

Homework 2

BS 728

Suppose you are a regional manager overseeing the implementation of the national Antenatal Care (ANC) program. Baseline data from your region estimates the uptake of ANC services amongst pregnant women to be 70%.

You propose LQAS as a system to evaluate the uptake of ANC services in the 20 different health center catchment areas in your region. The system would result in two classifications: areas classified as having *high* ANC coverage would continue as currently exist, areas classified as *low* ANC coverage would receive extensive education and media campaigns, estimated at \$7,000 per health center catchment area.

You are currently considering four LQAS classification systems:

1. $p_u=60\%$, $p_l=30\%$, $\alpha=10\%$, and $\beta=10\%$
2. $p_u=60\%$, $p_l=40\%$, $\alpha=10\%$, and $\beta=10\%$
3. $p_u=80\%$, $p_l=60\%$, $\alpha=10\%$, and $\beta=10\%$
4. $p_u=80\%$, $p_l=60\%$, $\alpha=10\%$, and $\beta=5\%$

Part a

For each proposed LQAS system, calculate the optimal sample size and corresponding decision rule. For this optimal sample size and decision rule, please give the operating characteristic curve (include the image in your homework). Note, by optimal, we mean the *smallest* sample size that will meet the specified constraints. Please give the decision rule such that anything less than the decision rule is classified as low and anything greater or equal to the decision rule is classified as high.

Part b

For each proposed system, discuss the strengths and weaknesses (at least one strength and weakness for each system) for your evaluation. Think about both the costs of implementing the LQAS system, the costs of the resulting interventions based on the classifications, and the consequences of not intervening in certain areas.

Part c

Now suppose you are approached by the minister of health for the entire country. You are to be part of a larger effort to estimate the uptake ANC nationwide. The minister of health wants your input on how this will be designed. There are seven regions in the country with

approximately 20 health center catchment areas each. There are two study designs that are being considered:

- Option 1: Do a stratified sample in each region. Select 4 urban and 4 rural health center areas in each region and perform the LQAS sample at each health center.
- Option 2: Go into all the health centers in the country and perform LQAS at each.

What do you recommend and why? How does your recommendation meet the objectives of the program? What might be limitation(s) of your recommended design?