



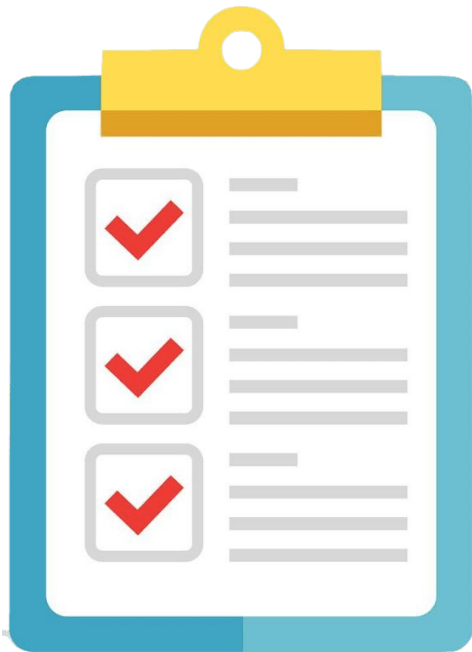
DS310 Team 6

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Pandemic Regulation Strategy for Caladan

Using COVID-19 data
to recommend future
policy implementation





Executive Summary

Problem: Caladan (pop: 3.2m) needs to prevent the next wave of COVID

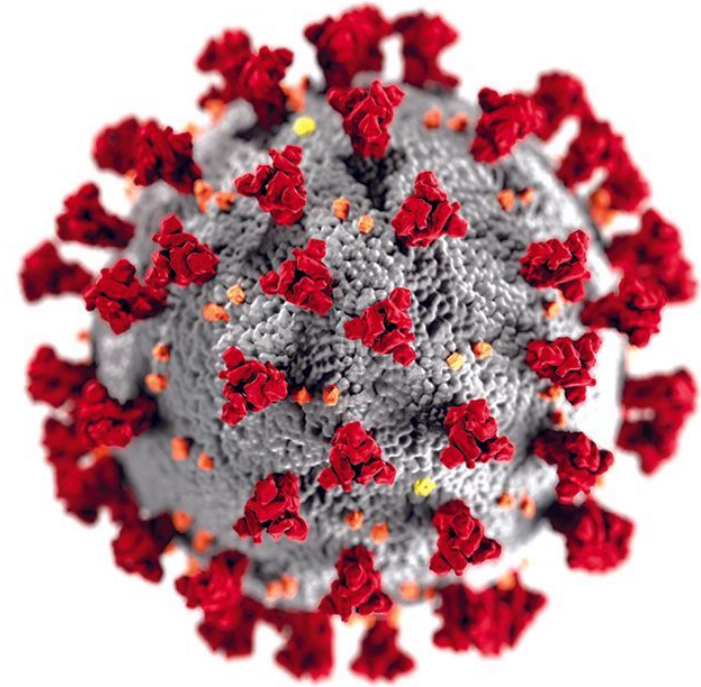
Focus: Permissive regulation (avoid disruptive regulation)

Approach: Use timely, dynamic, and targeted responses



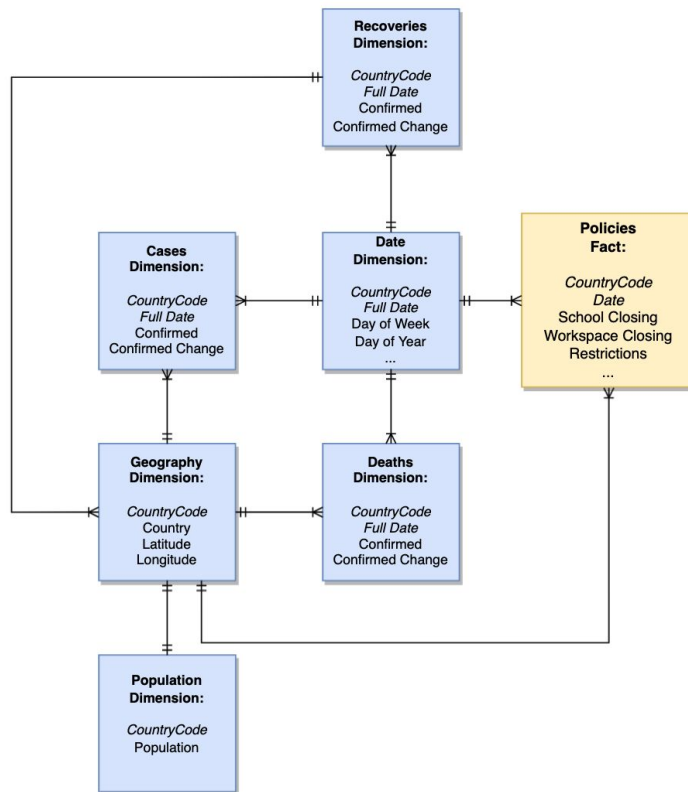
Success Metrics

1. Achieve **< 1%** growth rate of deaths
2. Achieve **< 3%** growth rate of new cases
3. Introduce **more permissive** policies



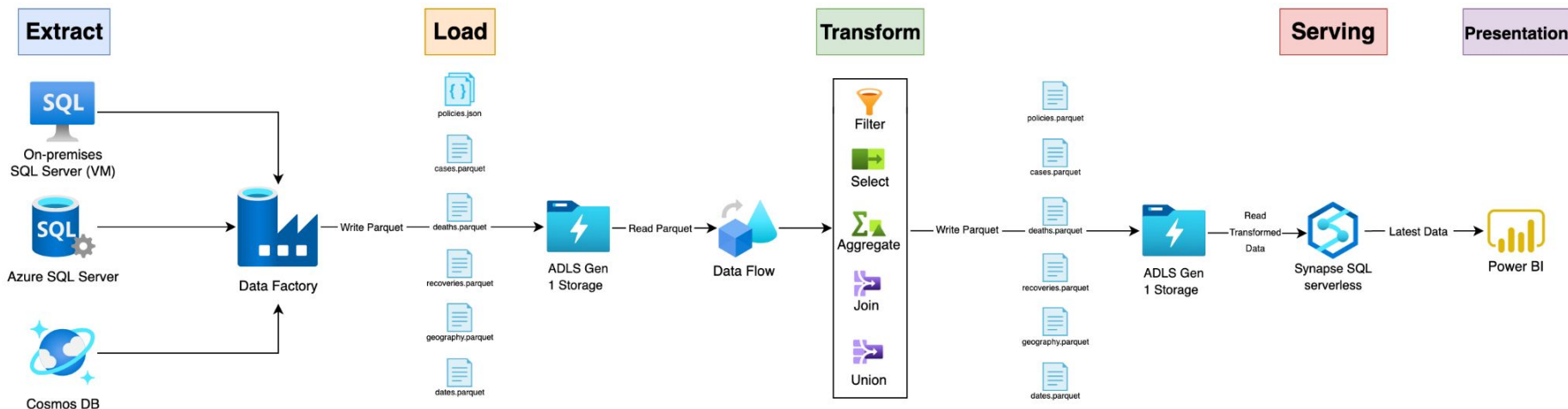


Entity Relationship Diagram





Architecture Overview



Covid Important Dates

March 2020



The WHO declares COVID-19 a global pandemic, acknowledging its rapid spread and severity.

December 2020



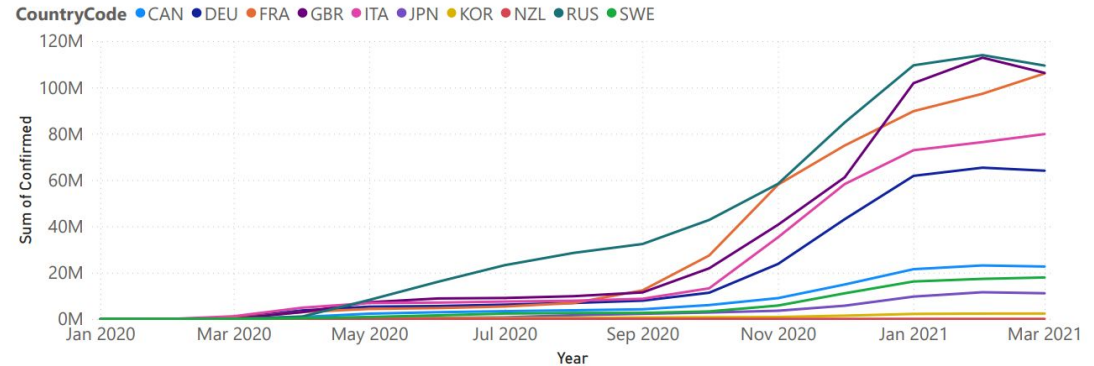
The World Health Organization approves the Pfizer-BioNTech COVID-19 vaccine.



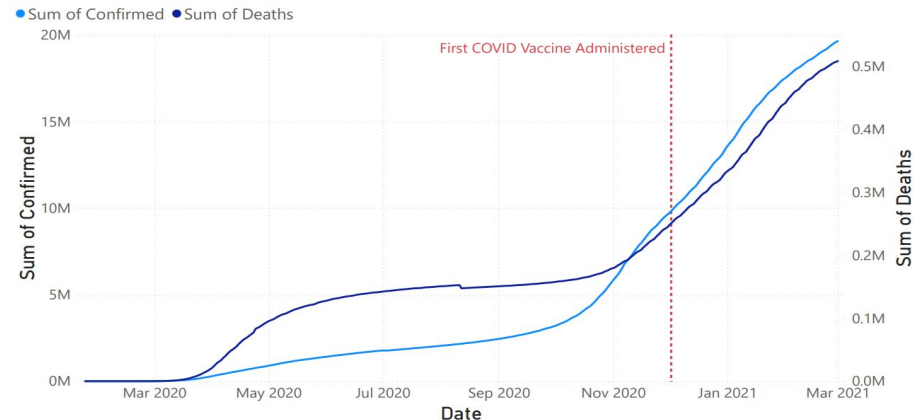
Global Trends

- Focused on Sweden and New Zealand
 - Similar populations to Canada
 - Contrasting COVID policy methods
- Ratio of cases to deaths dropped as the virus progressed

Sum of Confirmed Cases by Country Over Time

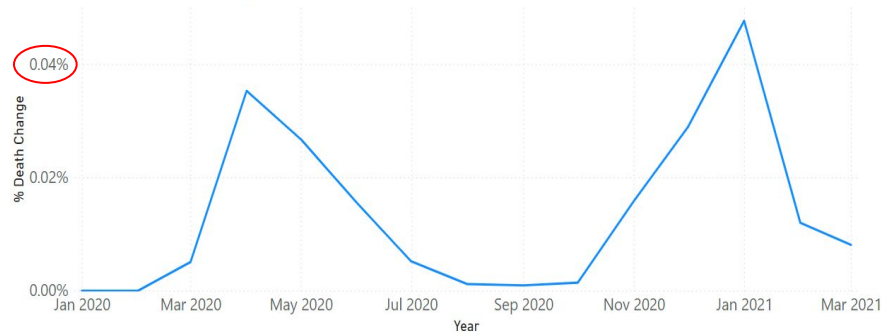


Confirmed Cases and Deaths Over Time

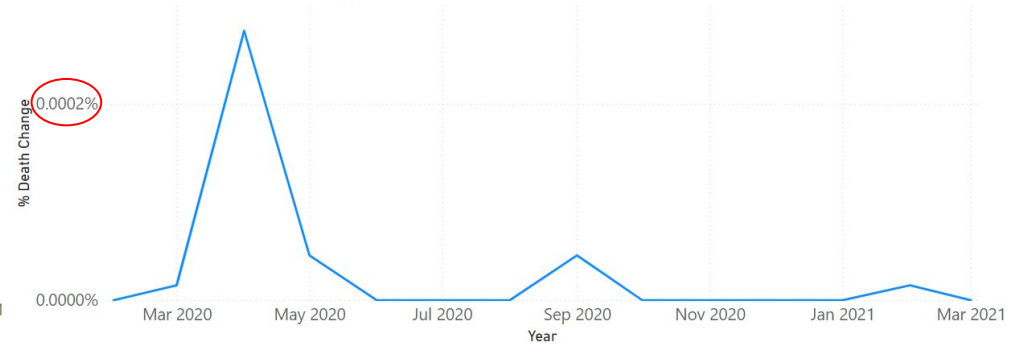


Sweden and New Zealand Death Rates

Sweden: % Death Change Over Time



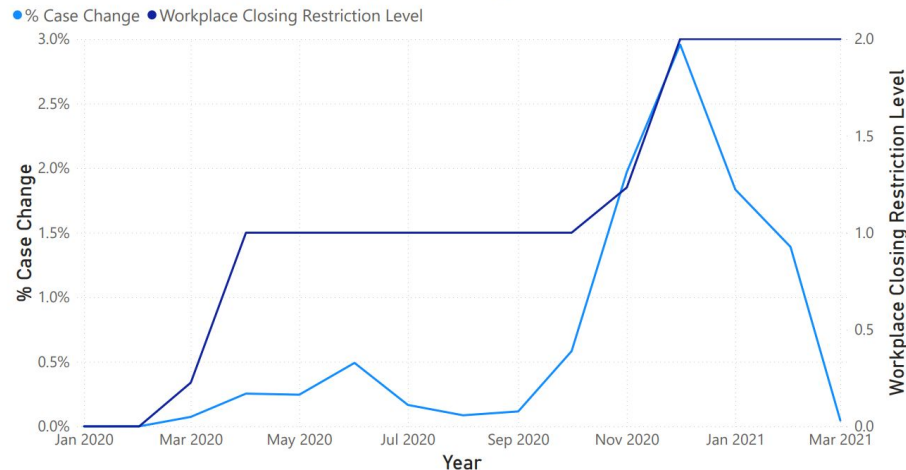
New Zealand: % Death Change Over Time



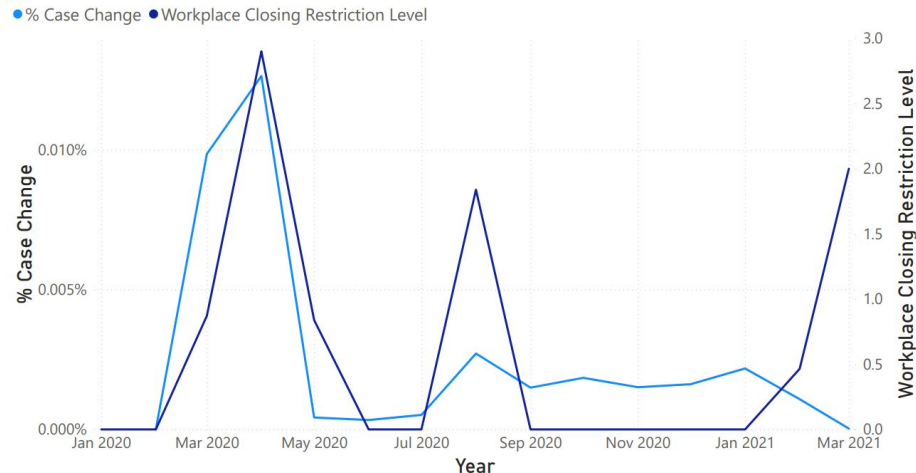
Workplace Closings

0: no restrictions
1: recommend closing (or recommend work from home)
2: require closing (or work from home) for some sectors or categories of workers
3: require closing (or work from home) for all-but-essential workplaces

Sweden: % Case Change and Workplace Closing Restriction Level Over Time



New Zealand: % Case Change and Workplace Closing Restriction Level Over Time



Key Insights:

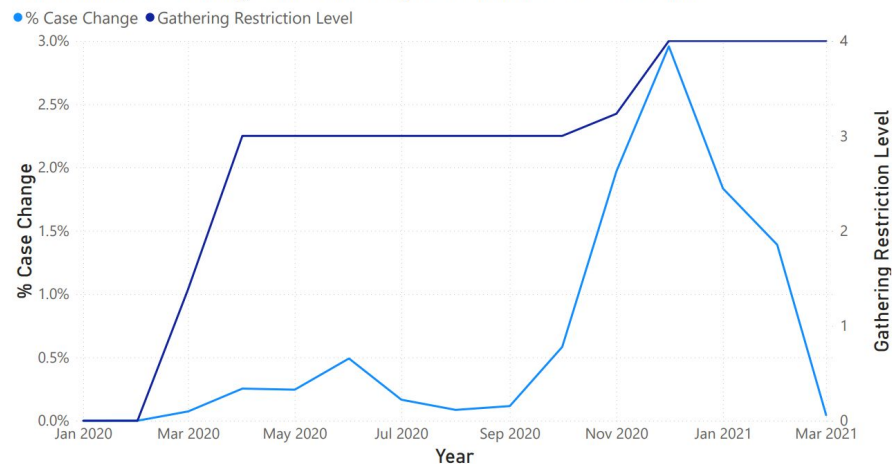
- **Sweden** – An increase in workplace closing restrictions helped to curb case change rate in early 2021
- **New Zealand** – Heavier level 3 restrictions helped curb case changes initially, allowing for lighter restrictions later



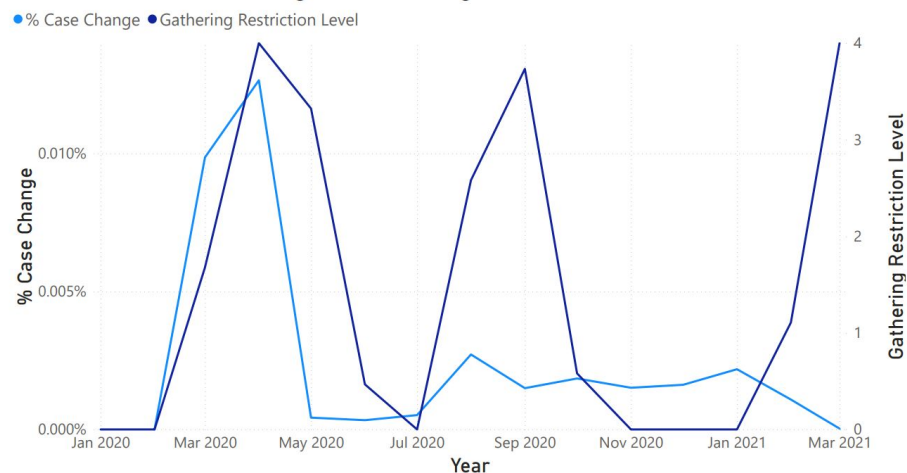
Gathering Restrictions

- 0: no restrictions
- 1: restrictions on very large gatherings (the limit is above 1000 people)
- 2: restrictions on gatherings between 101-1000 people
- 3: restrictions on gatherings between 11-100 people
- 4: restrictions on gatherings of 10 people or less

Sweden: % Case Change and Gathering Restriction Level Over Time



New Zealand: % Case Change and Gathering Restriction Level Over Time



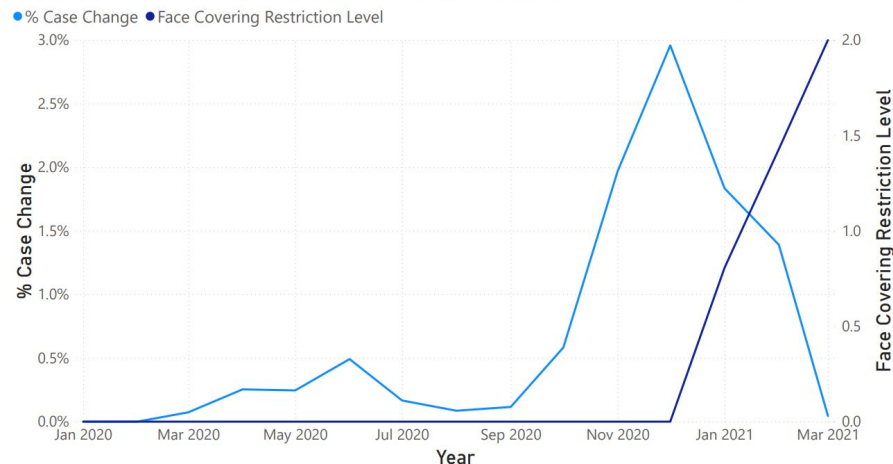
Key Insights:

- **Sweden** – Implementation of level 4 restrictions led to significant drop in case changes
- **New Zealand** – A dynamic approach involving hard level 4 restrictions allowed for rapid decrease in response to case changes

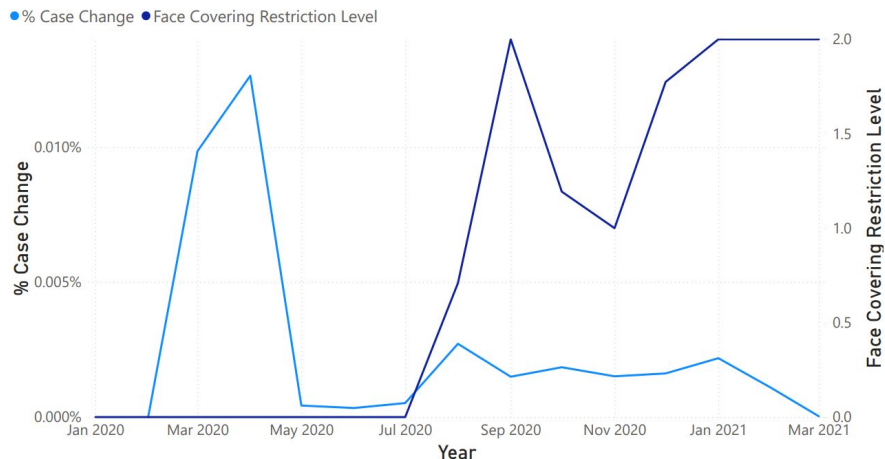


Face Coverings

Sweden: % Case Change and Face Covering Restriction Level Over Time



New Zealand: % Case Change and Face Covering Restriction Level Over Time

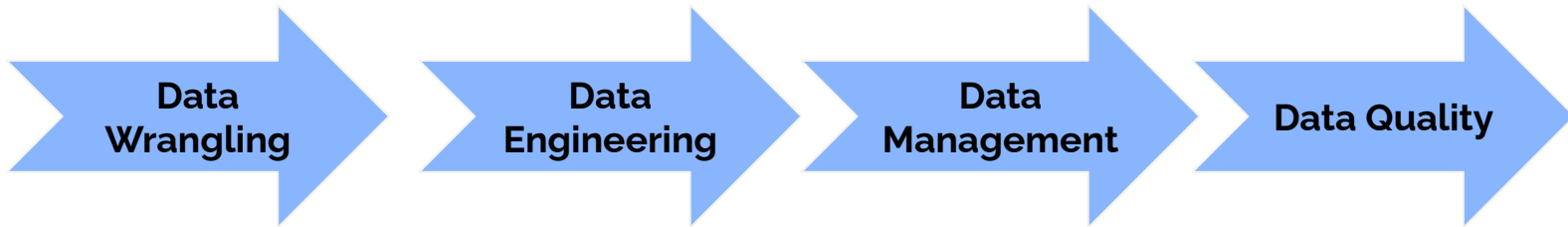


Key Insights:

- **Sweden** – Increased mask restrictions in response to the spike in November 2020 is correlated with a significant decrease in cases
- **New Zealand** – Increased mask restrictions in July 2020 prevented further COVID spikes



Challenges and Limitations



Data extraction process

Variable and file naming conventions

Duplicate and missing values

Relationships between different tables

Permissions for data lake storage and Azure Synapse

Recovery data is generally not reported much, so it's unreliable

Data after March 2021 is insufficient to draw any conclusions from



Recommendations



Timely Response

- Quickly institute heavy restrictions when cases are observed
- Workplace/school and gathering restrictions early
- Encourage face coverings



Dynamic Response

- Reduce restrictions when cases subside
- Immediately reintroduce restrictions when a rise is observed



Targeted Response

- R&D for COVID-19 variants
- At-risk subpopulation: elderly, underlying conditions



Conclusion

Recommendations:

- **Timely Responses:** immediate implementation of strict regulation to curb case growth
- **Dynamic Responses:** reduce restrictions as cases decrease
- **Targeted Responses:** target at-risk subpopulations

Risks:

- Less restrictive policies leads to less immediate impact -> requires greater patience for policy
- Dynamic response can be difficult to communicate with citizens

Next Steps

1. Consult policymakers with findings to implement immediate changes
2. Conduct stress-test surveying with citizens to understand which more restrictive policies could be reasonable
3. Investigate best practices in COVID-19 communication with citizens to increase morale and education
4. Implement big data architectures to monitor Caladan's COVID-19 response

