Policy Proposal

COVID-19 Policy Analysis

May 7th, 2024

Team 24 - Mason Carlucci, Moses Chen, Sviatoslav Shevchenko, Freya Zhu

Meet the Team

Mason

Project Manager

Moses

Data Engineer

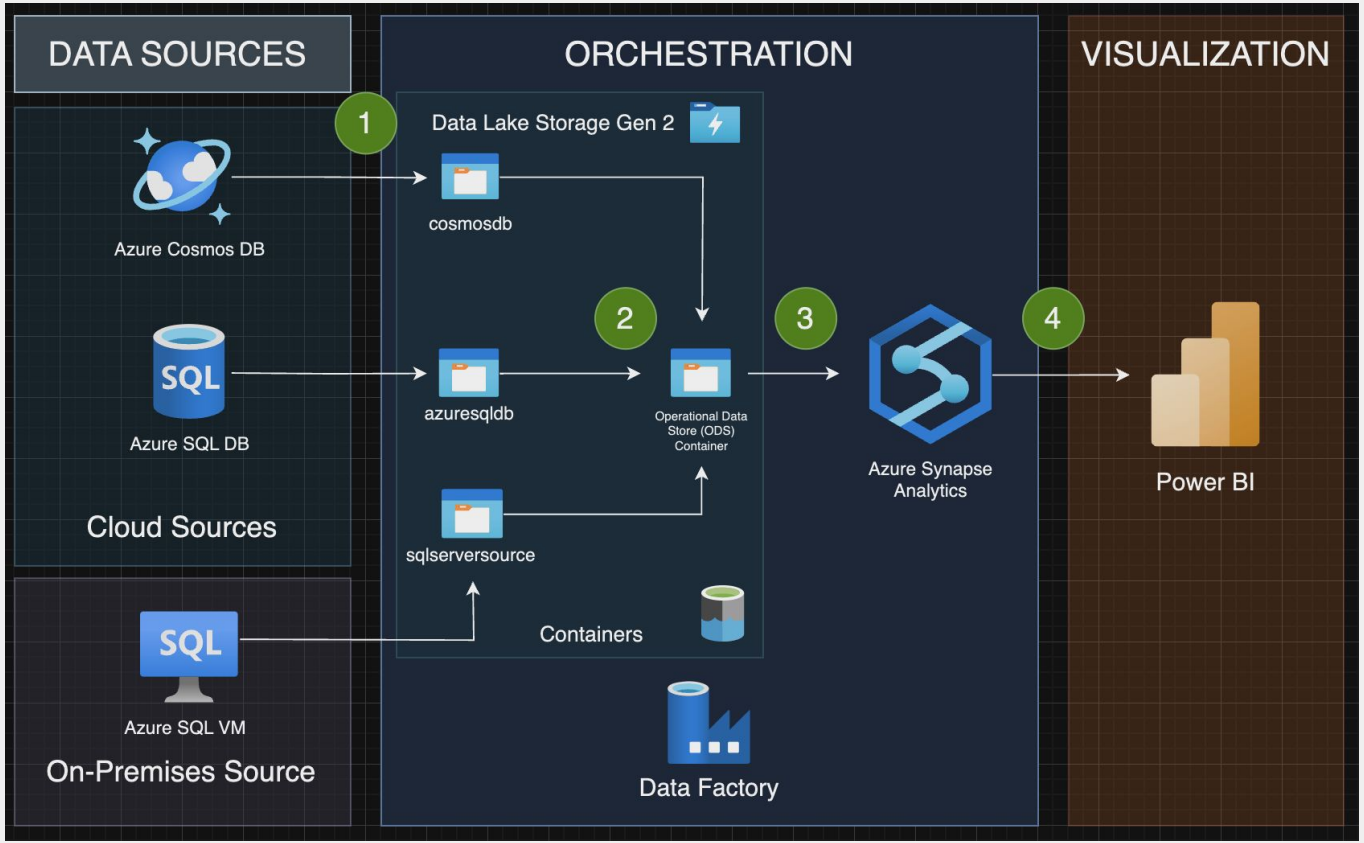
Sviatoslav

Data Architect/DB Admin

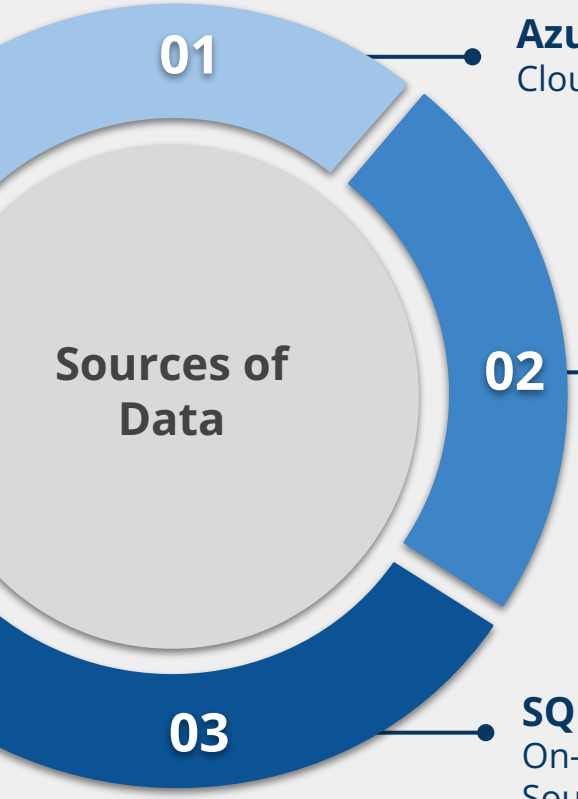
Freya

Data/BI Analyst

The Data Flow and Services Architecture Diagram illustrates the flow of data through extraction, orchestration, and visualization with adjacent services



Data was extracted from three sources while ensuring data validity and minimizing data redundancy



Azure SQL Database
Cloud Source

Cosmos DB
Cloud Source

SQL Server (VM)
On-Premises Source

Azure SQL Database

- Created pipeline with SQL Database as the linked service
- Landed files into the SQL Database container in parquet format

Cosmos DB

- Created pipeline with CosmosDB as the linked service
- Changed mapping to remove errors
- Landed into the CosmosDB container as parquet

SQL Server (VM)

- Deployed data factory within and configured its SHIR
- Connect to Virtual Machine
- Pull the files from SQL Server with pipeline and land files into the SQL Server container

After the data was extracted, it was transformed using SQL, and loaded into a centralized Operational Data Store

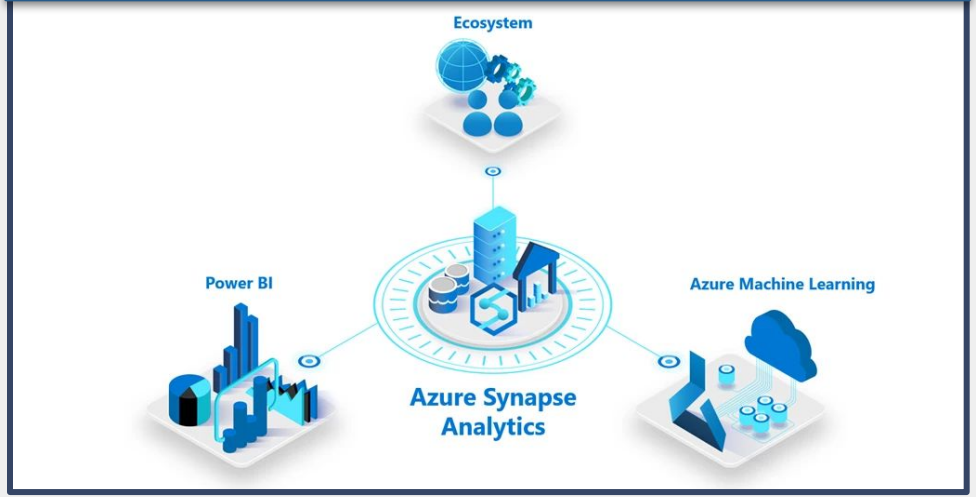
Transforming Raw Data

We accessed the **SQL Database query editor to create tables for each file**, assigning the appropriate data types as specified in the consolidated project details file. Subsequently, multiple pipelines were established in the data factory to accurately **transfer the data into their designated tables and the Operational Data Store (ODS)**.

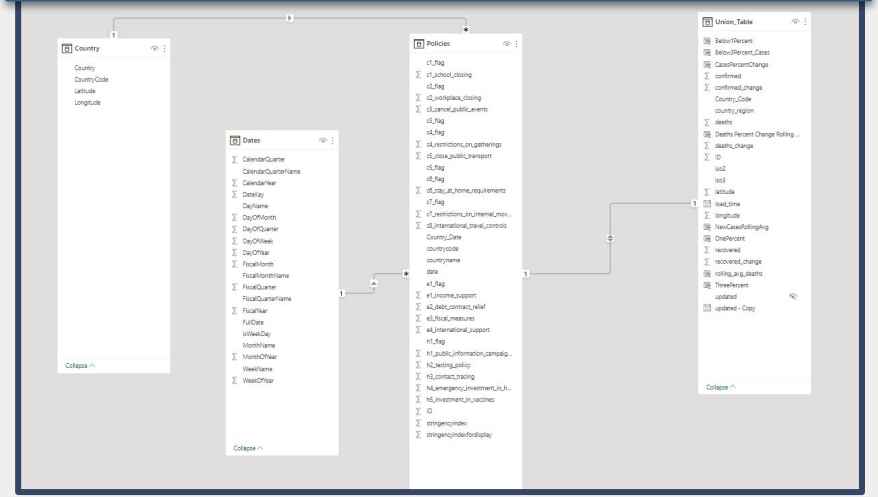
- New Operational Data Store
- Data Standardization
- Centralized Data Access
- Data Preservation

The newly transformed data was loaded into Azure Synapse Analytics, followed by PowerBI where data analysis and visualization was conducted

Loading Processed Data



Analyzing and Visualizing Data



Key Takeaway

The **ODS was connected to Azure Synapse via the Data tab**, enabling visualization and ensuring files were sourced uniquely. To support reporting needs, a **Data Warehouse was set up using existing Serverless Pools in Synapse,** linking to Fact and Dimension files in the Data Lake through External Tables.

Key Takeaway

After connecting the Power BI to the Azure SQL Database we were able to create **a star schema**. The nature of the tables necessitated new columns, such as **Country_Code and Country_Date to create relationships between Policy, Union_Table, Dates, and Country tables.**

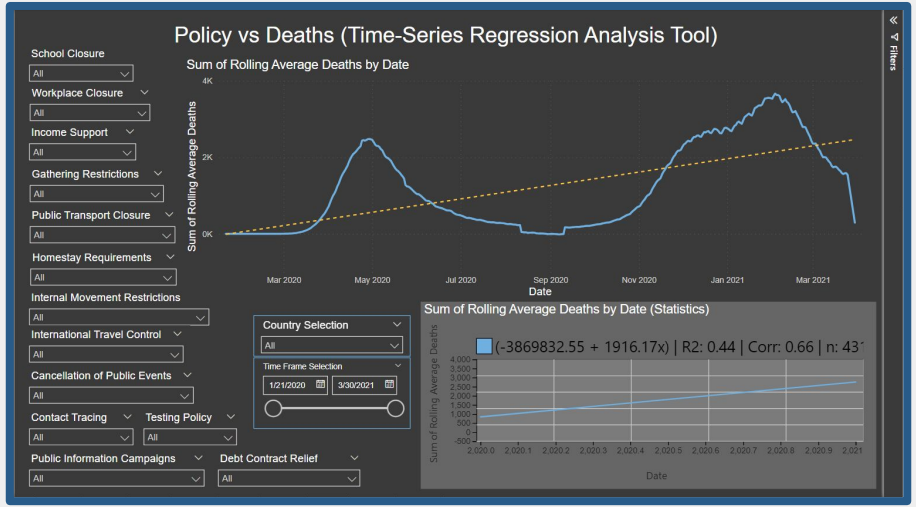
PowerBI Report Walk-Through

Dashboard Creation

- Focus on policy implementation
- Effects on % change:
  - New Cases 30-Day Rolling Average
  - Deaths 30-Day Rolling Average

DEMO

Power BI Report Native Regression Policy Implementation Analysis Tools



Key Takeaway

The initial implementation of any policy at lower levels or even higher levels did not allow for a decreasing line of regression in rolling average cases, with them being at a consistent rise in any case. However, the **simultaneous implementation of several policies (varying levels), produced a regression line approaching a correlation coefficient of 0 and even becoming downward sloping.**

From the analysis of various dashboards and regressions, the following policies best addressed the COVID-19 death rates and growth grates

2 Workspace Closing
Encourage companies to allow for remote work

4 Stay-at-Home Requirements
Encourage citizens to remain at home and limit outdoor activities

1 Restriction on International Travel
Restrict travel from international countries

3 School Closing
Allow asynchronous schooling and leverage online platforms like Zoom

5 Cancel Public Events
Place restrictions on large gatherings (like concerts) to reduce contraction rates

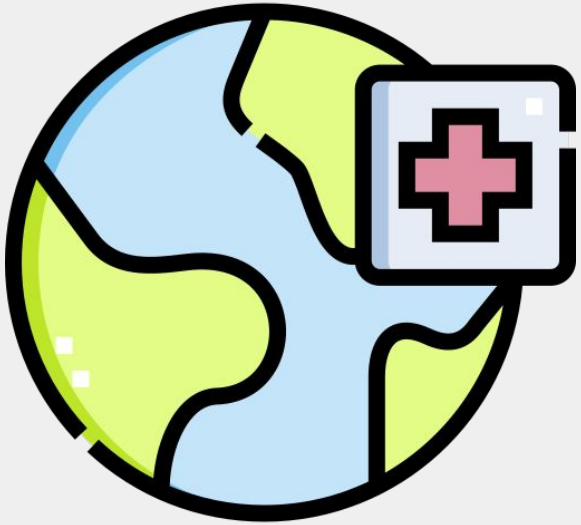
Caladan must implement proactive policies to ensure that growth rate of COVID-19 deaths remain below 1% and the growth rate of new cases below 3%

Final Recommendation:

While no country perfectly reflects Caladan, the policies they have implemented and their impacts can serve as a reference. Caladan might consider adopting the following policies:

1. Restriction on international travel (3)
2. Workplace closing (1)
3. School closing (2)

Through these policies, Caladan can help contain the spread of COVID-19.



Appendix

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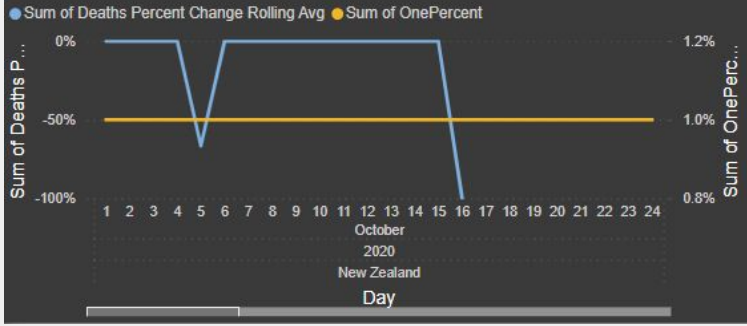
Mason Carlucci, Moses Chen, Sviatoslav Shevchenko, Freya Zhu

Power BI Dashboards

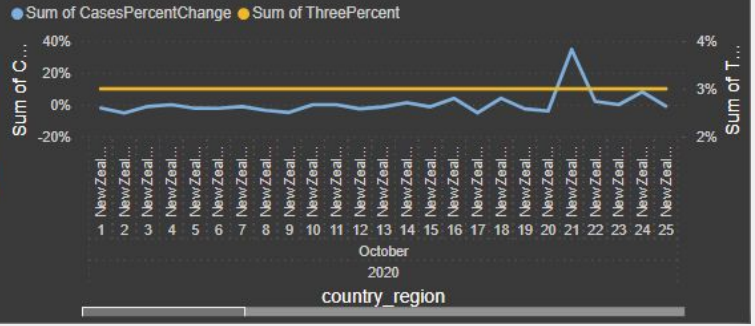
COVID-19 Cases In New Zealand

date	countryname	Sum of c1_school_closing	Sum of c2_workplace_closing	Sum of c3_cancel_public_events	Sum of c4_restrictions_on_gatherings	Sum of c5_close_public_transport	Sum of c6_st
2020-10-01	New Zealand	0.00	0.00	1.00	3.00	0.00	
2020-10-02	New Zealand	0.00	0.00	1.00	3.00	0.00	
2020-10-03	New Zealand	0.00	0.00	1.00	3.00	0.00	
2020-10-04	New Zealand	0.00	0.00	1.00	3.00	0.00	
2020-10-05	New Zealand	0.00	0.00	1.00	3.00	0.00	
2020-10-06	New Zealand	0.00	0.00	1.00	3.00	0.00	
2020-10-07	New Zealand	0.00	0.00	0.00	0.00	0.00	
2020-10-08	New Zealand	0.00	0.00	0.00	0.00	0.00	
2020-10-09	New Zealand	0.00	0.00	0.00	0.00	0.00	
2020-10-10	New Zealand	0.00	0.00	0.00	0.00	0.00	
2020-10-11	New Zealand	0.00	0.00	0.00	0.00	0.00	
2020-10-12	New Zealand	0.00	0.00	0.00	0.00	0.00	
2020-10-13	New Zealand	0.00	0.00	0.00	0.00	0.00	
2020-10-14	New Zealand	0.00	0.00	0.00	0.00	0.00	
2020-10-15	New Zealand	0.00	0.00	0.00	0.00	0.00	
Total		0.00	0.00	6.00	18.00	0.00	

Sum of Deaths Percent Change Rolling Avg and Sum of OnePercent by country_region, Year, Month and Day



Sum of CasesPercentChange and Sum of ThreePercent by Year, Month, Day and country_region

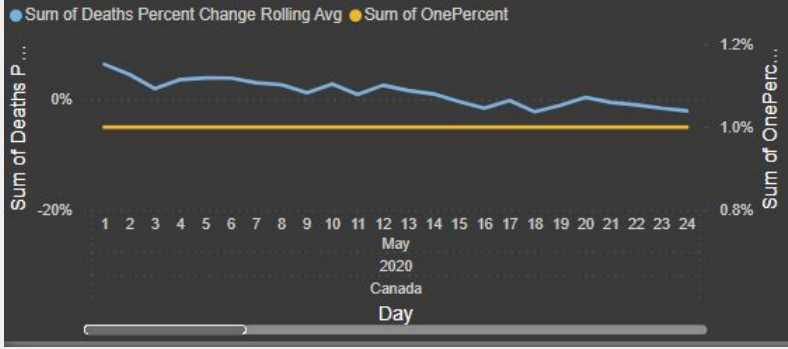


Power BI Dashboards

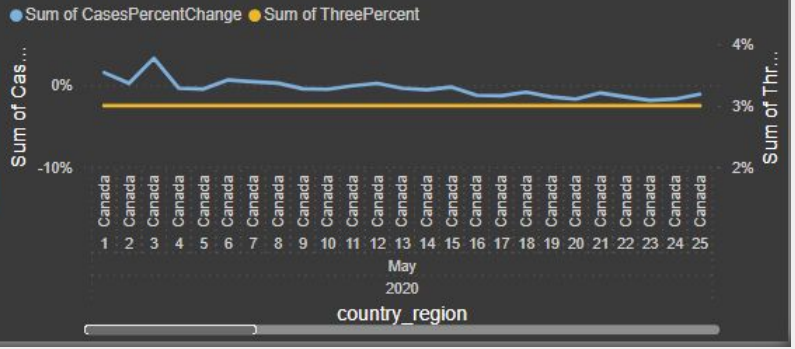
COVID-19 Cases In Canada

date	countryname	Sum of c1_school_closing	Sum of c2_workplace_closing	Sum of c3_cancel_public_events	Sum of c4_restrictions_on_gatherings	Sum of c5_close_public_transport	Sum of c6_sta
2020-05-01	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-02	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-03	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-04	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-05	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-06	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-07	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-08	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-09	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-10	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-11	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-12	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-13	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-14	Canada	3.00	3.00	2.00	4.00	0.00	
2020-05-15	Canada	3.00	3.00	2.00	4.00	0.00	
Total		**276.00**	**236.00**	**184.00**	**368.00**	**0.00**	

Sum of Deaths Percent Change Rolling Avg and Sum of OnePercent by country_region, Year, Month and Day



Sum of CasesPercentChange and Sum of ThreePercent by Year, Month, Day and country_region

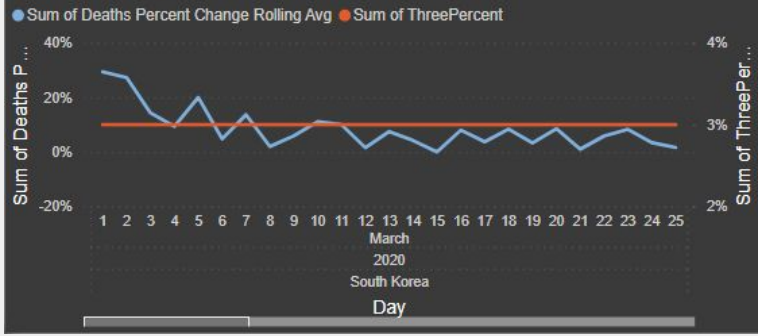


Power BI Dashboards

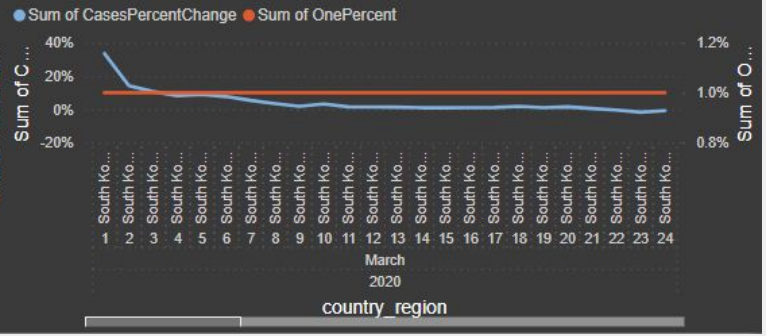
COVID-19 Cases In South Korea

countryname	date	Sum of c1_school_closing	Sum of c2_workplace_closing	Sum of c3_cancel_public_events	Sum of c4_restrictions_on_gatherings	Sum of c6_stay_at_home_requirements	Sum of
South Korea	2020-03-01	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-02	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-03	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-04	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-05	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-06	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-07	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-08	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-09	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-10	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-11	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-12	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-13	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-14	3.00	1.00	2.00	2.00	1.00	
South Korea	2020-03-15	3.00	1.00	2.00	2.00	1.00	
Total		183.00	115.00	111.00	145.00	78.00	

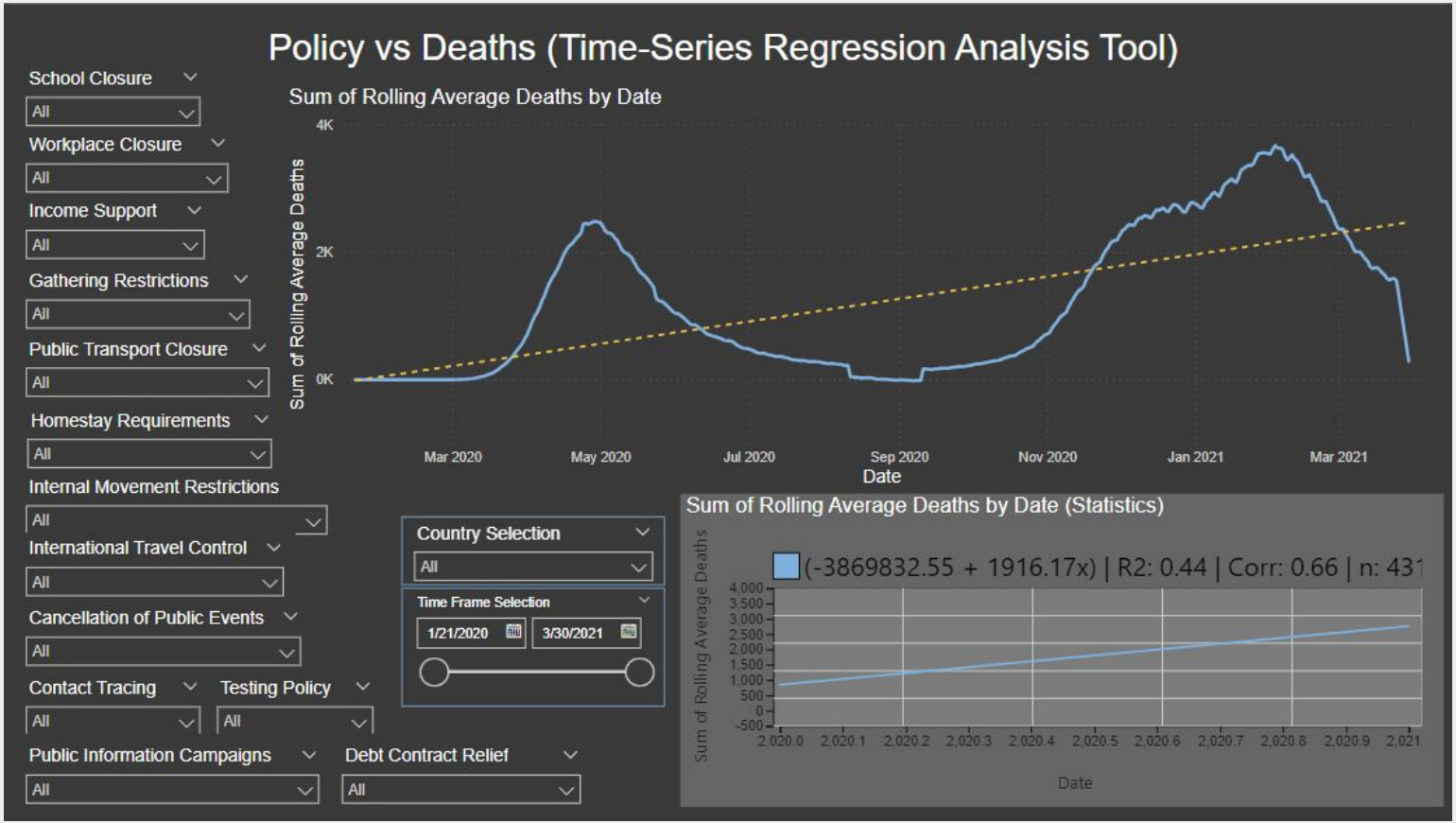
Sum of Deaths Percent Change Rolling Avg and Sum of ThreePercent by country_region, Year, Month and Day



Sum of CasesPercentChange and Sum of OnePercent by Year, Month, Day and country_region



Power BI Dashboards



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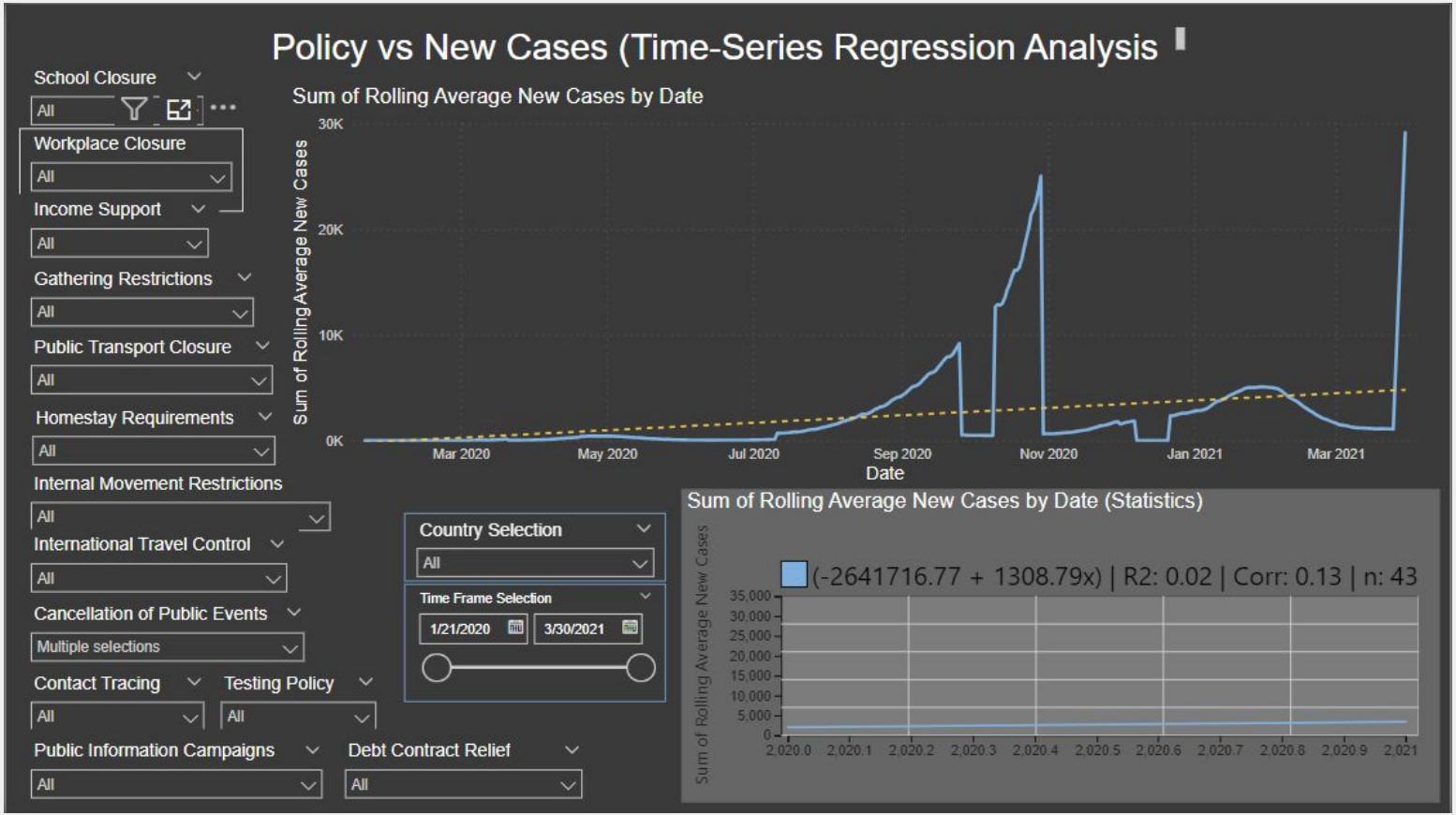

Power BI Dashboards

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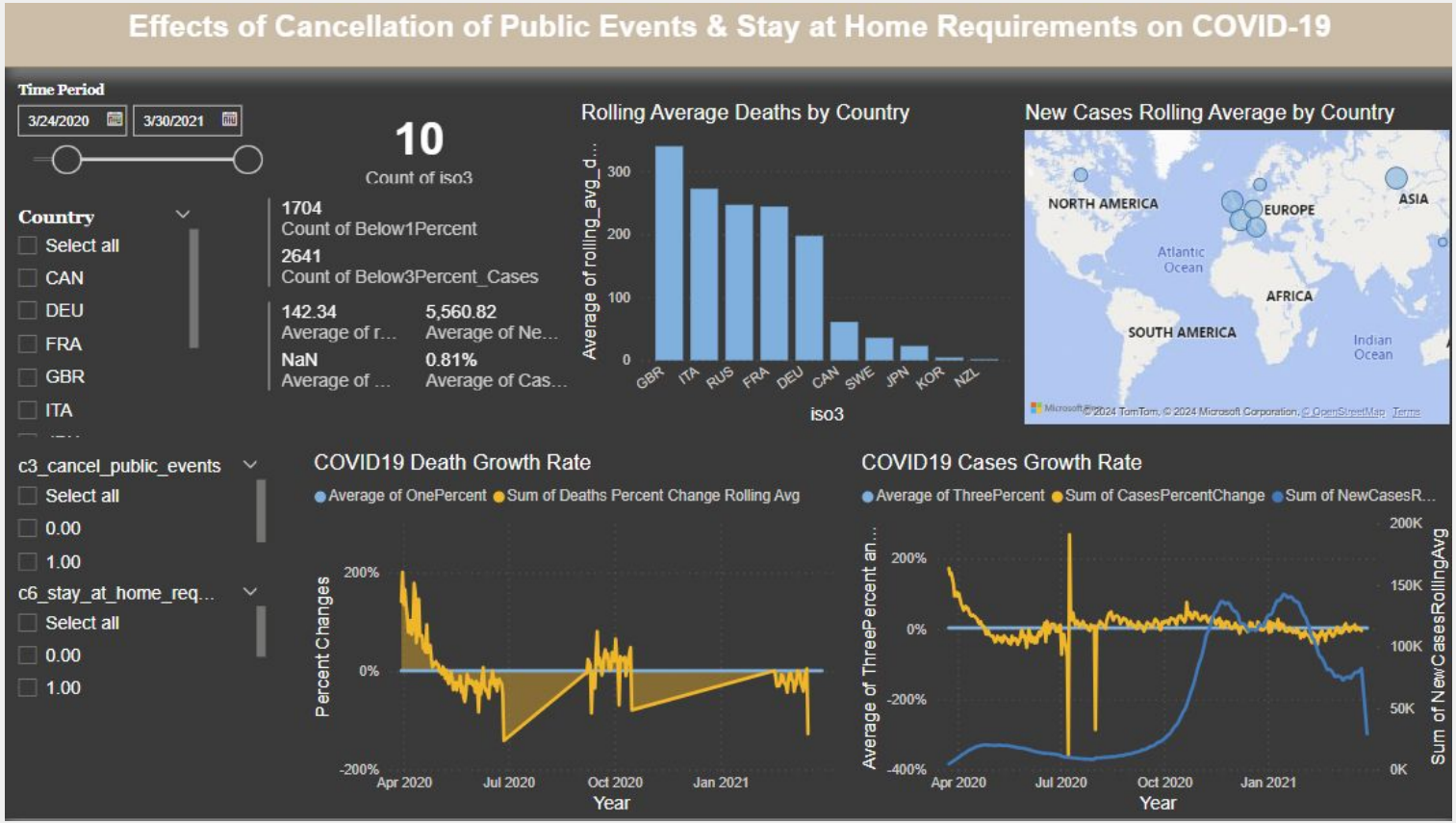

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