# COVID 19 Policy Recommendations for Caladan

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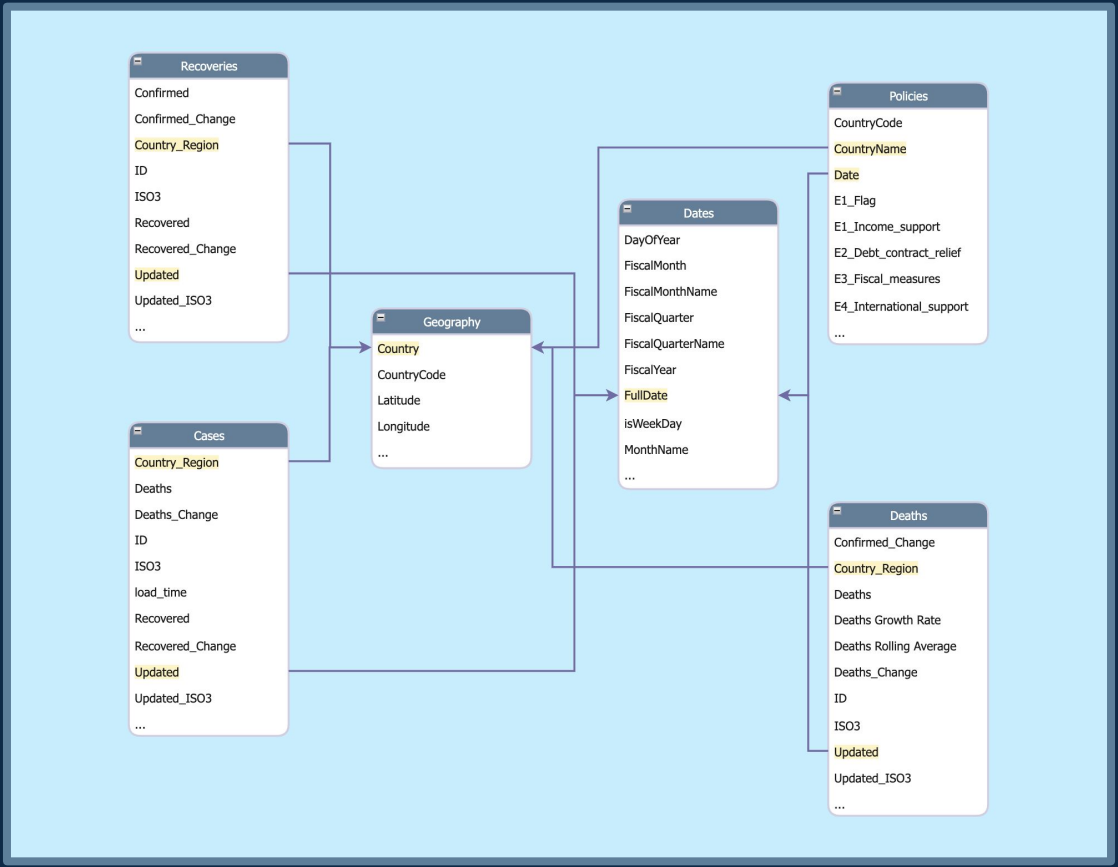
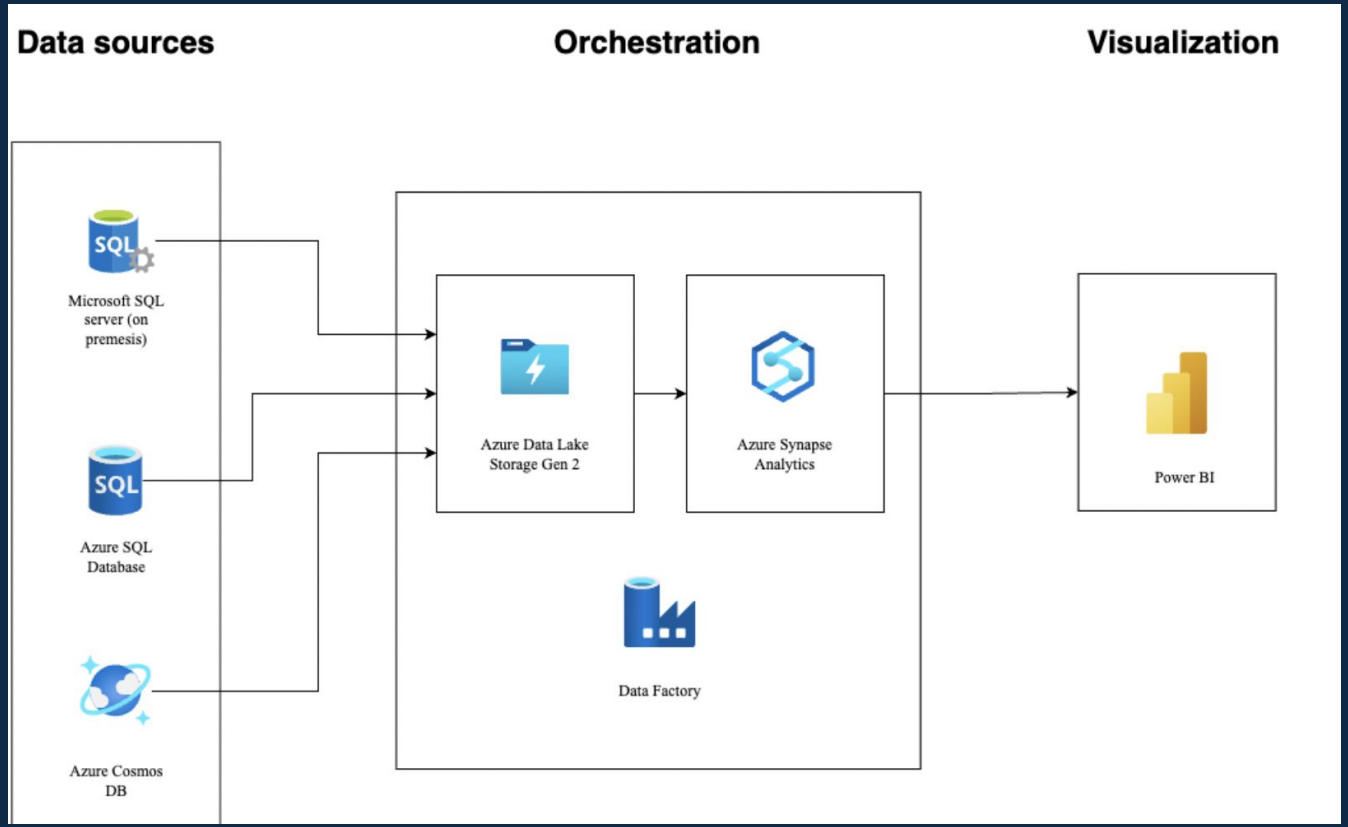
| | |
|---|---|
| **Problem** | Caladan is a midsize commonwealth with a population of 3.2 million, featuring two major urban centers, Duncan and Stillgard. The leaders of Caladan are concerned about the impact of the virus and are seeking effective policies to mitigate its spread while keeping the economy as unrestricted as possible. |
| **Goals** | Help Caladan's government leaders determine the most effective, minimally restrictive policies that can keep the growth rate of COVID-19 deaths below 1% and the growth rate of new cases below 3% on a 30-day rolling average. |
| **Approach** | Utilized a linear regression model to examine the relationship between the policies and the death growth rates/cases growth rates |

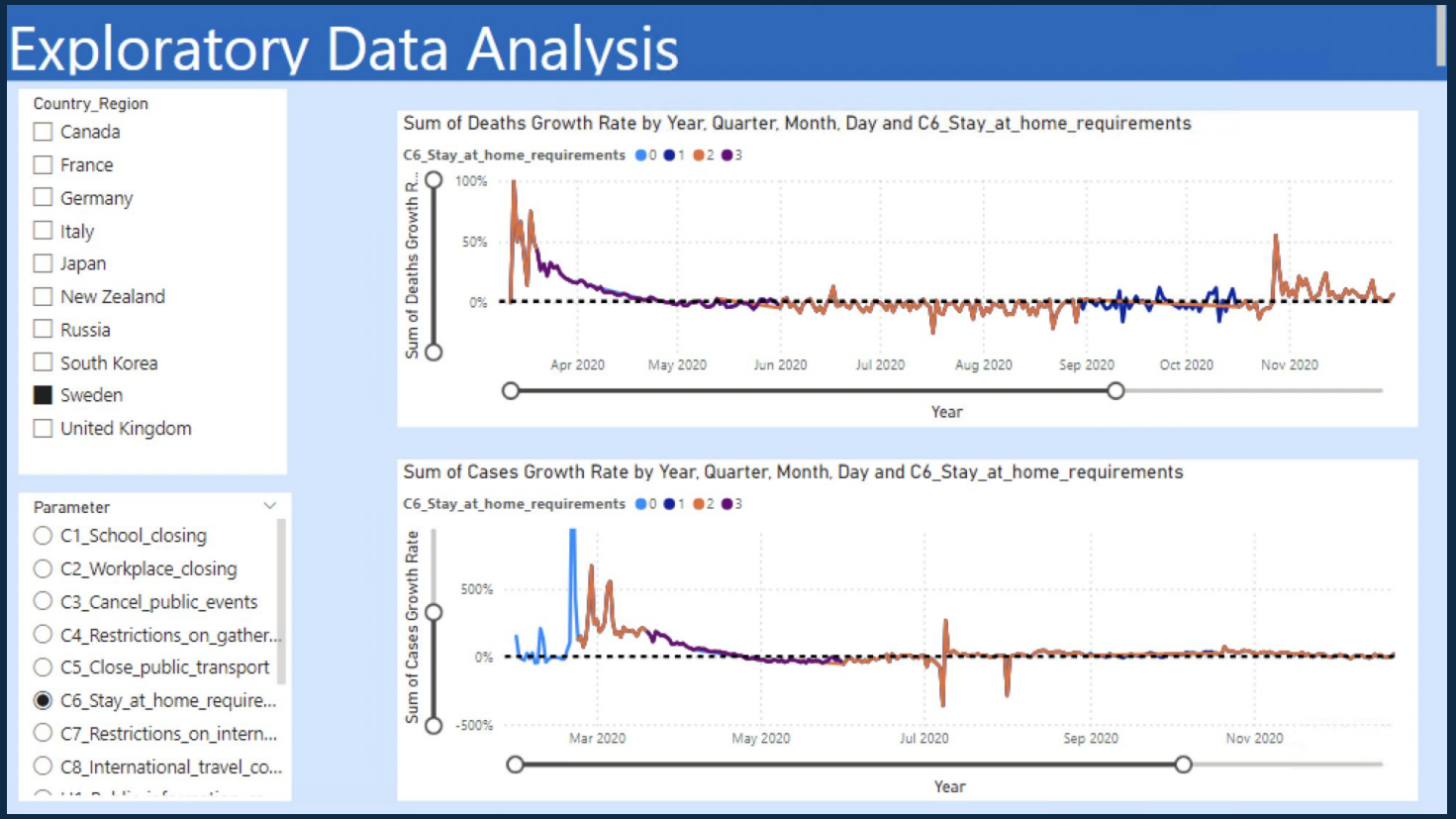
# Galaxy Schema



# Data Architecture



# Exploratory Data Analysis



# Confirmatory Data Analysis

Two linear regression models were created to learn the relationship between the policies and the death growth rates and the coefficients corresponding to each policy were ranked to obtain the order of the policies with the most significant impact. We narrowed down 4 policies that overlapped as most significant for both growth rates.

In [290]:

```
from sklearn.linear_model import LinearRegression

## LINEAR REGRESSION FOR CASES GROWTH RATE AGAINST POLICIES

X_cols = ['C1_School_closing', 'C2_Workplace_closing', 'C3_Cancel_public_events',
          'C4_Restrictions_on_gatherings', 'C5_Close_public_transport',
          'C6_Stay_at_home_requirements', 'C7_Restrictions_on_internal_movement',
          'C8_International_travel_controls', 'E1_Income_support',
          'E2_Debt_contract_relief', 'E3_Fiscal_measures', 'E4_International_support',
          'H1_Public_information_campaigns', 'H2_Testing_policy', 'H3_Contact_tracing',
          'H4_Emergency_investment_in_healthcare', 'H6_Facial_Coverings',
          'H7_Vaccination_policy', 'H8_Protection_of_elderly_people']

X = dfcases[X_cols]
y = dfcases['Cases Growth Rate']
model = LinearRegression()
model.fit(X, y)

result = pd.DataFrame({"Coefficient": model.coef_, "Intercept": model.intercept_})
print(result)
```

```
    Coefficient  Intercept
0 -3.137759e-02   0.023354
1  1.055935e-02   0.023354
2 -1.537395e-02   0.023354
3  8.538424e-04   0.023354
4 -6.775959e-03   0.023354
5  2.292902e-02   0.023354
6 -4.208675e-03   0.023354
7 -6.847045e-04   0.023354
8 -1.193934e-02   0.023354
9 -5.383634e-03   0.023354
10 -2.505659e-14   0.023354
11 -7.837292e-13   0.023354
12  2.602085e-18   0.023354
13  1.254895e-02   0.023354
14 -1.933842e-02   0.023354
15  4.072723e-12   0.023354
16  1.128402e-03   0.023354
17  0.000000e+00   0.023354
18  2.267924e-02   0.023354
```

Top Features:

| | Feature | Coefficient |
|---|---|---|
| 0 | C1_School_closing | −3.137759e-02 |
| 5 | C6_Stay_at_home_requirements | −2.292902e-02 |
| 2 | C3_Cancel_public_events | −1.537395e-02 |
| 8 | E1_Income_support | −1.193934e-02 |
| 4 | C5_Close_public_transport | −6.775959e-03 |
| 16 | H6_Facial_Coverings | −1.128402e-03 |
| 6 | C7_Restrictions_on_internal_movement | −4.208675e-03 |
| 7 | C8_International_travel_controls | −6.847045e-04 |
| 11 | E4_International_support | −7.837292e-13 |
| 10 | E3_Fiscal_measures | −2.505659e-14 |
| 17 | H7_Vaccination_policy | 0.000000e+00 |
| 12 | H1_Public_information_campaigns | 2.602085e-18 |
| 15 | H4_Emergency_investment_in_healthcare | 4.072723e-12 |
| 3 | C4_Restrictions_on_gatherings | 8.538424e-04 |
| 9 | E2_Debt_contract_relief | 5.383634e-03 |
| 1 | C2_Workplace_closing | 1.055935e-02 |
| 13 | H2_Testing_policy | 1.254895e-02 |
| 18 | H8_Protection_of_elderly_people | 2.267924e-02 |
| 14 | H3_Contact_tracing | 1.933842e-02 |

Top Features:

| | Feature | Coefficient |
|---|---|---|
| 5 | C6_Stay_at_home_requirements | −2.467589e-02 |
| 2 | C3_Cancel_public_events | −1.668817e-02 |
| 4 | C5_Close_public_transport | −1.123808e-02 |
| 16 | H6_Facial_Coverings | −1.106383e-02 |
| 9 | E2_Debt_contract_relief | −6.448139e-03 |
| 13 | H2_Testing_policy | −5.354533e-03 |
| 14 | H3_Contact_tracing | −2.107307e-03 |
| 7 | C8_International_travel_controls | −2.371305e-04 |
| 17 | H7_Vaccination_policy | 0.000000e+00 |
| 12 | H1_Public_information_campaigns | 6.938894e-18 |
| 10 | E3_Fiscal_measures | 9.221065e-14 |
| 15 | H4_Emergency_investment_in_healthcare | 4.318764e-12 |
| 11 | E4_International_support | 1.246284e-11 |
| 0 | C1_School_closing | 1.279788e-03 |
| 3 | C4_Restrictions_on_gatherings | 3.559271e-03 |
| 1 | C2_Workplace_closing | 3.867059e-03 |
| 18 | H8_Protection_of_elderly_people | 1.039132e-02 |
| 6 | C7_Restrictions_on_internal_movement | 1.070187e-02 |
| 8 | E1_Income_support | 2.830049e-02 |

# Policy Recommendations

## Stay at Home

**Level 1**

This policy recommends that all citizens remain at home, with exceptions only for daily exercise, grocery shopping, and trips deemed 'essential.'

## Facial Coverings

**Level 2**

This policy mandates all individuals to wear facial coverings in all indoor and outdoor spaces

## Cancel Public Transportation

**Level 1**

This policy significantly reduces the volume, routes, and means of transportation available.

## Cancel Public Gatherings

**Level 2**

This policy mandates the cancellation of all public events to prevent large gatherings.

# Power BI Demonstration