EpiMetrics, Inc.

Big Data in Universal Health Care

Case 1: An Analysis of Social Determinants of Health and Factors of Universal Health Care

EXECUTIVE SUMMARY

Abstract

The project applied big data methods in three topics highly relevant to the DOH. This first case analyzed the association between significant Social Determinant of Health (SDH) and health system factors to health outcomes and Universal Health Care (UHC) inequalities in the Philippines.

Since the application of big data in the Philippine setting is an emerging field, this project was a proof of concept for the DOH and PhilHealth to explore the field for important tools in the monitoring and evaluation of public health. With big data tools, analysis of diverse and voluminous data becomes possible, and the DOH can gain insight into the factors that significantly impact and influence the health of the nation. However, mechanisms and policies must be put in place to ensure that data is available, accessible, and of good quality in order to properly apply big data analysis. The study aimed to measure the association between UHC indicators and health outcomes to the SDH and health system indicators using big data tools and analysis.

Data sets were gathered and requested from various government agencies and websites, as well as from the Freedom of Information (FOI) website. Some difficulties in obtaining the data were encountered, such as a government agency denying the request due to: lack of availability, the data belonging to a different agency, or the data being publicly available online. Another problem was that agencies did not necessarily comply with the requested format, and instead gave a format that was not ideal for analysis.

This study was a mixed ecologic study with two aspects: place and time. Data from all 18 regions and 81 provinces from 2000-2015 were included in the analysis. Univariate, bivariate, and multivariate analyses were done through SPSS Statistics. Only *p*-values of 0.05 were considered to be significant.

The analysis of provincial health outcomes resulted with a total of 181 significant correlations: 85 Health System Indicators and 96 Social Determinants of Health. As for regional health outcomes, there were a total of 173 significant correlations: 22 Health System Indicators and 151 Social Determinants of Health.

The application of Big Data in the Philippine setting is an emerging field. Case 1, in general, measured the association of SDH-driven health inequalities and their relation with UHC-related inequalities. This study proved that it is possible to utilize big data tools to create outputs that will contribute to the decision-making process in the healthcare system.

Executive Summary

A. Introduction

Government agencies, specifically, the Department of Health (DOH) and the Philippine Health Insurance Corporation (PhilHealth) have been amassing data about the nation's health, universal health care, and on the social determinants of health (SDH). To assist the Department of Health (DOH) and the Philippine Health Insurance Corporation (PhilHealth) in the achievement of national and global health goals for sustainable development, this project used big data tools to maximize the generation of actionable information from the amassed data. Moreover, since the application of big data in the Philippine setting is an emerging field, this project was a proof of concept for the DOH and PhilHealth to explore the field for important tools in the monitoring and evaluation of public health.

B. Methods

Data sets were gathered and requested from various government agencies and websites, as well as from the Freedom of Information (FOI) website. Some difficulties in obtaining the data were encountered, such as a government agency denying the request due to lack of availability, the data belonging to a different agency, or the data being publicly available online. Another problem was that agencies did not necessarily comply with the requested format, and instead gave a format that was not ideal for analysis.

This study was a mixed ecologic study with two aspects: place and time. Data from all 18 regions and 81 provinces from 2000-2015 were included in the analysis. Univariate, bivariate, and multivariate analyses were done through SPSS Statistics. Only *p*-values of 0.05 were considered to be significant.

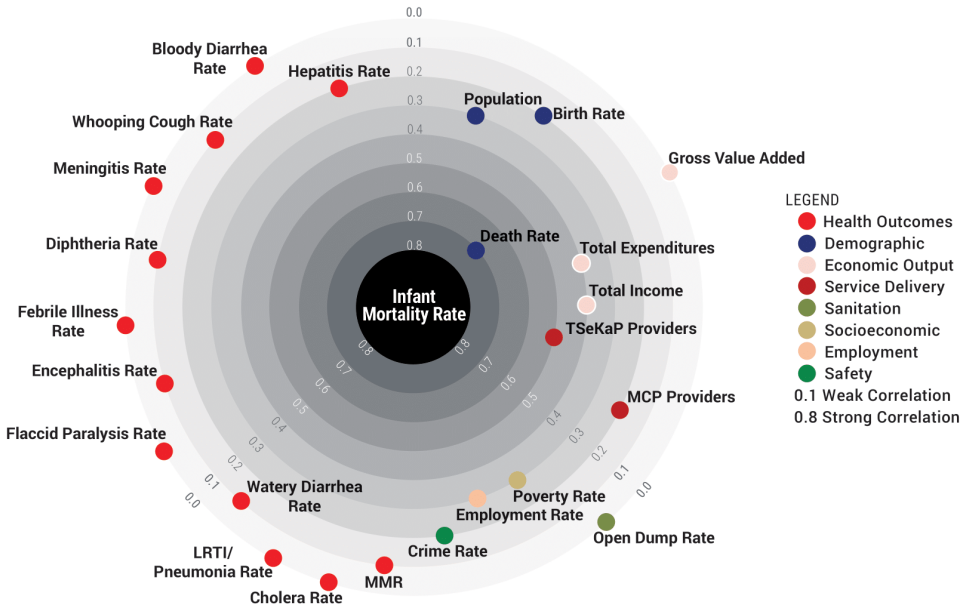
C. Results and Discussion

The analysis of provincial health outcomes resulted with a total of 181 significant correlations: 85 Health System Indicators and 96 Social Determinants of Health. As for regional health outcomes, there was a total of 173 significant correlations: 22 Health System Indicators and 151 Social Determinants of Health. In case 1, the unavailability of viable data led to a change in the intended outputs. Several reasons for unavailability were identified: 1) the DOH Data Governance is not established thus resulting in difficulty gaining access to large, properly documented data sets, and 2) the compliance rates of non-DOH government-owned sources were limited. Moreover, instead of an interactive dashboard with a data feed, static visualizations were made. The study in case 1 measured the association of SDH-driven health inequalities and their relationship with UHC-related inequalities which proved the possibility of utilizing available data to create tools that will contribute to the decision-making process in the healthcare system.

D. Conclusions and Recommendations

The application of Big Data in the Philippine setting is an emerging field. This study proved that it is possible to utilize big data tools to create outputs that will contribute to the decision-making process in the healthcare system. The study measured the association of SDH-driven health inequalities and their relationship with UHC-related inequalities.

As technology advances, the Philippines must take advantage of its available healthcare related data and improve on it for better utilization and application. It is important that the country, particularly the Department of Health, invests in data governance. Mechanisms and policies must be put in place to ensure that data is available, accessible and of good quality in order to properly apply Big Data analytics.



The study aimed to measure the association between (1) universal health care indicators and health outcomes to (2) the social determinants of health and health system indicators using big data tools and analysis. Data sets from both literature and secondary sources were collected and analyzed to show insights on the relationships of health outcomes and social determinants.

The sample above is a cross-section of the study showing what certain indicators have significant positive correlation with infant mortality rate at the regional level. The closer the indicator is to the center, the stronger the correlation.

Figure 1. SDH positively correlated with Infant Mortality at the Regional level

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