Where is the Coronavirus Situation the Worst?

Data Journalism Project — General Assembly Singapore Data Analytics Bootcamp

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COVID-19: A Global Pandemic

Timeline & Origins

- **December 2019:** First cases identified in Wuhan, China
- **January 2020:** WHO declares Public Health Emergency of International Concern
- **March 11, 2020:** WHO officially declares global pandemic
- **2020–2021:** Multiple devastating waves spread across continents
- **2022:** Omicron variant causes unprecedented surge in cases
- **2023–2024:** Transition to endemic phase begins globally

Devastating Global Impact

- **770+ million** confirmed cases worldwide
- **6.9+ million** deaths recorded globally
- **$12.5 trillion** in economic losses (2020–2024)
- Healthcare systems overwhelmed in most countries
- Unprecedented lockdowns implemented across continents
- Education disrupted for **1.6 billion students**
- Employment crisis: **255 million jobs** lost worldwide
- Mental health crisis escalated dramatically

External Factors Influencing COVID-19 Outcomes

Healthcare Infrastructure

- Hospital beds per capita: Critical for managing severe cases
- ICU capacity: Determines ability to handle respiratory failures
- Healthcare workforce availability
- Medical equipment stockpiles

Demographics & Population

- Median age: Older populations faced higher mortality risk
- Population density: Urban areas saw faster transmission
- Comorbidities prevalence
- Life expectancy indicators

Socioeconomic Factors

- GDP per capita: Economic resources for response
- Poverty rates affected isolation ability
- Human Development Index
- Basic hygiene infrastructure

Government Policy Response

- Stringency Index measures
- Testing capacity and contact tracing
- Vaccination rollout speed
- Travel restrictions timing

Data Source & Methodology

Data Source: Our World in Data (OWID)

- GitHub Repository: **owid/covid-19-data**
- Daily updates from over 200 countries
- Comprehensive metrics: cases, deaths, hospitalisations, vaccinations
- Standardised per-million calculations for fair comparison
- Smoothed data to reduce reporting noise and anomalies
- Includes crucial socioeconomic indicators
- **Time period:** January 2020 – December 2024

Analysis Approach

Key Metrics Analysed:

- New cases/deaths per million (7-day smoothed)
- Total cases/deaths per million
- Hospital & ICU admissions
- Vaccination coverage rates
- Stringency Index (policy response)
- Excess mortality estimates

Why per-million rates? Makes countries directly comparable regardless of population size, ensuring fair analysis.

Focus Countries: Peru, Bulgaria, Brazil, Singapore, North Macedonia, Hungary, United Kingdom, United States, India

Let's Explore the Data

1 **Global Trends**

Tracking worldwide patterns in cases, deaths, and vaccinations over the entire pandemic period

2 **Regional Comparisons**

Analysing how different continents and countries experienced vastly different outcomes

3 **Temporal Patterns**

Understanding how the pandemic evolved through distinct phases from 2020 to 2024

4 **Policy Impact**

Evaluating the effectiveness of government responses and intervention strategies

Interactive Tableau Dashboards provide comprehensive visual analysis across four key dimensions

Key Insights from COVID-19 Data Analysis

01

Temporal Patterns: Cases vs Deaths Divergence

Deaths peaked in 2021, whilst cases peaked in 2022 during the Omicron wave. This critical divergence reflects improved treatments, widespread vaccination coverage, and lower variant severity. From 2023 onwards, sustained low mortality persisted despite continued transmission.

02

Regional Disparities in Outcomes

South America (Peru, Brazil): Highest death rates per million, especially devastating in 2021. **Europe** (Bulgaria, Hungary): Multiple waves with high mortality in 2020–2021. **Oceania** (Australia, New Zealand): Lowest mortality throughout, benefiting from geographic isolation and strict early policies. **Asia** (Singapore, South Korea): Effective early response, high testing capacity, and robust healthcare systems.

03

Healthcare Capacity & Mortality Correlation

Hospital and ICU admissions peaked in 2021, aligning precisely with highest death rates. Countries with higher hospital beds per capita demonstrated significantly better outcomes. By 2022, hospital burden decreased markedly despite high case counts—a clear vaccination effect.

Key Insights (continued)

Vaccination Impact: The Game Changer

Vaccination rollout began late 2020 and accelerated through 2021. Countries with faster vaccine deployment (UK, Singapore, US) experienced earlier mortality declines. Booster campaigns in 2022 coincided with reduced severity despite Omicron's exceptional transmissibility. Clear correlation: higher vaccination rates led to dramatically lower death-to-case ratios.

Policy Stringency vs Outcomes: Complex Relationship

High stringency in 2021 often reflected reactive response to severe waves, not policy failure. 2022 saw broad policy relaxation as deaths declined (vaccination + immunity effect). Oceania demonstrated that high stringency combined with low deaths equals effective early containment. Europe and the Americas showed mid-high stringency but higher deaths due to timing, density, and healthcare capacity constraints.

Socioeconomic Factors Matter Significantly

Higher GDP per capita correlated strongly with better healthcare access and improved outcomes. Countries with higher Human Development Index scores showed faster recovery trajectories. Median age proved crucial: older populations (particularly in Europe) faced substantially higher mortality risk. Diabetes prevalence and underlying comorbidities significantly influenced death rates across all regions.

Conclusions & Recommendations

Main Conclusions

- The pandemic evolved through distinct phases: **emergence** (2020), **peak mortality** (2021), **high transmission/low severity** (2022), and **endemic transition** (2023–2024)
- Vaccination was the single most effective intervention, successfully breaking the link between cases and deaths
- Healthcare infrastructure capacity directly influenced mortality outcomes across all regions and time periods
- Geographic, demographic, and socioeconomic factors created vastly different pandemic experiences between nations
- Policy responses were highly context-dependent; no one-size-fits-all approach succeeded everywhere

Recommendations for Future Pandemic Preparedness

- **Invest in healthcare infrastructure:** Increase ICU capacity and hospital beds per capita significantly
- **Strengthen global vaccine networks:** Improve manufacturing and equitable distribution systems
- **Develop flexible policy frameworks:** Create evidence-based approaches that adapt to evolving situations
- **Improve real-time data systems:** Enhance collection and sharing across countries and organisations
- **Address socioeconomic inequalities:** Reduce disparities that amplify pandemic impacts on vulnerable populations
- **Maintain preparedness:** Continue vigilance even during endemic phases to prevent future outbreaks

Final Takeaways

Data-driven decision making saves lives

Evidence-based policies and real-time data analysis proved essential for effective pandemic response

Global cooperation is essential

Information sharing, resource allocation, and coordinated responses across borders remain critical

Preparedness prevents catastrophe

Investing in healthcare infrastructure and pandemic readiness today protects lives tomorrow

Healthcare equity must be a priority

Ensuring equitable access to healthcare, vaccines, and treatment reduces preventable deaths

Science and public health work

Vaccination, evidence-based medicine, and robust public health infrastructure demonstrably save lives

Thank You

Questions?

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References & Data Sources

Primary Data Source

Our World in Data — COVID-19 Dataset

github.com/owid/covid-19-data

Ritchie, H., Mathieu, E., Rodés-Guirao, L., et al. (2020–2024)

Analysis Tools

- Tableau Desktop (Data Visualisation)
- Microsoft Excel (Data Processing)
- Microsoft PowerPoint (Presentation)

Additional References

- **World Health Organisation (WHO)**
  who.int/emergencies/diseases/novel-coronavirus-2019
- **Johns Hopkins University — COVID-19 Dashboard**
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