WEALTH IS HEALTH

A STATISTICAL EVALUATION OF PEOPLE'S HEALTH BASED ON THEIR WEALTH

APPLIED COMPUTATIONAL STATISTICS
Final Project

MSDS 2023 TERM 2 LT3
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OBJECTIVES

This project aims to look at the relationship between health and wealth indicators among indigent (poor) and well-to-do (non-poor) in the Filipino population.

Describe sick and poor households across provinces in the Philippines

Examine the relationship between wealth and sickness

Look into the independence of wealth and health service availment

Determine the difference between how poor and non-poor population experience sickness

The Demographic and Health Surveys Program collects and disseminates representative data on health and population in developing countries. They provide data for monitoring and impact evaluation indicators in the areas of population, health, and nutrition.
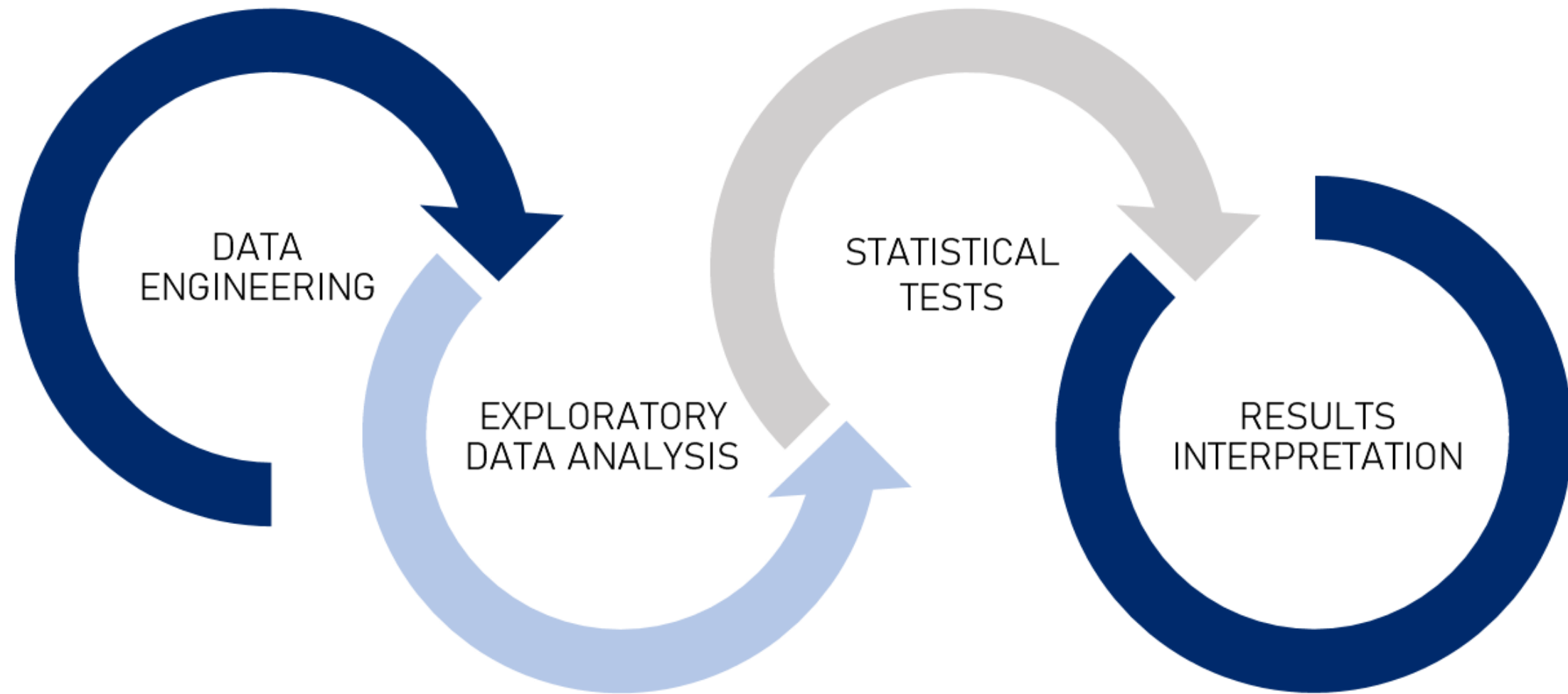
Focus Topics: HIV/AIDS, malaria, gender, youth, geographic information, biomarkers
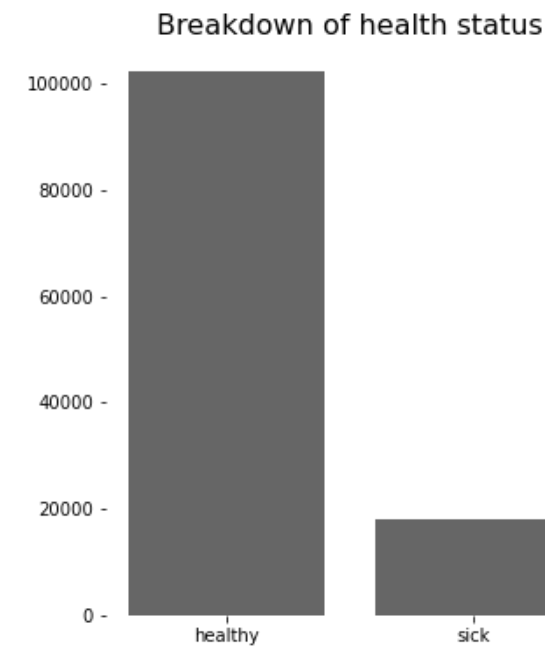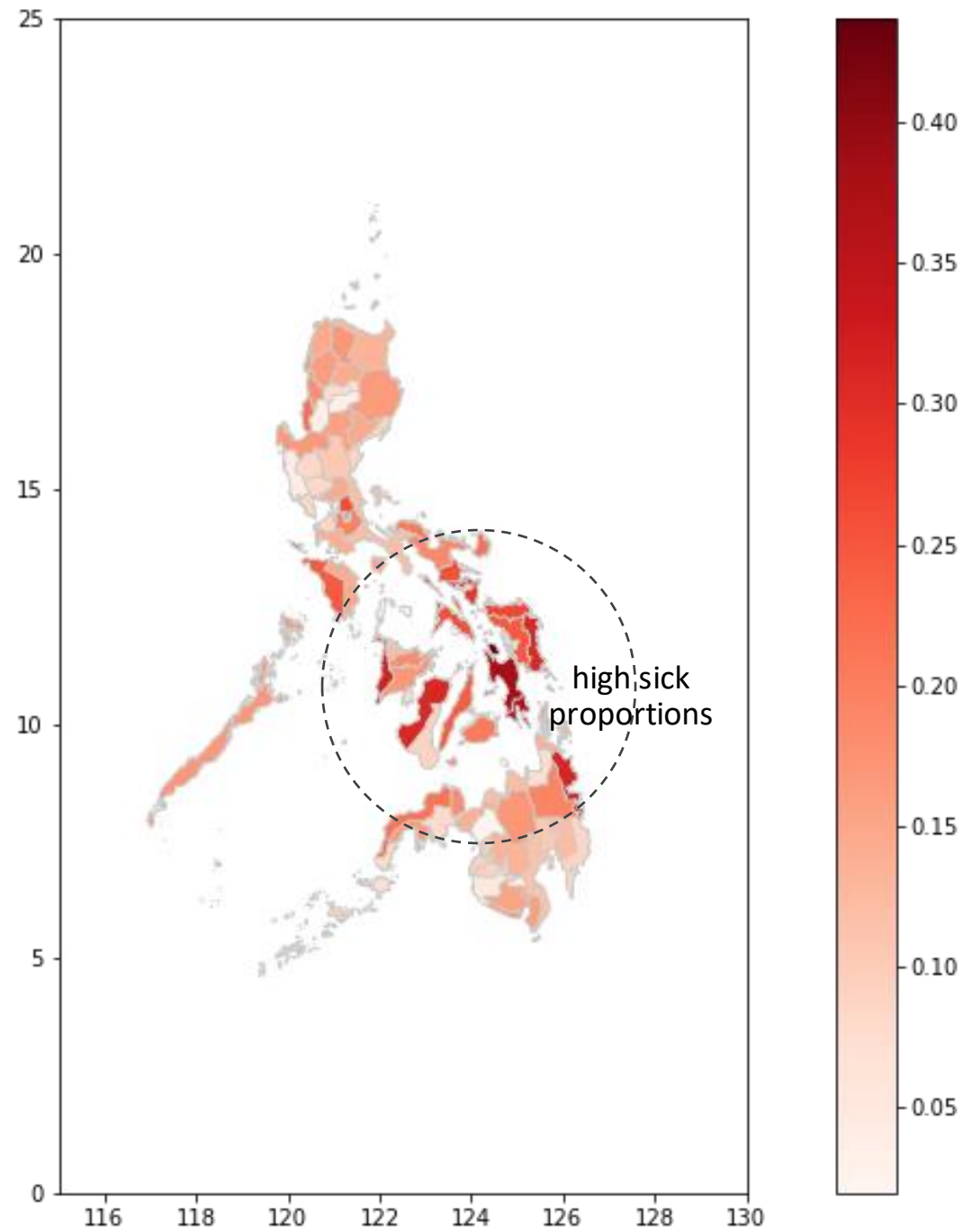
DATA DESCRIPTION

The Philippines Standard DHS 2017 survey dataset for household was used for this study.

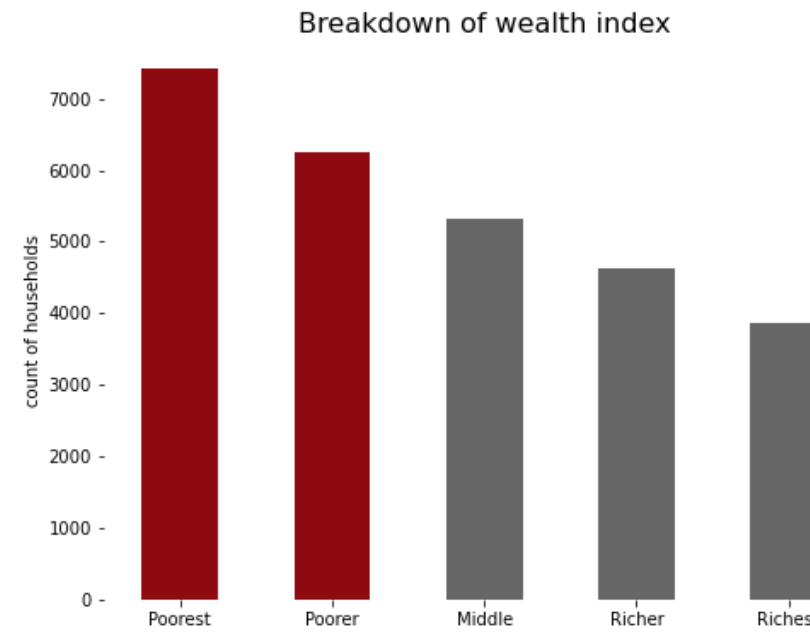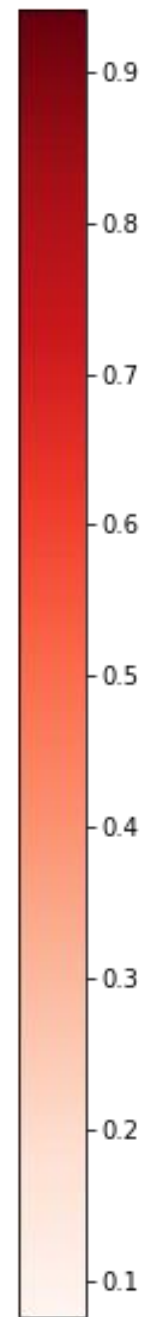| CODE	ATTRIBUTE INFORMATION
SHPROV	Province code
HV270	Wealth index combined
HV009	Number of household members
SH201	In the last 30 days, has any member of your household been sick or injured
SH202	Number of sick/injured persons
HV243E	Has a computer
HV243A	Has mobile telephone
HV225	Share toilet with other households
HV209	Has refrigerator
SH206	Visited health facility for consultation/advise or treatment In the last 30 days
SH303	Did you avail /purchase any medicines or vitamins in the last 30 days

METHODOLOGY

DATA ENGINEERING

EXPLORATORY DATA ANALYSIS

STATISTICAL TESTS

RESULTS INTERPRETATION

Breakdown of health status

15.0%
of Filipino population
have been sick in the past 30 days

95% Confidence Interval Estimate
[14.8%, 15.3%]

high sick
proportions

Provinces w/ highest sick pop'n proportions	
Biliran	44%
Leyte	38%
Southern Leyte	37%
Antique	32%
Surigao Del Sur	31%

Provinces w/ lowest sick pop'n proportions	
Camiguin	1.9%
Lanao Del Sur	2.4%
Ifugao	3.4%
Benguet	3.6%
Romblon	3.6%

Breakdown of wealth index

count of households

Poorest | Poorer | Middle | Richer | Richest
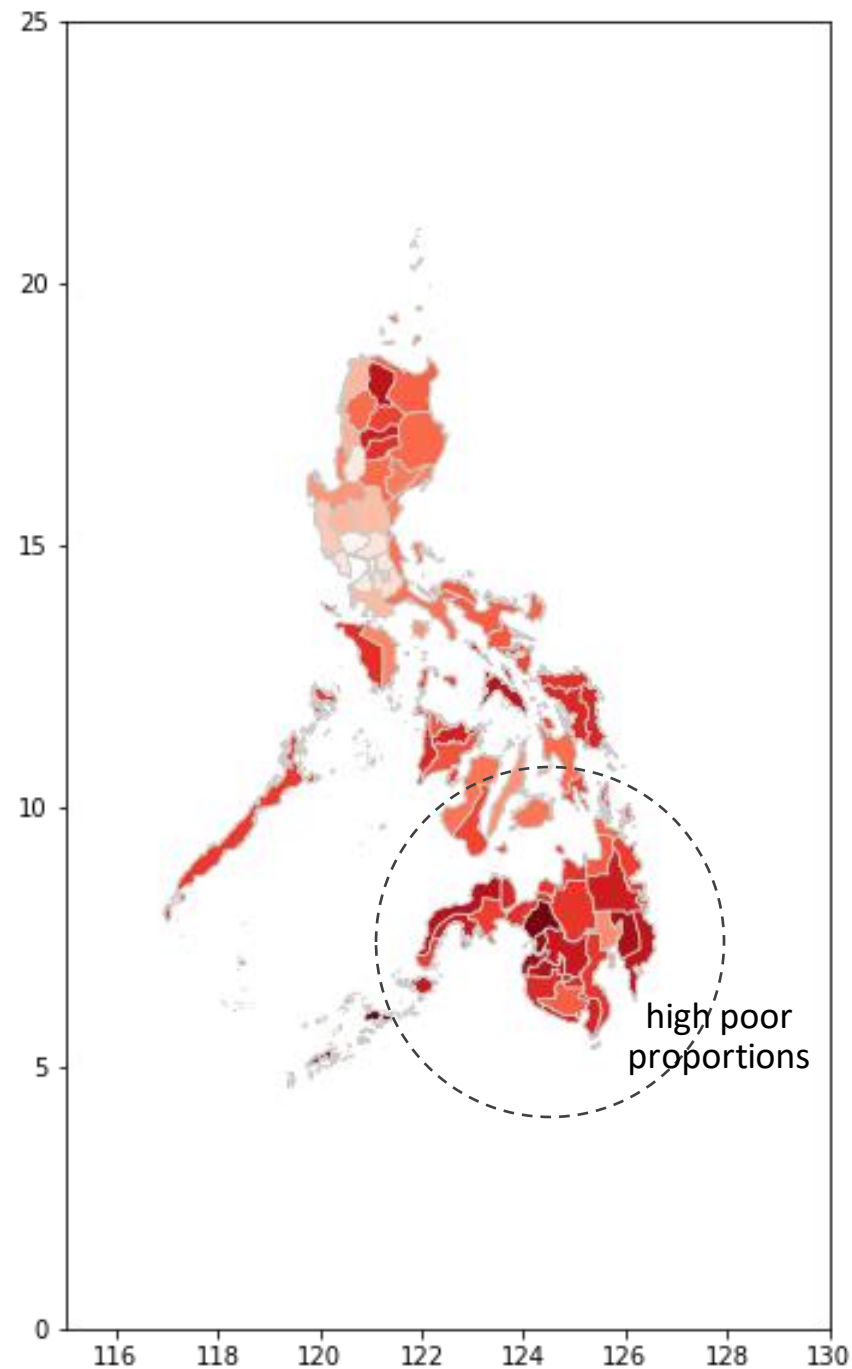
49.7%
of Filipino households
are poor

95% Confidence Interval Estimate
[49.2%, 50.3%]

high poor
proportions

Provinces w/ highest poor HH proportions	
Sulu	94%
Lanao Del Sur	91%
Davao Occidental	84%
Tawi-Tawi	84%
Compostela Valley	81%

Provinces w/ lowest poor HH proportions	
Pampanga	7.5%
Metro Manila	7.9%
Batanes	10%
Cavite	14%
Benguet	14%

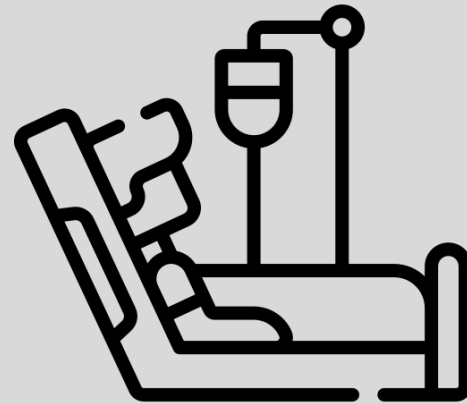Quadrant analysis of health and wealth disposition of provinces
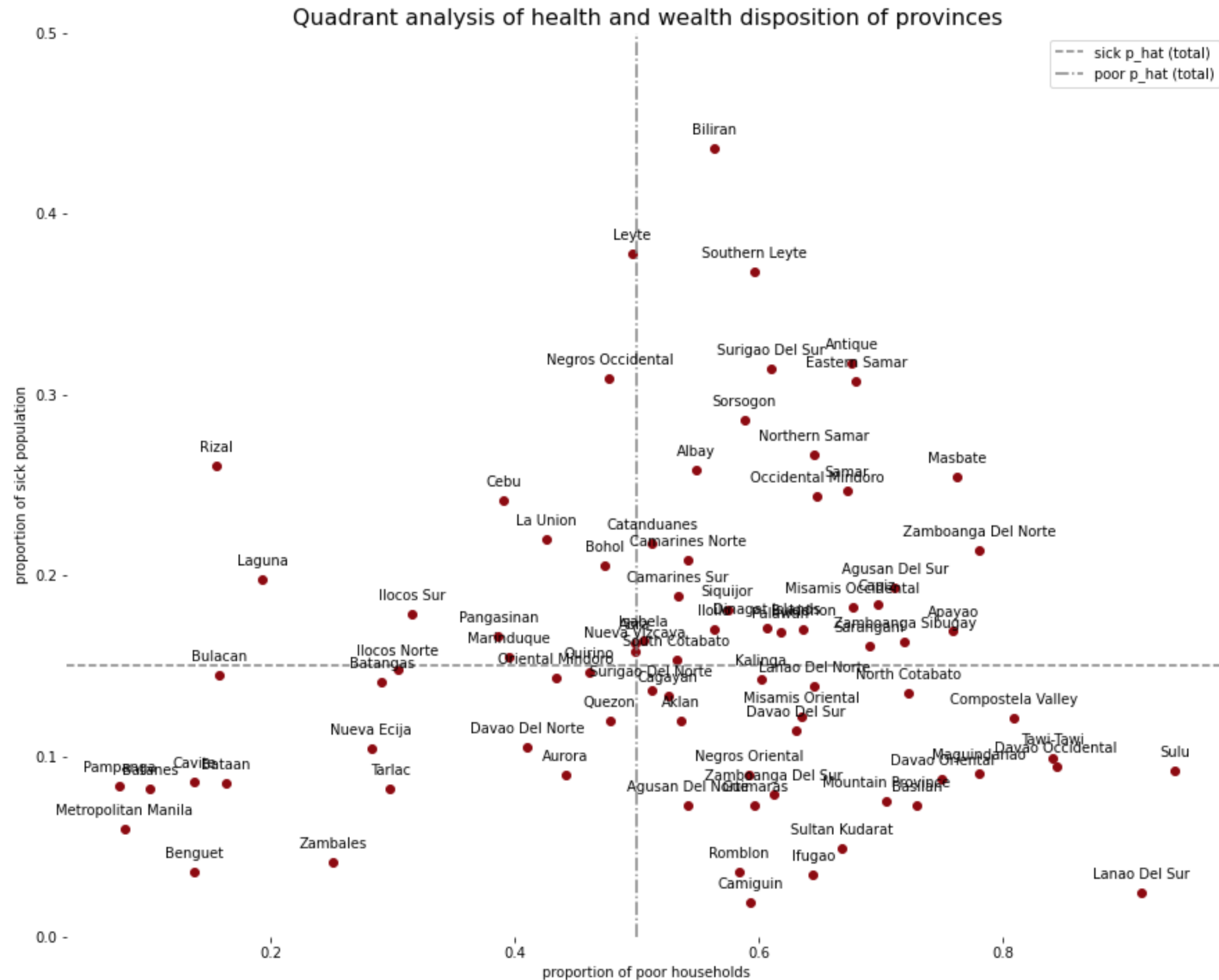
A combined analysis of these proportions can tell us which specific province needs what kind of assistance.

Provinces with relatively high sick & poor proportions should be priority in terms of aid.

16.2%
Estimated proportion of sick people among poor

13.8%
Estimated proportion of sick people among non-poor

Using t–test for significance testing,

$$H_0: \hat{p}_{poor} = \hat{p}_{non\text{-}poor}$$
$$H_1: \hat{p}_{poor} > \hat{p}_{non\text{-}poor}$$

t–stat = 11.62
p–value = 1.59e–31

At 0.05 level of significance, there is sufficient evidence to reject the null hypothesis that the proportions of sick people among poor and non-poor population are equal. More poor people get sick than non-poor.

REFRIGERATOR & SHARING OF TOILET VS OCCURRENCE OF SICKNESS

One-tailed t-test for significance testing

At 0.05 level of significance, households with a refrigerator have smaller mean value for the number of sick members. Similarly, sharing of toilets increases the chances of one household catching the sickness of another household

REFRIGERATOR OWNERSHIP	SHARING OF TOILET
Null Hypothesis. Mean number of sick household members (*in the last 30 days*) is the same regardless of refrigerator ownership.	**Null Hypothesis.** Mean number of sick household members is the same regardless of having shared toilet with other households.
Alternative Hypothesis. Household with refrigerators have smaller mean count of sick household members.	**Alternative Hypothesis.** Households who share toilet with others have higher mean count of sick household members.
t-stat = -5.66 p-value = 7.66e-09	t-stat = 2.30 p-value = 0.01

ELECTRONIC GADGETS VS OCCURRENCE OF SICKNESS

One-tailed t-test for significance testing

At 0.05 level of significance, households with mobile phone have a larger mean value of the number of sick household members. Households who own a computer, on the other hand, have a smaller mean value of the number of sick household members.

MOBILE PHONE OWNERSHIP	PC OWNERSHIP

Null Hypothesis. Owning a mobile phone does not affect the mean value of the number of sick household members

Alternative Hypothesis. Households with mobile phone have a larger mean value of the number of sick household members.
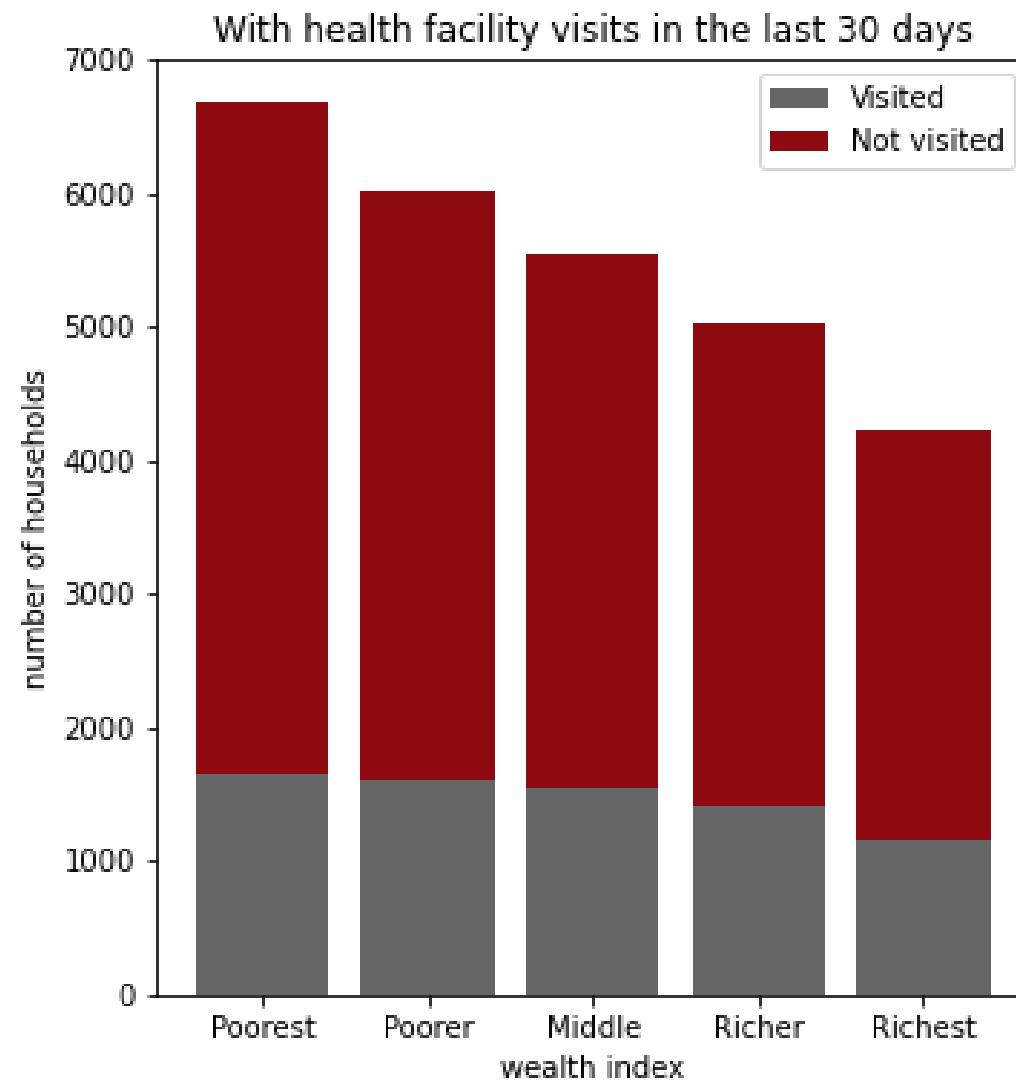
t-stat = 4.20
p-value = 1.36e-05

Null Hypothesis. Owning a computer does not affect the mean value of the number of sick household members
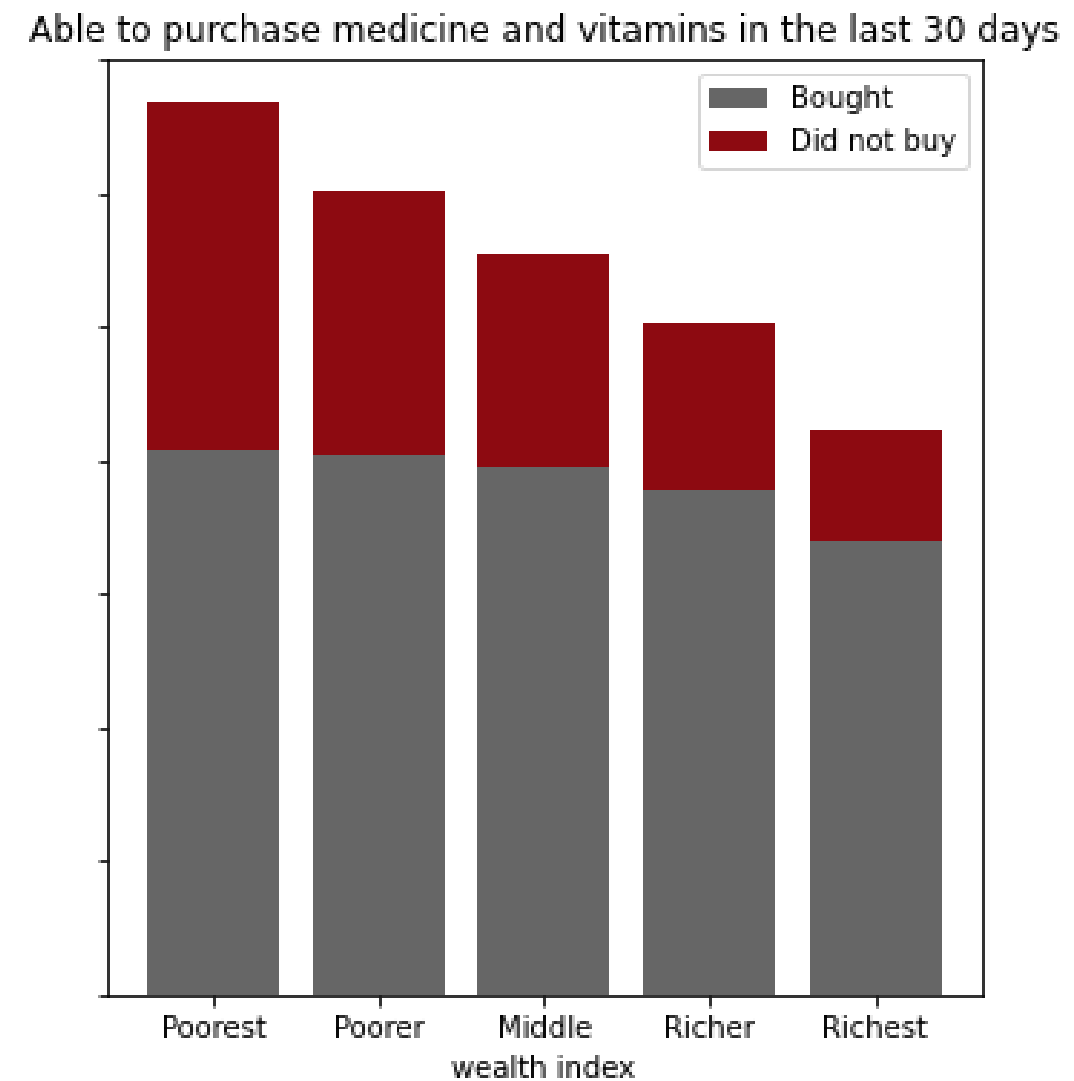
Alternative Hypothesis. Households who own a computer have a smaller mean value of the number of sick household members.

t-stat = -5.91
p-value = 1.76e-09

INDEPENDENCE OF AVAILMENT OF HEALTH SERVICES & WEALTH

With health facility visits in the last 30 days

Able to purchase medicine and vitamins in the last 30 days

Chi-Squared Statistic = 24.9195
p-value = 0.0001

Chi-Squared Statistic = 547.5808
p-value = 0.0000

MEAN NUMBER OF CONFINED PEOPLE ACROSS HOUSEHOLD WEALTH INDICES

Total Number of Confined People Based on Wealth Index
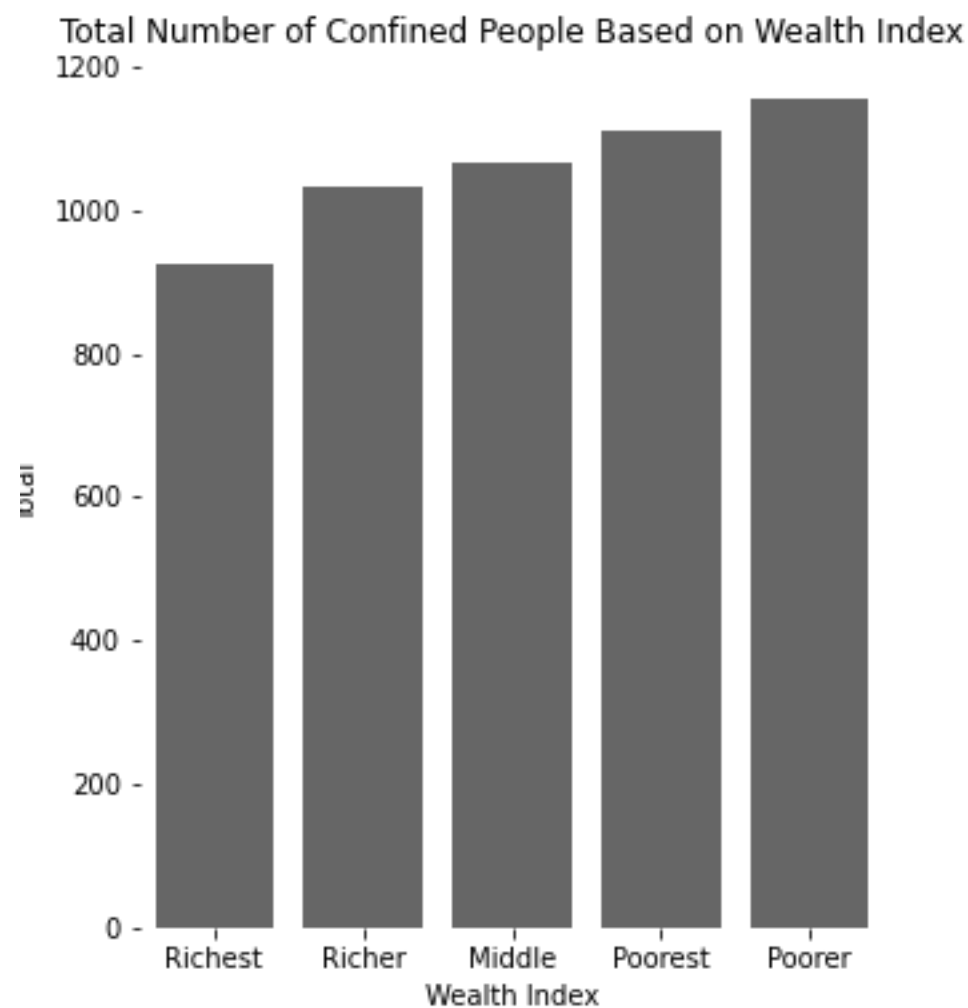
F-statistic = 1.95
P-value = 0.099

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Tukey's HSD Pairwise Group Comparisons (95.0% Confidence Interval)
Comparison   Statistic   p-value   Lower CI   Upper CI
(0 - 1)        0.025      0.539     -0.020      0.070
(0 - 2)        0.023      0.632     -0.022      0.067
(0 - 3)       -0.011      0.958     -0.055      0.033
(0 - 4)        0.014      0.917     -0.031      0.058
(1 - 0)       -0.025      0.539     -0.070      0.020
(1 - 2)       -0.002      1.000     -0.045      0.041
(1 - 3)       -0.036      0.134     -0.079      0.006
(1 - 4)       -0.012      0.947     -0.054      0.031
(2 - 0)       -0.023      0.632     -0.067      0.022
(2 - 1)        0.002      1.000     -0.041      0.045
(2 - 3)       -0.034      0.182     -0.076      0.008
(2 - 4)       -0.009      0.977     -0.051      0.033
(3 - 0)        0.011      0.958     -0.033      0.055
(3 - 1)        0.036      0.134     -0.006      0.079
(3 - 2)        0.034      0.182     -0.008      0.076
(3 - 4)        0.025      0.485     -0.017      0.067
(4 - 0)       -0.014      0.917     -0.058      0.031
(4 - 1)        0.012      0.947     -0.031      0.054
(4 - 2)        0.009      0.977     -0.033      0.051
(4 - 3)       -0.025      0.485     -0.067      0.017
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SUMMARY OF FINDINGS

- There is a significant difference in the proportion of sick people among poor and non-poor Filipinos.

  - Households with a refrigerator have smaller mean value for the number of sick members
  - Sharing of toilets increases the chances of one household catching the sickness of another household
  - Households with mobile phone have a larger mean value of the number of sick household members.
  - Households who own a computer, on the other hand, have a smaller mean value of the number of sick household members.

- Availment of health products and services is not independent of wealth status.