-axis against Cumulative cases (0B-400B) on the Y-axis; EUR displays the highest value while AFR is highlighted in dark blue against light grey bars. The bottom left chart, "Who Region and Cumulative Deaths", shows Cumulative deaths (0M-300M) on the Y-axis with a single prominent bar for AFR. The bottom right chart, "Who Region and Measure Names and CC", plots Cumulative cases (0B-15B) on the Y-axis for AFR. Dashboard navigation tools appear on the top left.

WHO-REGION YEAR CUMMULATIVE DEATHS: Tooltip: bar chart highlight:

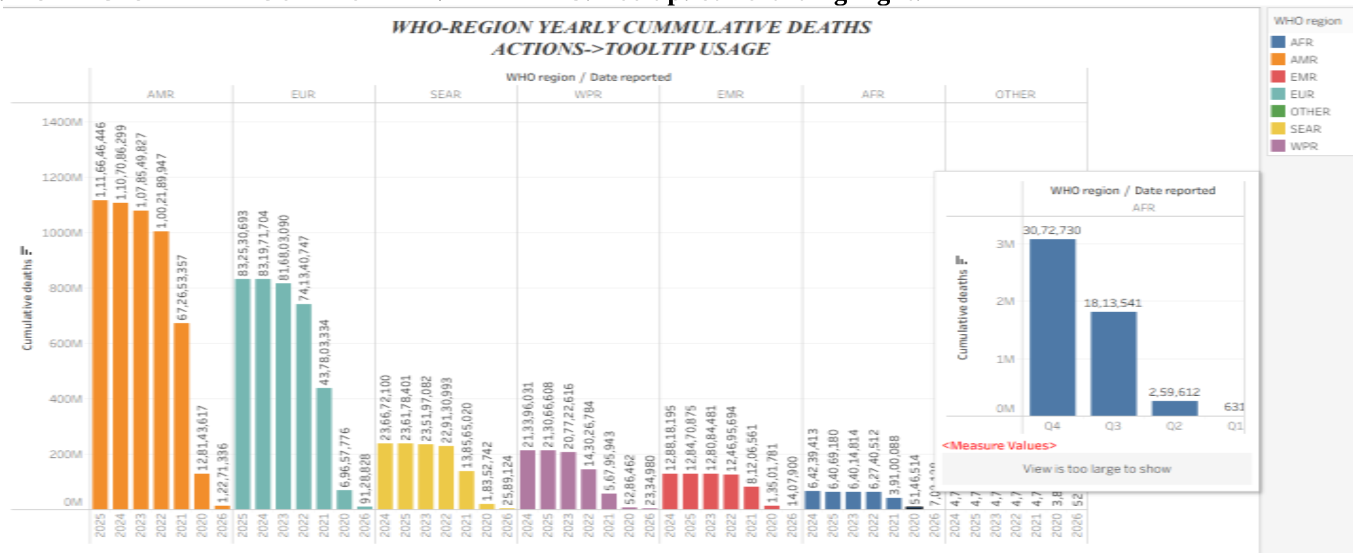

Fig: 17

Chart Description: This is a faceted vertical bar chart titled "WHO-REGION YEARLY CUMMULATIVE DEATHS ACTIONS->TOOLTIP USAGE". The Y-axis represents Cumulative deaths (scaled 0M-1400M), while the X-axis displays Date reported (years 2020-2026) organized under WHO region headers (AMR, EUR, SEAR, WPR, EMR, AFR, OTHER). Bars are color-coded by region (e.g., AMR-Orange, EUR-Teal, AFR-Blue) per the legend on the top right. Specific values label each bar vertically (e.g., AMR 2025: 1,11,56,46,446). A floating tooltip on the right displays a quarterly breakdown for AFR (Q4: 30,72,730) with a mini chart and text noting "<Measure Values>" and "View is too large to show".

WHO-REGION YEAR CUMMULATIVE DEATHS: Tooltip:Geo-map(cummulative cases highlighting):

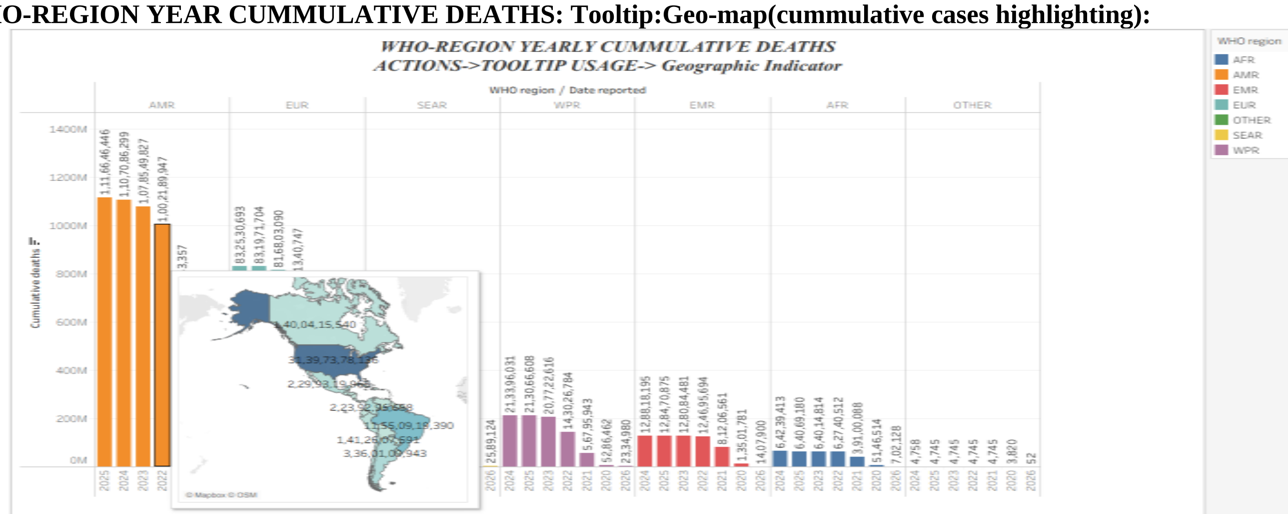

Fig: 18

Chart Description: This is a faceted vertical bar chart titled "WHO-REGION YEARLY CUMMULATIVE DEATHS ACTIONS- >TOOLTIP USAGE-> Geographic Indicator". The Y-axis represents Cumulative deaths (scaled 0M 1400M), while the X-axis displays Date reported (years 2020-2026) grouped under WHO region headers (AMR, EUR, SEAR, WPR, EMR, AFR, OTHER). Bars are color-coded by WHO region (AMR-Orange, EUR-Teal, WPR-Purple, EMR-Red, AFR-Blue, SEAR-Yellow) per the legend on the top right. Specific values label each bar vertically (e.g., AMR 2025: 1,11,66,46,446). A floating map tooltip action is active, displaying a choropleth map of the Americas with country-level data labels (e.g., 1,40,04,15,540, 31,39,73,78,135) and a footer citing © Mapbox © OSM.

Whisker Chart (Similar to Quartile plot):

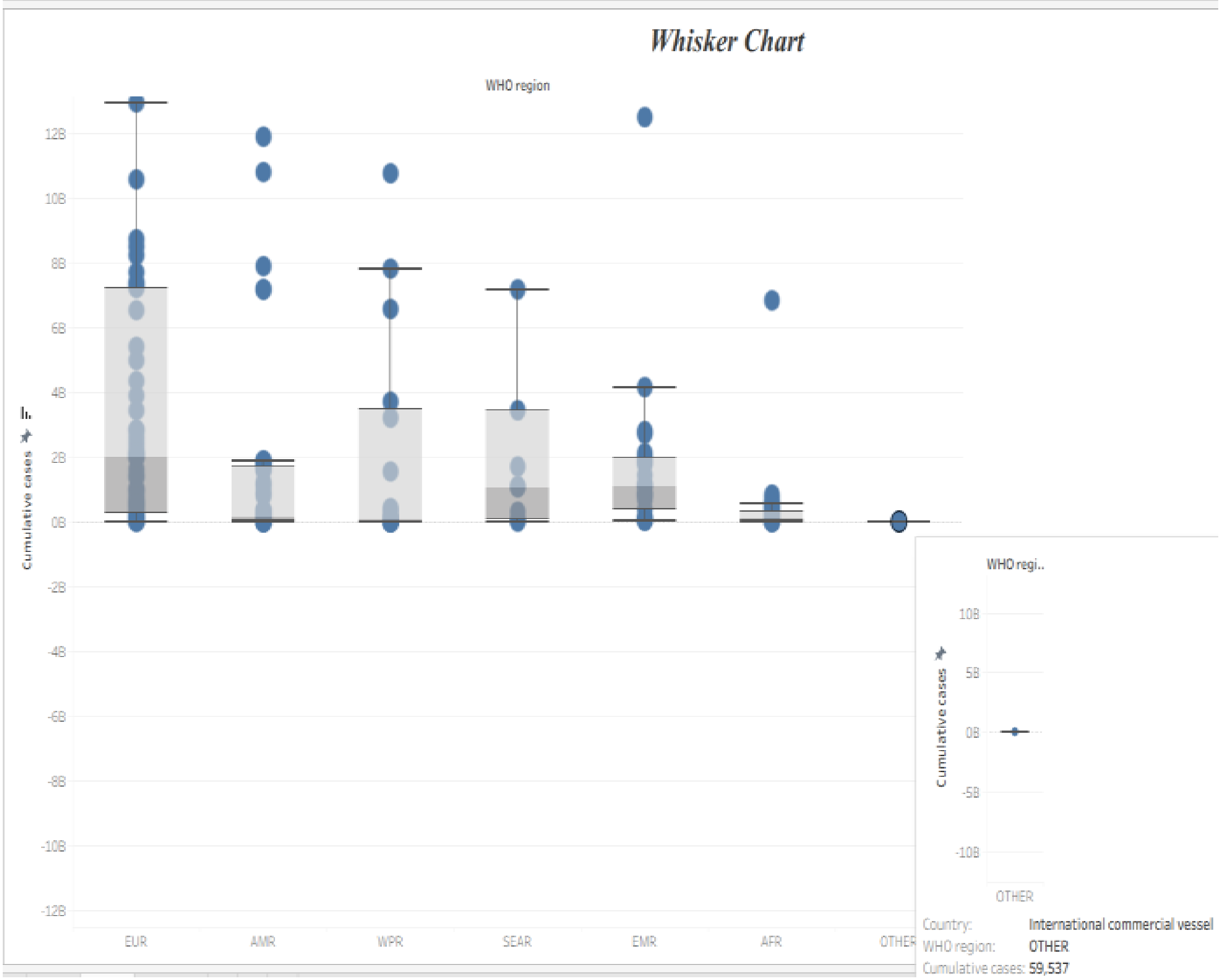

Fig: 19

Chart Description: This is a box-and-whisker plot titled "Whisker Chart". The Y-axis represents Cumulative cases (scaled -12B to 12B), while the X-axis categorizes data by WHO region (EUR, AMR, WPR, SEAR, EMR, AFR, OTHER). Visual elements include grey boxes for interquartile ranges, black whiskers for extremes, and blue dots for individual data points. A tooltip in the bottom right highlights the OTHER region for "International commercial vessel" with 59,537 cumulative cases, displaying a mini chart and specific country details. "WHO region" is labeled at the top center.

Funnel Chart:

Waterfall Chart:

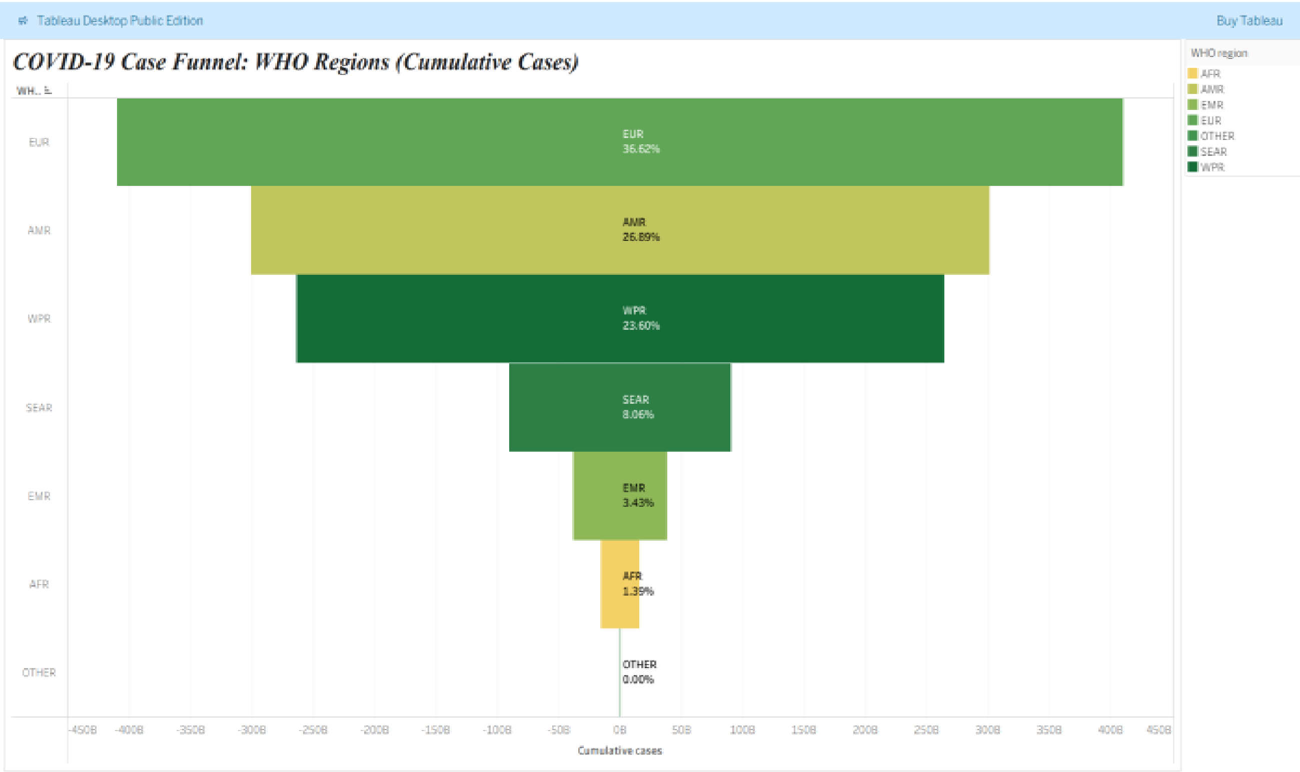

Fig: 20

Chart Description: This is a horizontal bar chart arranged as a funnel, titled "COVID-19 Case Funnel: WHO Regions (Cumulative Cases)". The Y-axis lists WHO regions (EUR, AMR, WPR, SEAR, EMR, AFR, OTHER), while the X-axis displays Cumulative cases (scaled -400B to 450B). Each bar includes a percentage label, with EUR highest at 36.62%, followed by AMR (26.89%) and WPR (23.60%). Bars are colored by WHO region according to the legend on the right. Tableau interface elements show SUM(Cumulative cases) and AGG(Negative Cases) on the Columns shelf, with the Marks card configured for Bar charts.

Waterfall Chart:

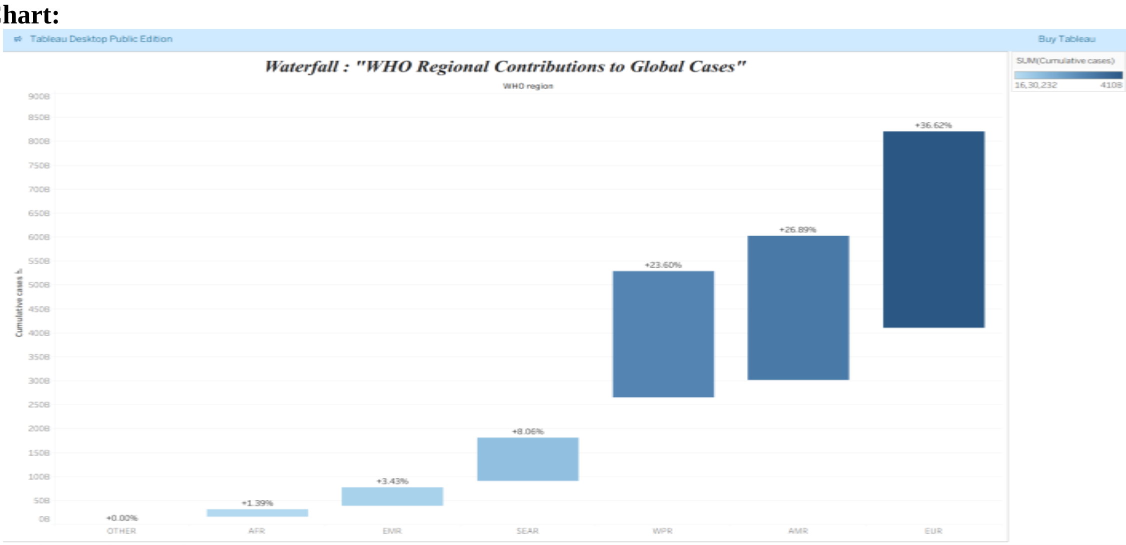

Fig: 21

Chart Description: This is a waterfall chart titled "Waterfall : 'WHO Regional Contributions to Global Cases'". The X-axis lists WHO region (OTHER, AFR, EMR, SEAR, WPR, AMR, EUR), while the Y-axis represents Cumulative cases (0B to 900B). Floating bars display incremental contributions with percentage labels (e.g., EUR +36.62%, AMR +26.89%, WPR +23.60%). A color legend on the right indicates SUM(Cumulative cases) intensity (16,30,232 to 410B), with darker blue representing higher values. Tableau interface elements show WHO region on Columns, SUM(Cumulative cases) on Rows, and the Marks card set to Gantt Bar.

III. CONCLUSION

In conclusion, this study successfully demonstrates that comprehensive data visualization using Tableau provides powerful tools for understanding, analyzing, and communicating the complex dynamics of the COVID-19 pandemic. By transforming raw WHO epidemiological data spanning over 250,000 records across 230+ countries from 2020 to 2026—into intuitive visual representations including horizontal bar charts, time-series line graphs, heat maps, choropleth maps, stacked area charts, and interactive dashboards, this research enables stakeholders to identify temporal patterns, compare regional impacts across six WHO regions, track the progression of cases and deaths, and make informed decisions based on evidence. The methodological framework developed through Modules 2 to 6—including best practices for chart selection, calculated fields, dashboard interactivity, filter actions, and narrative storytelling—provides a replicable model for future public health surveillance and outbreak response efforts.

As the world continues to face emerging infectious disease threats, the integration of robust data analytics with effective visual communication will remain essential for translating complex health data into actionable insights. This research contributes to that vital endeavor by demonstrating how thoughtful visualization design, grounded in dataviz best practices and implemented through Tableau's interactive capabilities, can illuminate pandemic patterns, support evidence-based decision-making, and ultimately contribute to more effective public health responses in an increasingly data-driven world.

IV. REFERENCES

[1]. Hamzah F. Binti, et al. (2020). CoronaTracker: worldwide COVID-19 outbreak data analysis and prediction, Bull World Health Organ, (pp.1–32).

[2]. Ramadan Ahmed, et al. (2020). A multivariate data analysis approach for investigating daily statistics of countries affected with COVID-19 pandemic, Heliyon, (pp.1–10).

[3]. Eltoukhy Abdelrahman EE, et al. (2020). Data analytics for predicting COVID-19 cases in top affected countries: observations and recommendations, International Journal of Environmental Research and Public Health, (pp.7080).

[4]. Dash Sujata, et al. (2021). Intelligent computing on time-series data analysis and prediction of COVID-19 pandemics, Pattern Recognition Letters, (pp.69–75).

[5]. Dey Samrat K., et al. (2020). Analyzing the epidemiological outbreak of COVID-19: A visual exploratory data analysis approach, Journal of Medical Virology, (pp.632–638).

[6]. Mondal M. Rubaiyat Hossain, et al. (2020). Data analytics for novel coronavirus disease, Informatics in Medicine Unlocked, (pp.100374).

[7]. Hoque Ashabul, Malek Abdul, and Zaman KM Rukhsad Asif. (2022). Data analysis and prediction of the COVID-19 outbreak in the first and second waves for top 5 affected countries in the world, Nonlinear Dynamics, (pp.77–90).

[8]. Sadowski Adam, et al. (2021). Big data insight on global mobility during the Covid-19 pandemic lockdown, Journal of Big Data, (pp.78).

[9]. Akhtar Nikhat, et al. (2020). Data analytics and visualization using Tableau utilitarian for COVID 19 (Coronavirus), Global Journal of Engineering and Technology Advances, (pp.1–12).

[10]. Healey Christopher G., et al. (2022). Visual analytics for the coronavirus COVID-19 pandemic, Big Data, (pp.95–114).

[11]. Shuja Jawad, et al. (2021). COVID-19 outbreak prediction and analysis using machine learning and data visualization techniques, IEEE Access, (pp.58315–58328).

[12]. Batra Shalini, et al. (2021). Interactive dashboards for real-time monitoring of COVID-19: A comparative study of Tableau, Power BI, and Qlik, Journal of Healthcare Informatics Research, (pp.245–267).

[13]. Gupta Rakesh, et al. (2021). Geospatial visualization of pandemic spread: A Tableau-based approach for COVID-19 surveillance, International Journal of Geographical Information Science, (pp.1623–1645).

[14]. Chen Min, et al. (2021). Design principles for effective public health dashboards: Lessons from COVID-19 data visualization, Journal of Biomedical Informatics, (pp.103935).

[15]. Knaflic Cole Nussbaumer. (2022). Storytelling with data in public health: Visual communication strategies for pandemic response, Data Visualization in Health Communication, (pp.89– 104).

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