Estimating Excess Mortality in Malaysia

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• 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

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

Deaths at Hospital
- MCD
- Medical Officer

Deaths at Home / Public Areas
- MCD
- Informant
- NMCD
- Police

District Health Office
- NMCD List for VA
- Completed VA

Health Information Centre, MOH
- All NMCD Data

National Registration Department
- Data Cleaning
- ICD Coding

Department of Statistics
- Data Cleaning
- ICD Coding
- TWG with MOH
- IAPG with MOH and other agencies
- DOSM Publication Committee

Final Death with COD
• 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.
Expected Mortality Modelling

Validation

Training Data | Forecast Model

March 2015 | August 2019 | Feb 2020 | Feb 2023

- 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.

\[
MAPE = \frac{1}{n} \sum_{t=1}^{n} \left| \frac{A_t - F_t}{A_t} \right| \quad n = \text{number of fitted points}
\]

\[
A_t = \text{Actual value at time } t
\]

\[
F_t = \text{Forecast value at time } t
\]
Excess Mortality:

Excess Mortality: - 18,011 deaths
Overall Excess Mortality: -18,011 deaths

Medically Certified Excess Mortality: -15,502 deaths

Non-Medically Certified Excess Mortality: -623 deaths
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
- Infectious Diseases
- Diabetes Mellitus
- Blood & Immune Disorders
- Respiratory Infections
- Renal Diseases
- Neurological Conditions
- Injuries
• 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)
• 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;

- **Biostatistics and Data Repository, National Institutes of Health**
  Dr Muhd Zulfadli Hafiz Ismail

- **Institute for Health System Research, National Institutes of Health**
  Dr Fathullah Iqbal Ab Rahim
  Dr Awatf Amer Nordin

- **Health Information Centre, Ministry of Health Malaysia**
  Dr Ahmad Aqram
  Dr Mohd Fadli Kharie

- **Department of Statistics Malaysia**
  En Mohamad Shukor Mat Lazim

- **Centre for Burden of Disease Research, Institute for Public Health**
- **Deloitte Consulting Malaysia**
Thank you

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