Geographic Information System
In Health, Malaysia

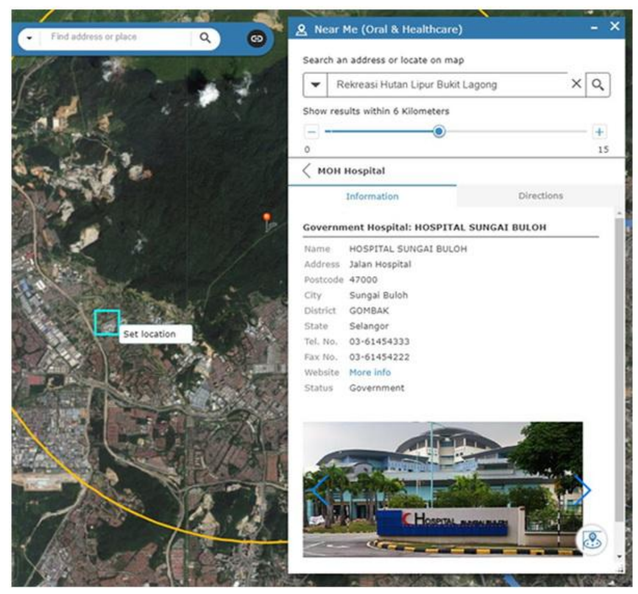
HEALTH INFORMATION SYSTEM GEO-ENABLING PROCESS IN MALAYSIA

Introduction

- Malaysia is a nation with an ethnically diverse population distributed across two major landmasses as well as numerous surrounding smaller islands.
- Various Departments have been established within the Ministry of Health (MOH) to manage public health challenges in Malaysia such as vector-borne diseases, non-communicable diseases, maternal health as well as neonatal health. The usage of GIS will allow the data to be mapped, enhancing visualisation thus allowing the decision makers to make better planning.

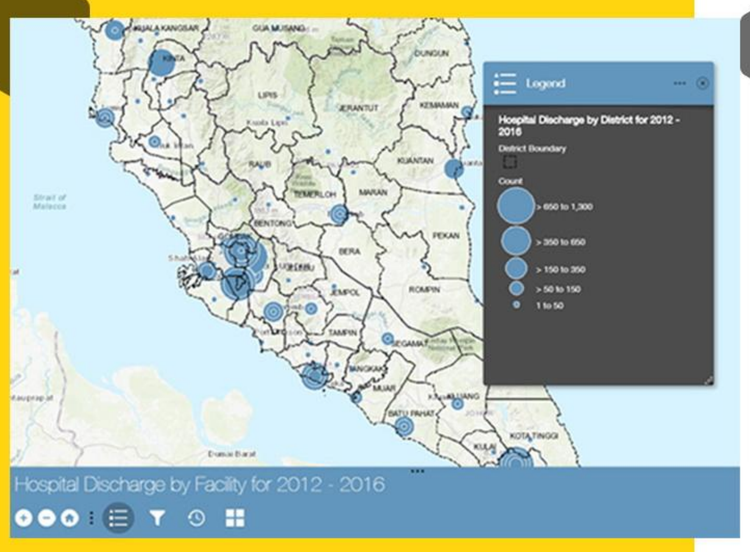
The Challenge

- Over the years, various Departments within the MOH have initiated data collection programmes for specific purposes. As a result, the data collected has various degrees of variabilities, duplications, as well as inadequate standardisation of data elements. It became apparent that an authoritative body was needed to enhance the quality of healthcare data. In the 8th Malaysian Plan (covering the period of year 2001-2005), the existing Information and Documentation (IDS) Unit of MOH was restructured to National Health Informatics Centre and entrusted with health information planning and monitoring for the country.



- In addition, the lack of geographical knowledge integration to the data collected stymies the prioritization of healthcare services. Coordination of data collection is a real challenge as the technology capability has to go in tandem in order to maximize GIS' potential. Besides, access to sensitive information in GIS has to be refined in accordance with data and information governance and geocoding the locations of health facilities are the challenges faced in this process.
- Malaysia Health Data Warehouse (MyHDW) is a project initiated in 2011 with the aim to be a trusted source of truth of comprehensive healthcare data structured for query and analysis purposes. GIS being one of the visualisation tools of MyHDW, the task to geo-enable the information in the MyHDW is another challenge that had to be overcome.

Solution



- The MyHDW project is a collection of data for secondary data use from public and private healthcare facilities in Malaysia. It makes use of both structured and unstructured data for complete and comprehensive healthcare information generation.
- ArcGIS (Geographic Information System (GIS) develop by Environmental System Research Institute ; ESRI) is a mapping and analytics platform that provides contextual tools for mapping and spatial reasoning. Data is aggregated from different sources and all the healthcare facilities by attributing a unique identifier for each facility. Therefore,ArcGIS map can be used to map information for better visualization and interpretation. This also provides an opportunity for further analysis in relation to space and time.

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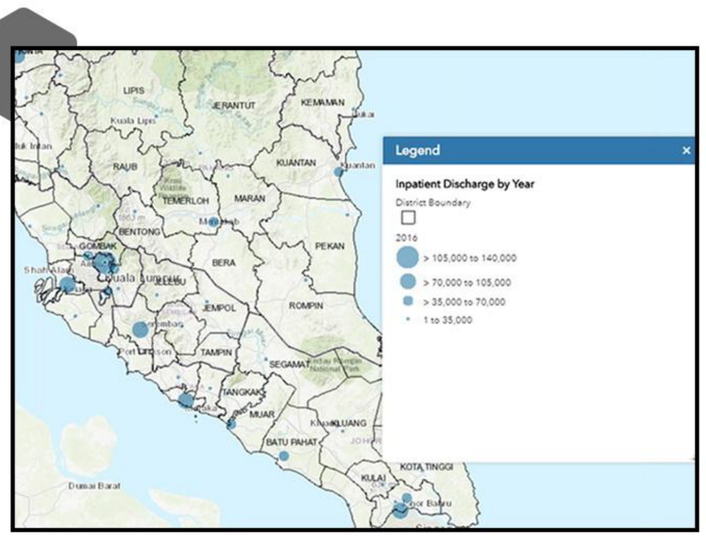
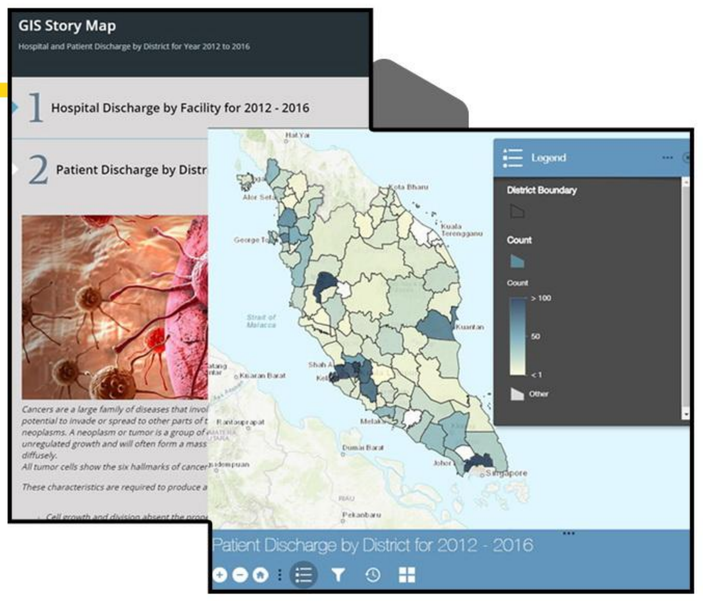
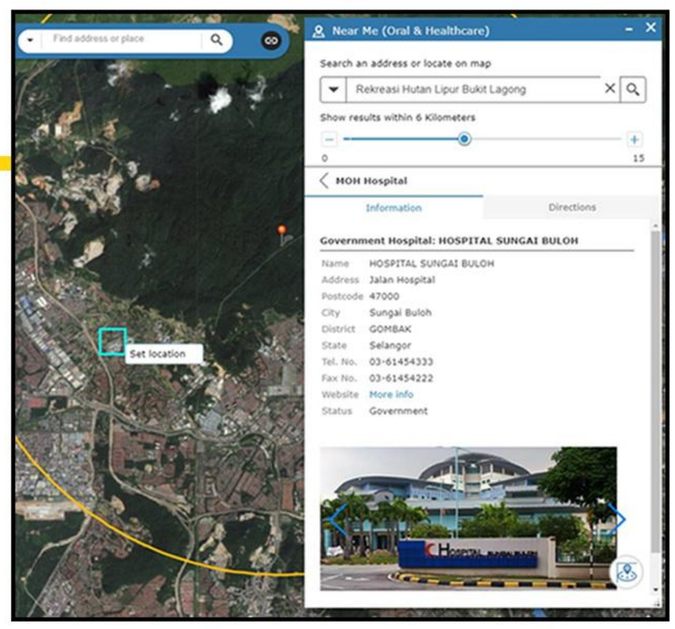
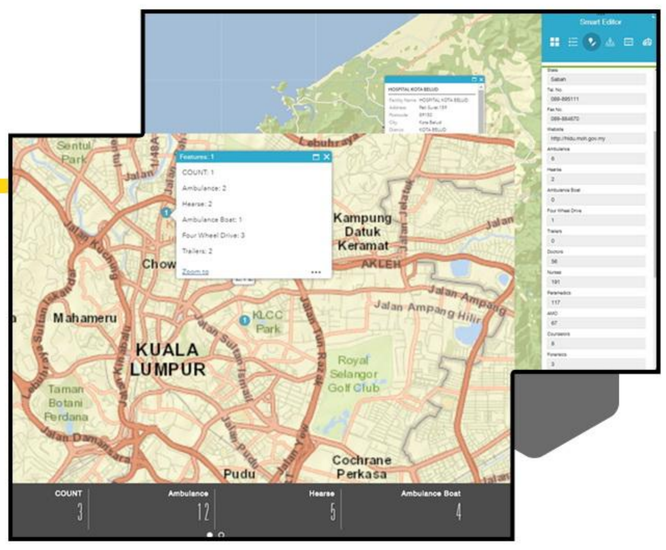
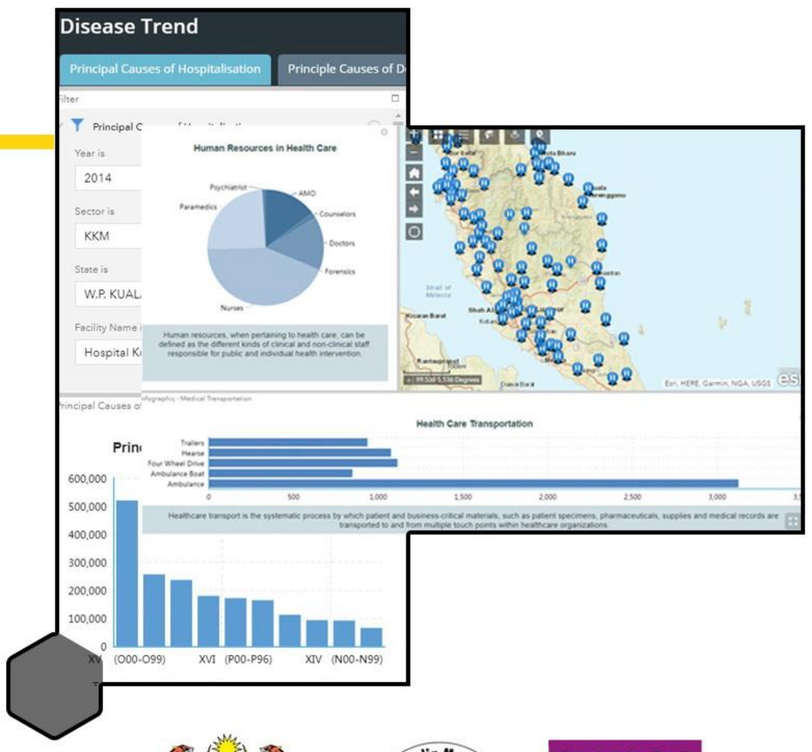










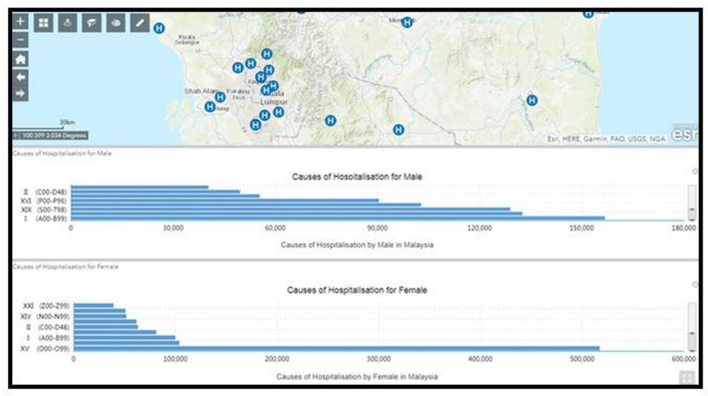
Solution ...continuation...

- MyHDW data is available right-time through a browser-based interface. It becomes an invaluable tool to those involved in health planning with the integration of GIS capability within the MyHDW architecture. This complies with the principle behind the MyHDW which is to 'build once, use many' in order to reduce the burden of data collection and processing.
- The development of GIS' layers is guided by various domain experts within MOH divisions and contribute to improved content for disaster management and planning. In addition, GIS is slated to greatly improve the nation's disaster management and resources distribution. Engagements with various stakeholders such as the State Health Directors and Emergency Medicine Physicians are currently ongoing.
- ArcGIS desktop has been used to visualise breast cancer discharges from healthcare facilities in Malaysia and using data series from different years, it enables geo-temporal tracking and analysis of the disease. This is visualised via the "Story Map" application in the GIS system.
- The crowdsourcing portal in our GIS application enhances data submission efficiency and management within robust data quality framework. Data about the number of healthcare personnel, ambulances and other medical devices imperative at the time of disaster will be updated by the officer in-charge from the nearest Ministry of Health (MOH) healthcare facilities. The required information will greatly assist in decision making.
  Not only that, to ensure the validity and reliability of the data submitted, the timestamp function is added. This pragmatic approach will encourage sense of data ownership and accountability at all levels.

Results

Integrating GIS capability into the MyHDW architecture not only augments present technical capability of the MyHDW, it also has the additional benefits of;

- Greater access to spatial analysis capability for various MOH Divisions and MyHDW users. For example, the State Health Directors will be able to utilise geographical knowledge to prioritize healthcare services.
- Enhancing service planning through outcome or event projection and flagging by utilising the time series data.
- Ensuring the quality of geospatial data through the use of common standards and guidelines across various data sources by the Malaysian Centre for Geospatial Data Infrastructure (MaCGDI) under the purview of the Ministry of Natural Resources and Environment (NRE) who is responsible for coordinating access and delivery of the geospatial information held by all government agencies.
- Avoiding duplication of work in data collection and processing that goes in tandem with the principle behind the development of MyHDW which is to "build once, use many".



Kementerian Kesihatan Malaysia

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