Estimating Excess Mortality in Malaysia

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Overview

- Excess Mortality - the difference between the observed numbers of deaths in specific time periods and expected numbers of deaths in the same time periods[1].

Malaysian Approach

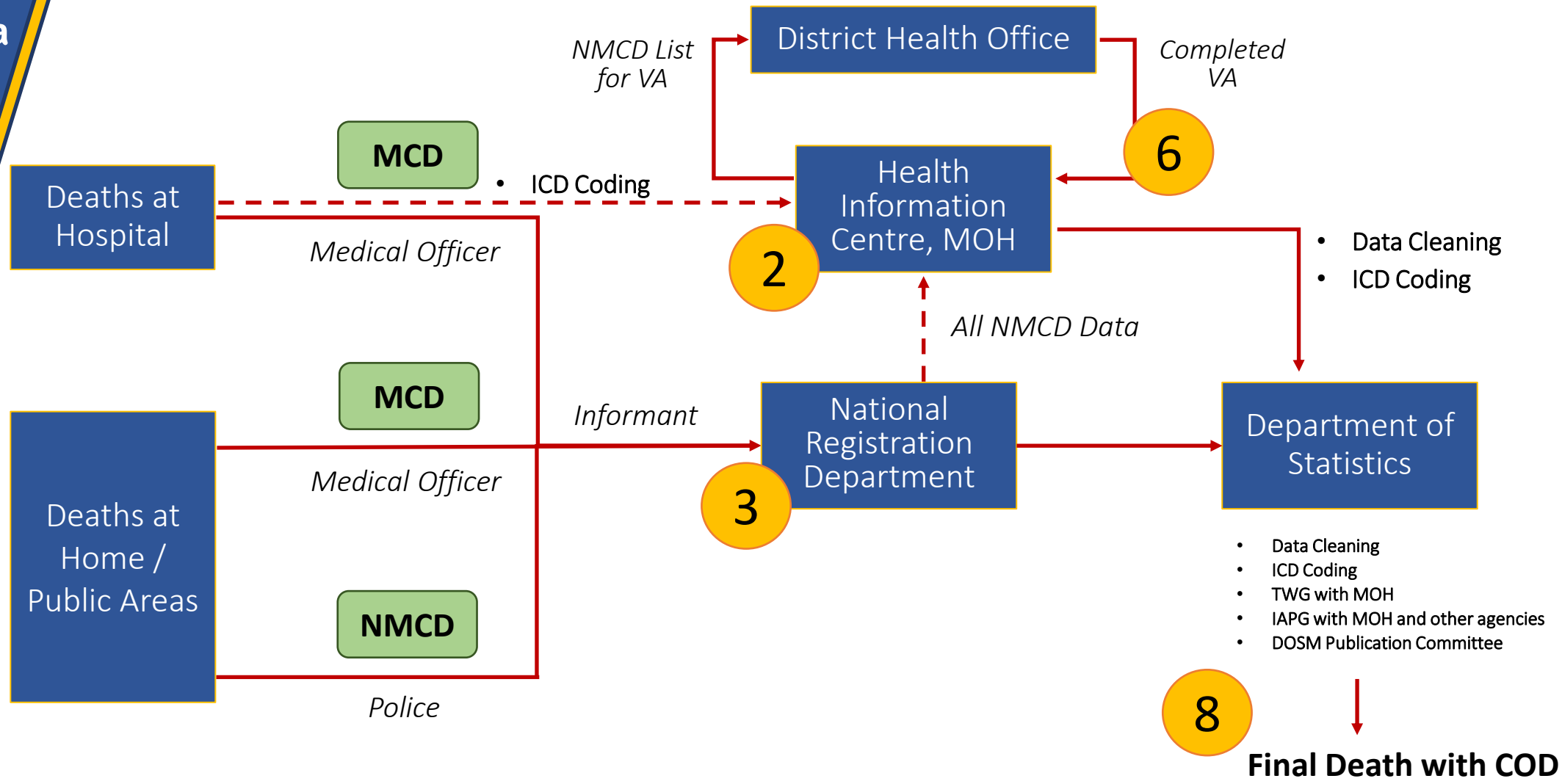
- Observed number of deaths – reported number of deaths
- Expected number of deaths – forecast based on 5 year historical data

1. Centre for Disease Control and Prevention, US. https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm

Malaysian Situation

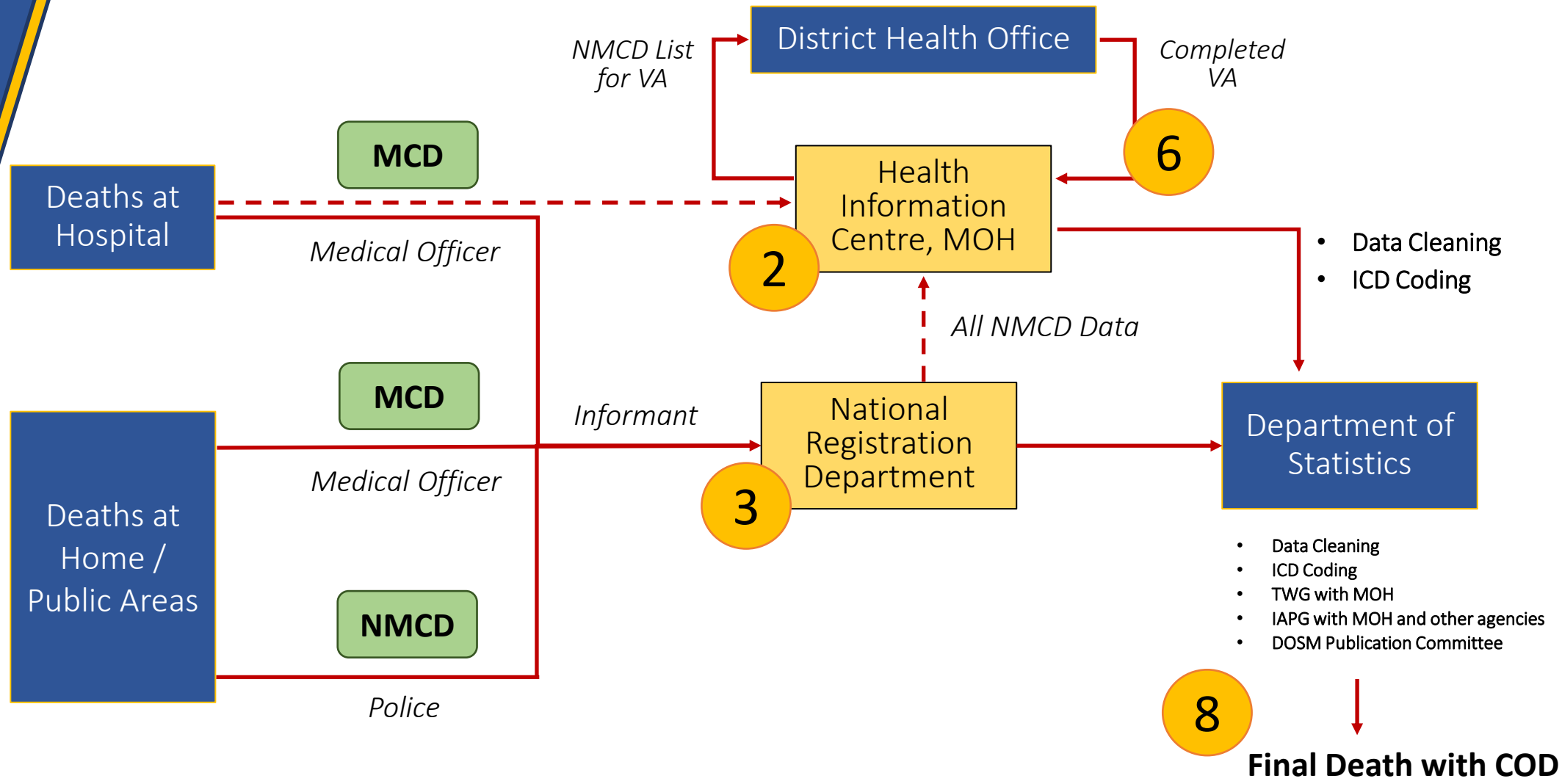
- Birth and Death Registration Act 1957
- All deaths are recorded by the National Registration Department
- Civil Registration captured almost 100% of deaths
- Cause of death and national statistics by the Department of Statistics Malaysia

Mortality Data Flow in Malaysia

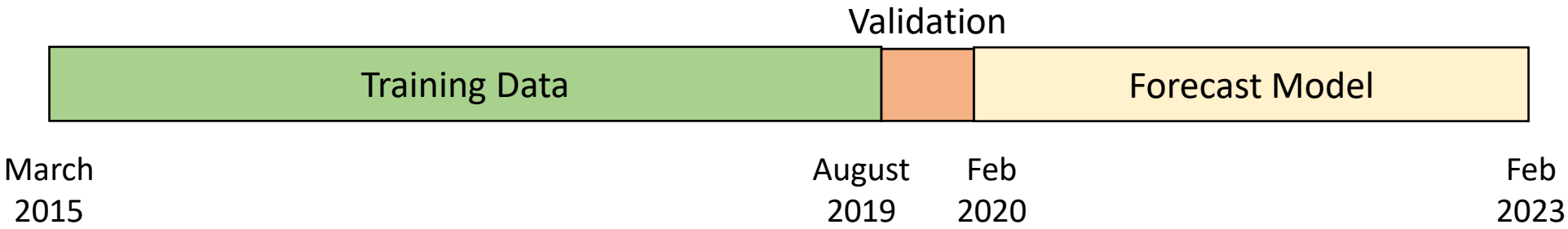


- Estimation of excess mortality is time sensitive.
- Due to the data limitation and delay in availability of data, a decision was made to NOT use data from Department of Statistics Malaysia (DOSM) data, despite it being the official source of data.
- The research team thus decided to utilize data from two separate sources for the estimation.

Observed Mortality



Expected Mortality Modelling



- Validation is carried out on 2 models, ARIMA and Prophet (Time Series Forecasting Models)
- We used weighted Mean Absolute Percentage Error (MAPE) to determine the best performing model.

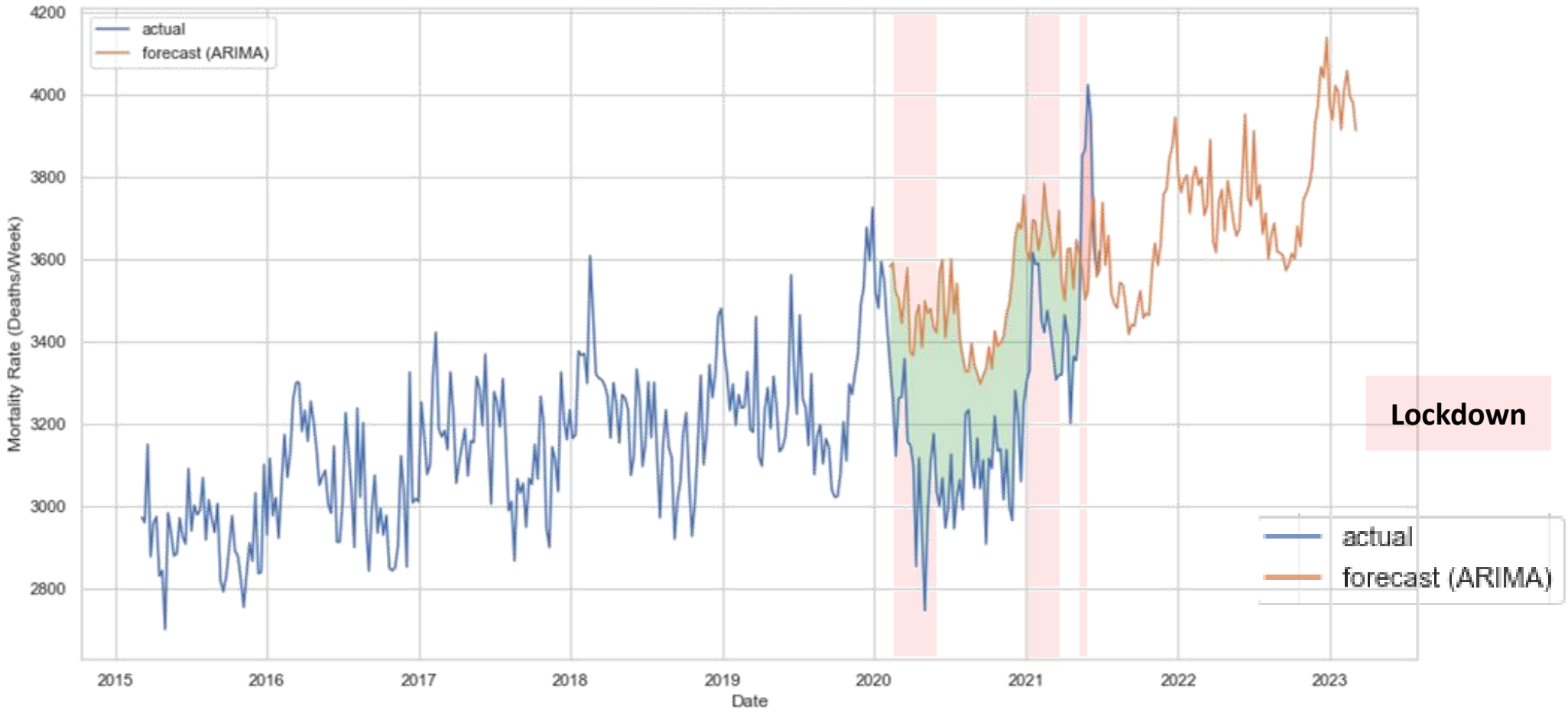
$$MAPE = \frac{1}{n}\sum_{t=1}^{n}\left|\frac{A_t - F_t}{A_t}\right|$$

n = number of fitted points

A_t = Actual value at time t

F_t = Forecast value at time t

Excess Mortality



Excess Mortality : - 18,011 deaths

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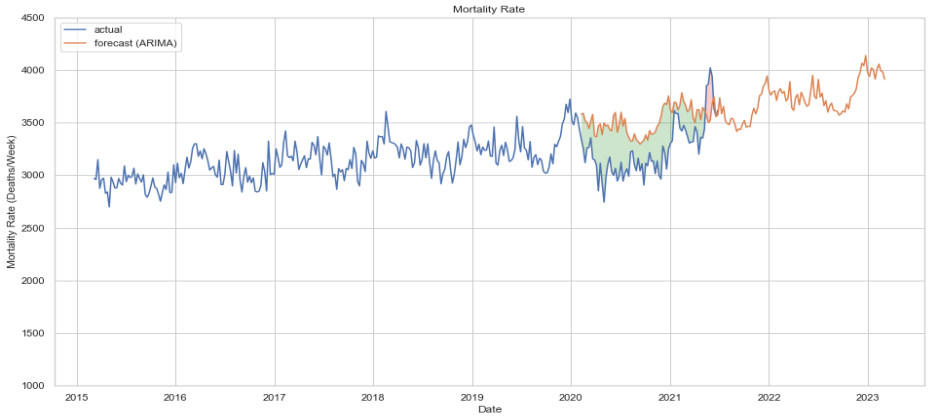
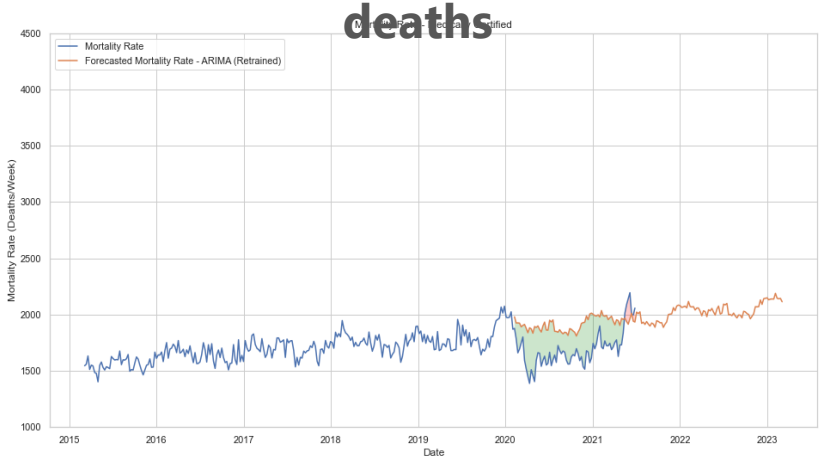
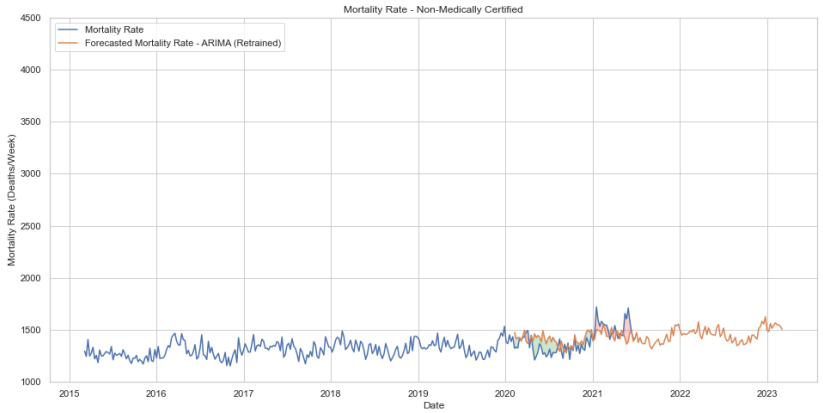


Overall Excess Mortality : -18,011 deaths

Medically Certified Excess Mortality : -15,502 deaths





Non-Medically Certified Excess Mortality : - 623 deaths

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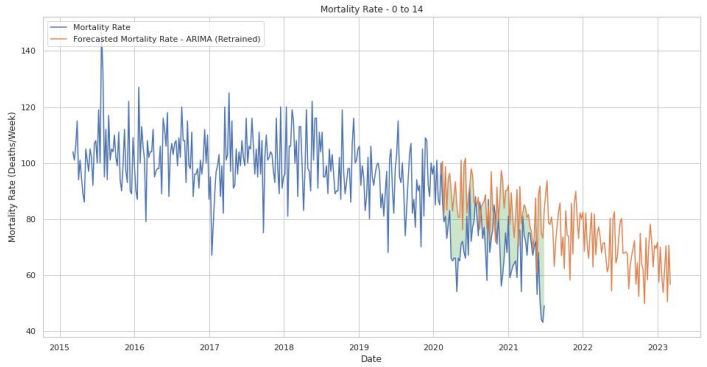
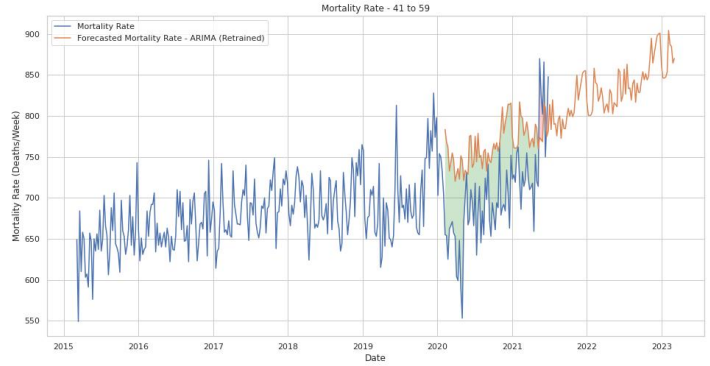
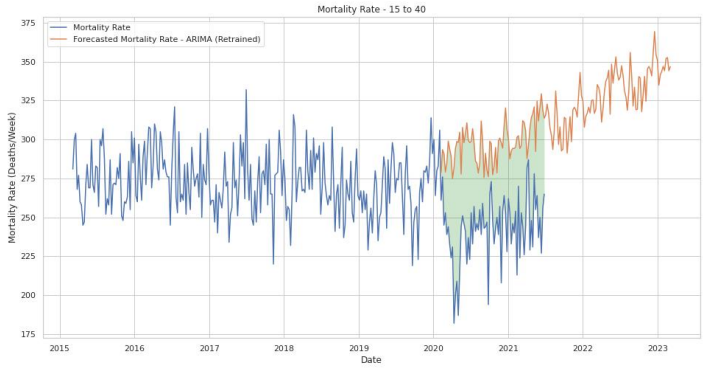
Disaggregation by Age



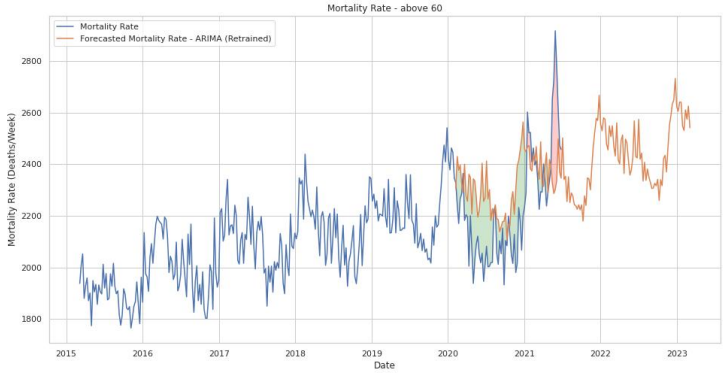
0 – 14 years (- 1,059 deaths)



41 - 59 years (- 4,685 deaths)

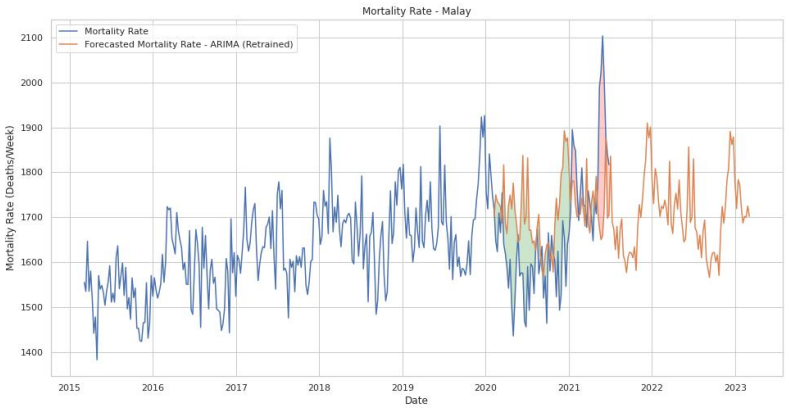


15 – 40 years (- 4,026 deaths)

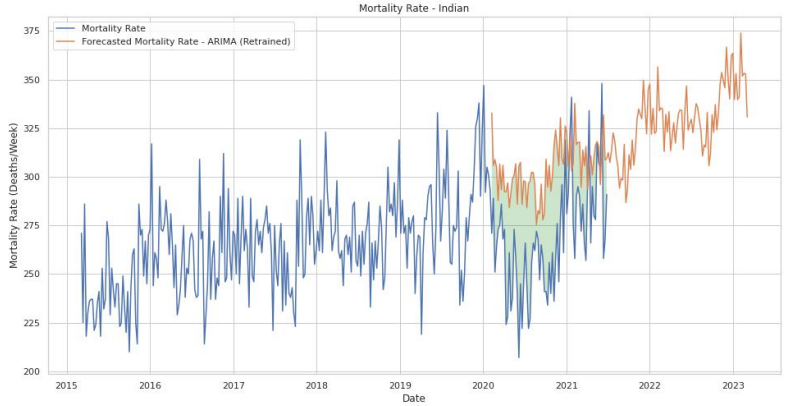


60 years and above (- 6,971 deaths)

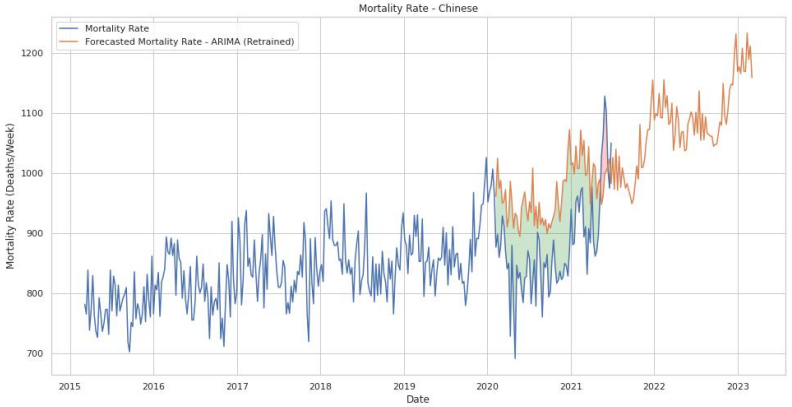
Disaggregation by Ethnicity



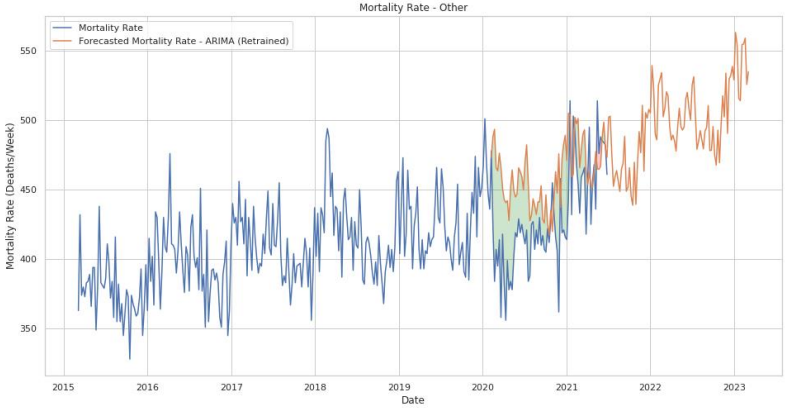
Malays (- 3,469 deaths)



Indian (- 2,617 deaths)



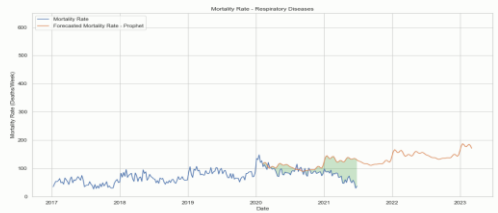
Chinese (- 6,580 deaths)



Others (- 2,264 deaths)

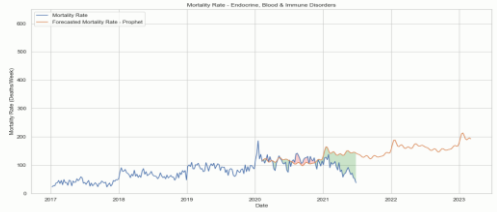
Disaggregation by Disease Groups

Cardiovascular Diseases

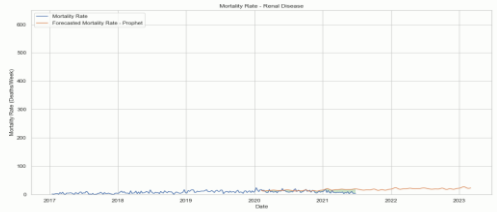


Respiratory Diseases

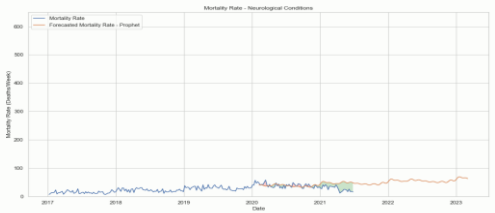
Diabetes Mellitus



Blood & Immune Disorders

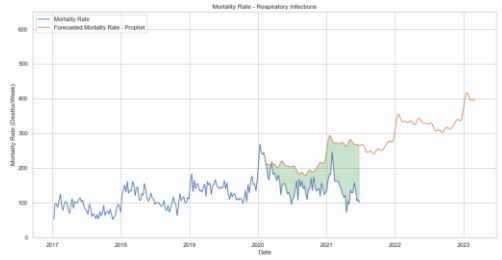


Renal Diseases

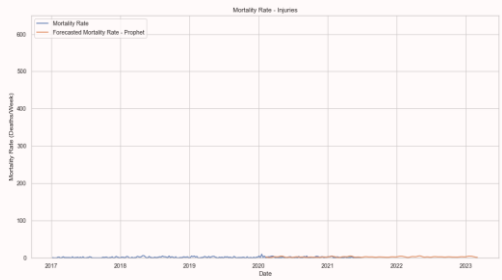


Neurological Conditions

Infectious Diseases



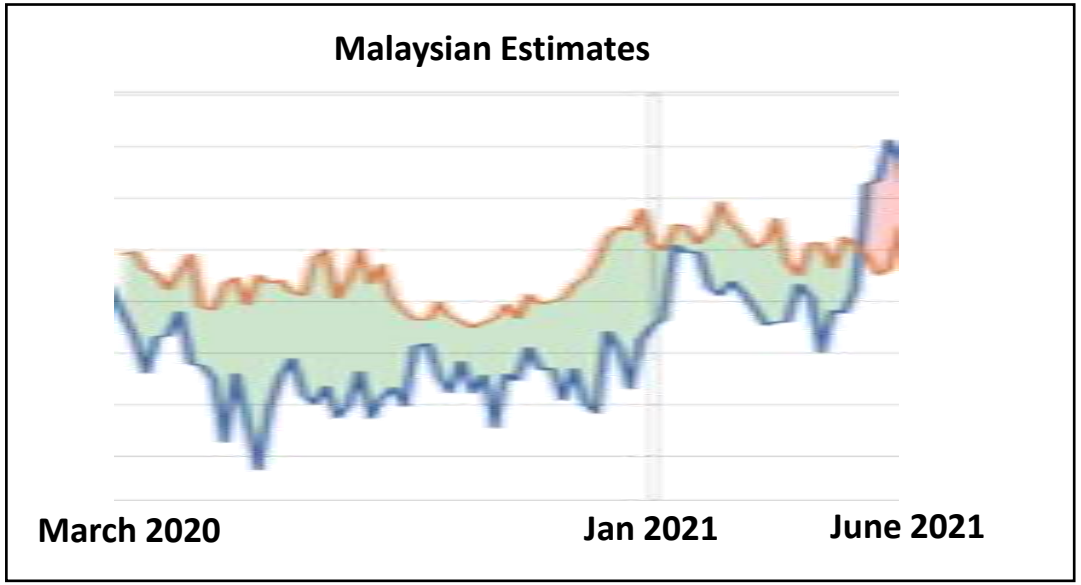
Respiratory Infections

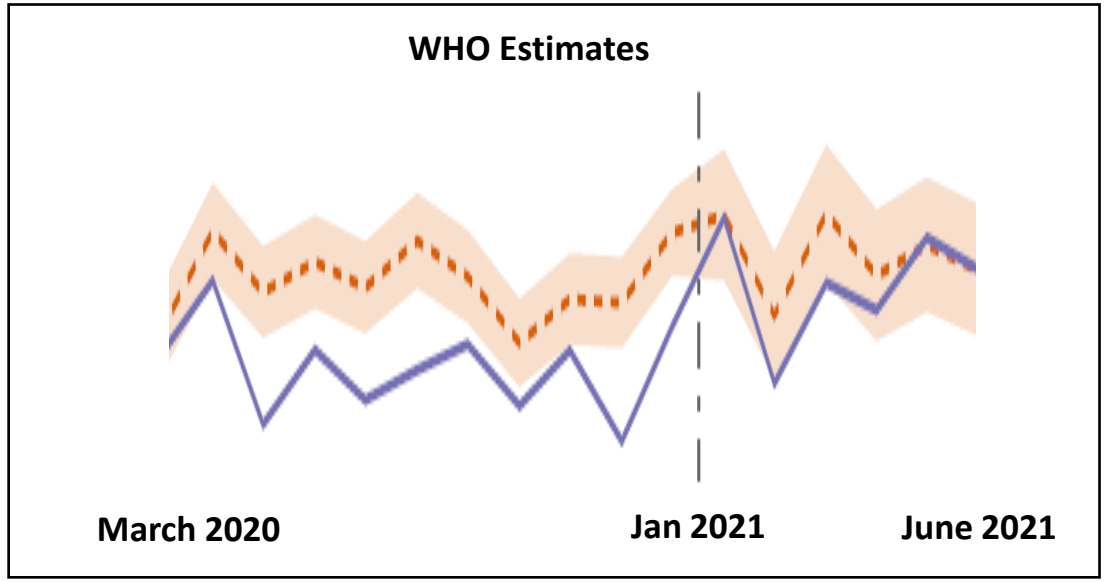


Injuries

Working with WHO

- Methodology was discussed with WHO Country Office and WEPRO Regional Office in December 2021.
- Findings were compared with Division of Data Analytics, WHO
  - Findings are fairly similar to WHO estimates (- 12,434)





Moving Forward

- Initial results have been presented to the top management of Ministry of Health Malaysia, including the Honorable Health Minister
- Regular updates, based on updated results will be carried out

- Up to date data
  - Data cleaning and estimation for July 2021 – Dec 2021

A big thank you to my research team members and individuals who have shown excellent support throughout this study;

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  En Mohamad Shukor Mat Lazim

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Thank you

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