DEMOGRAPHY & COVID-19

PopInfo MALAYSIA **LPPKN** NATIONAL POPULATION AND FAMILY DEVELOPMENT BOARD

In This Issue

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

This article briefly explains what is demography; its application in epidemiology and what demography can teach us about age-structure for understanding the populations at the highest risk of mortality particularly for this time of outbreak and what demographers have learned about ageing societies.

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Introduction

Malaysia and most part of the world are living in the unprecedented times. The emergence of the novel coronavirus or COVID-19 has altered economic, health, and social life across the states during the past month. While on-going epidemiological assessments are needed to better understand the spread of this highly infectious disease, what remains of concern is demographers all around the world, particularly in Malaysia can assist in the response to rapidly spreading diseases. In this special edition will discussed, in general, the importance and relevance of demography that can provide insights about the infectious disease, effectiveness of social distancing to flattened the curve, having disproportionate effects on certain age and what the demographic transitions linkages to the pandemic.

"Demographers are always interested in what they call the "Big Three" of demography i.e Births, Deaths and Migrations."

Demography and the COVID-19

Demography is the study of human populations – their size, distribution, composition and what more interesting is their changes. In a broader context, demography is also the study of the various determinants of population change and of the impact of population on the world around us. Of all the broad definition can be, demographers are always interested in what they call the "Big Three" of demography i.e births, deaths and migrations. In demography perspective, the spread of coronavirus sparks another lever for demographers to try and predict what the consequences will be as the virus moves through different countries or states, since one of the striking differences between countries around the world is age profile. Undoubtedly, there are many differences taken into account between countries such as healthcare functions as aged countries tend to be more develop and also have better healthcare-system.

Using Demographic tools to describe infectious-disease dynamics

In the study of epidemiology, Susceptible-Infected-Recovered (SIR) model is the most widely use predictive mathematical model for infectious diseases (transmission from human to human). In a simple explanation, in relation to what we experience now, most people in the world will be susceptible to the virus. Over the time, they will enter into the infected class if they bump into an individual who is infectious and become infected. After some period of time, they will recover.

We are born in the age-one class, and then we flow into the age-two class, and then flow into the age- three class. Likewise, in the susceptible-infectious- recovered model, we might be born susceptible, and then we might flow into the infected-age class, and then we would hopefully flow into the recovered-age class.

One example is, a community research group from Malaysia, known as *'CoronaTracker'*, of which they write advanced SIR model, that is SEIR (Susceptible-Exposed-Infected-Recovered) describing flows of individuals between these different categories, gives us an awful lot of insight into how fast the disease might spread, and what to expect. (visit *https://www.coronatracker.com*. The research team also publish a paper in the Bulletin of the World Health Organization (WHO) and was posted to the COVID-19 open site *(http://dx.doi.org/10.2471/BLT.20.251561)*)

What we can see is some similarities in what demographers do - putting people in compartments. When analysing population data, demographers usually adopts the double viewpoint. One approach is the demographic events to the span of one's life, which is called cohort analysis and another approach is demographic events are studied in yearly basis, and this approach is called period analysis. A classic set of mathematical models are demographic models where the flow is over age and it usually plots in *Lexis Diagram*.
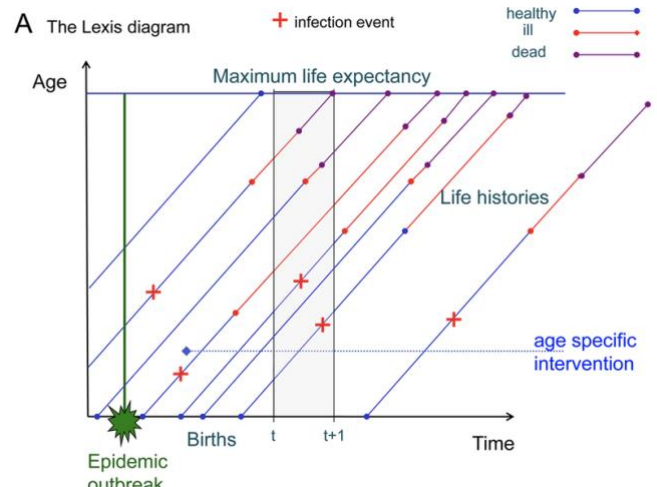
Exhibit 1

Susceptible-Infected-Recovered (SIR) model
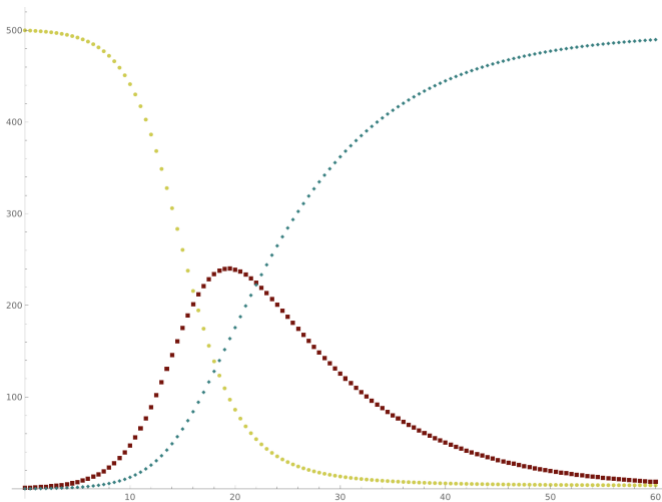
(Source: http://www.pandemsim.com/data/index.php/interpreting-a-sir-graph-2/; Yellow=Susceptible, Maroon=Infectious, Teal=Recovered)

Exhibit 2

The Lexis diagram shows events by age and time. (A) This Lexis diagram shows the occurrence of infection, disease, and death in individual life histories in the time–age plane. An epidemic outbreak affects several cohorts of individuals at a specific time.
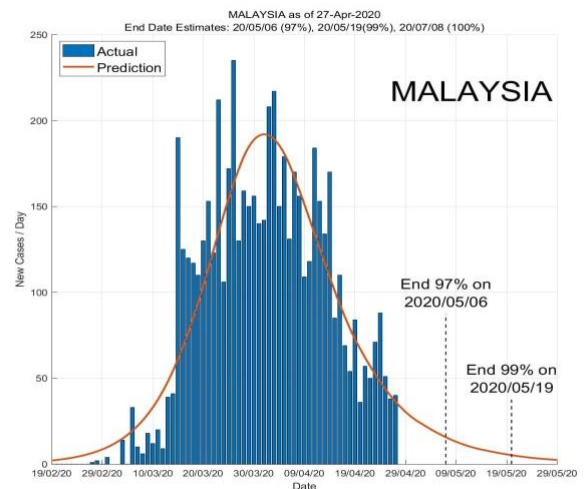

(Source: New Methodology for Estimating the Burden of Infectious Diseases in Europe. PLoS medicine. 9. e1001205. 10.1371/journal.pmed.1001205.)

Exhibit 3

SIR prediction by SUTD
Malaysia
End 97% around May 6; End 100% around July 08
In this instance, the estimated end date is the time for realizing 97% of the total expected epidemic cases.

(Source: Singapore University of Technology and Design (SUTD) Data-Driven Innovation Lab)

Understanding population age-structure during the pandemic

As the data on COVID-19 cases still coming in and how rapid the spread can be, demographically informed analytics and projections are needed to predict the burden of the virus and help the Government on targeted actions. After more than three months of the pandemic, by now, we might see how it interacts with population dynamics. Population age-structure is crucial for understanding the populations at the highest risk of mortality particularly for this time of outbreak, all eyes will be on the high risk population, aged 60 and above. Apart from that, it is also important to understand population behaviour like social distancing measures are required to reduce the number of critical cases that will eventually overburden the capacity of our health systems, or what we recognised as, "flattening the curve". The interaction of demography and current age-specific mortality for COVID-19 suggests that social distancing and other policies to slow transmission should consider both the age composition as well as the targeted communities. Kudos to the Government of Malaysia (through the Ministry of Health) for undertake measures to give special attention to those population or community that are at risk. The result is still not conclusive yet, however we can witness the curve is flattened day by day and the recovery rate keep on increasing.

One of the standpoints on the world is that demography gives us is an awareness of the fact that our nation live in increasingly ageing populations. This increasingly ageing populations come with a whole set of challenges, in everything from health systems, care for the elders to insurance policies. One of the things that has been suggested for this coronavirus is a role for co-morbidities that manifest in the later ages. As we are going through a demographic transition right now, where the shift from most mortalities being attributable to infectious diseases (most likely to young population) to more chronic or non-communicable diseases (older population) which will interact in unpredictable ways with these sorts of pandemics. This can be seen in the case of Malaysia (and most likely around the world), more than 80% deaths of COVID-19 are attribute to co-morbidities such as diabetes, hypertension and heart disease.

Beyond health indicators : Demographic sciences in post COVID-19

The Government made a lot of difficult policy decisions to mitigate the COVID-19 pandemics. Mobilizing measures like easing the Movement Control Order (MCO) or lifting it prematurely will be a crucial decisions as the spread of COVID-19 is apparent to be exponential. The pandemic is definitely impact our economy but we can also look at the angle of social and demographics as well. Beyond age-structure, gender and ethnicity differences, in the case of contracting the virus and mortality can be further investigate. As we expect to live in the 'new normal' soon, the coronavirus pandemic will impacted not only on our physical health and economic vitality, it will also change our society. Understanding social development and people behaviour is as important as economic crises and demographic changes. Thus, there will be so much opportunities for researchers and social scientists to explore. NPFDB call for academics, demographers and researchers to contribute and collaborate in research with regards to the COVID-19 and the pandemic impact to the population. This will be useful for the government to managing the risk and make an informed decision for now and for the future.

Call for Application: NPFDB Research Grant Programme is now open. We are inviting academics, demographers, health and social researchers to contribute and collaborate in research for population and development in this country. To apply, please log on to https://mprh.lppkn.gov.my