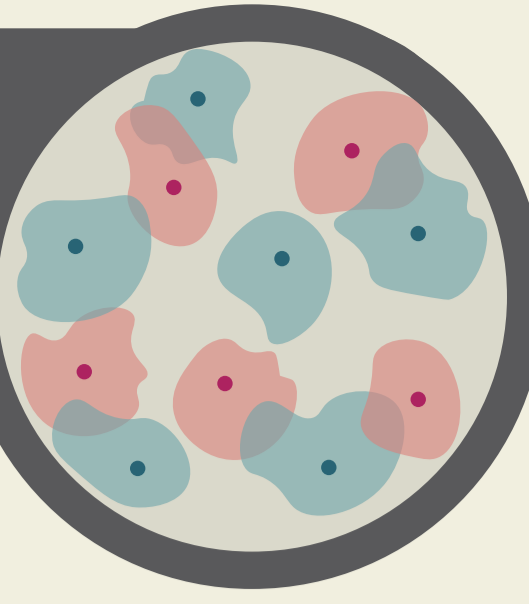


Study of socioeconomic inequities in Pap smear utilization as preventive health practice in Argentina



Introduction

The Papanicolaou test (better known as Pap smear) is a preventive practice that consists of the observation of cervix cells under a microscope with the purpose of detecting precancerous cells generated by the Human Papillomavirus (HPV), which infects 20% of the Latin American population. Cervical cancer is the second most frequent cancer and the one with the **highest mortality**; in Latin America alone, 33,000 women die of cervical cancer each year^(1, 2).

The **early treatment** of cervical cancer diminishes its incidence and mortality by 80%, that's why regular Pap testing has great relevance⁽³⁾. The Argentinian State recommends to undergo this test from age 25 onwards. It can be done for free in any healthcare center⁽⁴⁾.

Despite this, according to the 2018 National Risk Factors Survey (ENFR, for its spanish acronym)⁽⁵⁾, 38% of surveyed women did not undergo a Pap smear in the last two years. This arises a new question:

Are there inequities in the use of this preventive practice?

Inequity in the context of health care refers to an unfair distribution of the risks and resources that varies between individuals because of their social class, gender, religion, and ethnicity, among others, and as such is avoidable⁽⁶⁾.

Objective

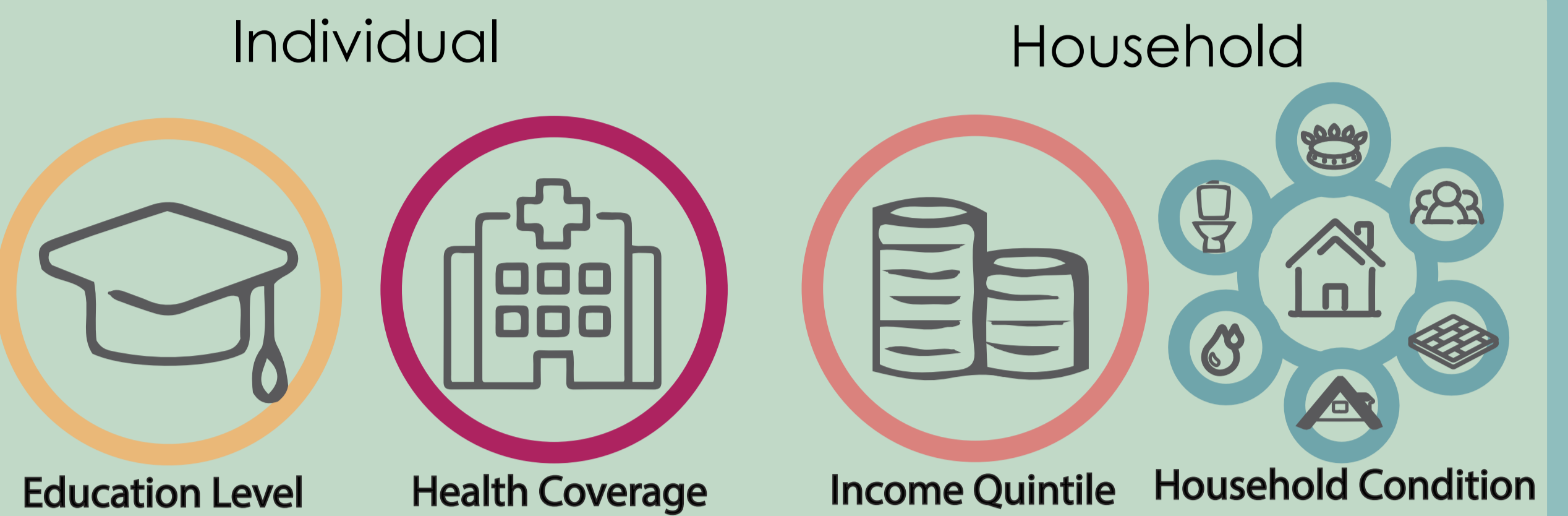
Identify socioeconomic factors which relate to the use of Pap smears, and evaluate their degree of impact with the purpose of contributing information to remedy inequities in healthcare access.

Dataset

The ENFR is carried out in Argentina every 4 years in urban centers with more than 5,000 habitants, to adults over 18. Its goal is to evaluate the main risk factors of non-communicable diseases. This survey includes characteristics of the respondent and their household.

According to the guidelines of the Ministry of Health (MSAL), it was decided to work with a subset that included women aged 25 or more, numbering 14,805 entries.

The relationship between having undergone a Pap smear in the last two years ("Pap smear", yes/no, dichotomous response variable) and socioeconomic factors was analyzed. As explanatory variables at the **individual level**, we used the **level of education** reached (in three categories: up to complete primary level ("Primary"), up to complete secondary level ("Secondary"), and up to complete tertiary/university level ("University")) and the type of **health coverage** of the respondent (dichotomous variable: only with state coverage ("Public"), or with a private service (regular or prepaid health insurance, or emergency services) ("Private")) were included.



At the **household level**: the **income quintile** and the **condition of the household** (deficient/not deficient) were included. A deficient household was defined as one in which there was, at least, a sanitary, structural or overcrowding deficiency⁽⁷⁾.

The age was included as a **control variable** (in 4 categories: from years 25 to 34; 35 to 49; 50 to 64; and 65 onwards), and the province was included as a random effect variable in order to contemplate the grouped data.

Mosaic-type descriptive charts were made, which evidenced that every variable presented some kind of relationship with the use of Pap smears.

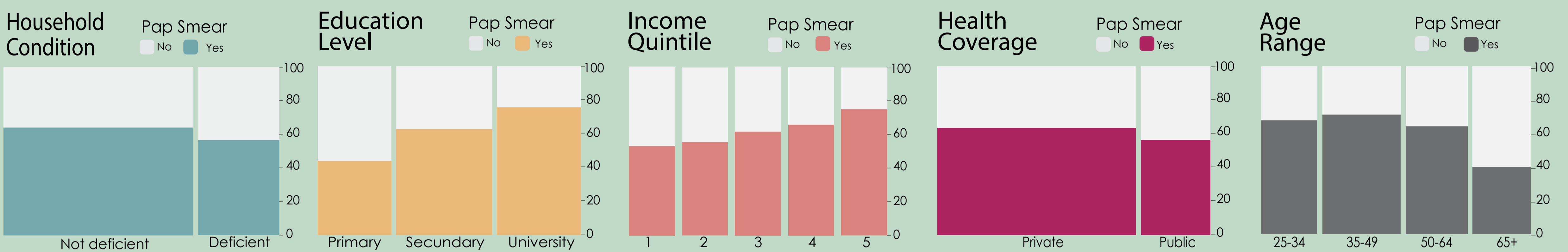


Figure 1: Charts of the percentage use of Pap smear according to each variable, the length of the bars is representative of the quantity of women belonging to each category.

The Model

To analyze the relationship between the use of Pap smears and the explanatory variables mentioned before, a logistic regression was fitted (Generalized Linear Mixed Model). The variables were incorporated one by one in an additive manner to the model, verifying in every step the significance of the likelihood test ($p < 0.05$).

Then, the magnitude of effect of each variable was estimated by calculating their adjusted Odds Ratios (OR), and the percentage prediction of the use of Pap smears in function of each of the explanatory variables was predicted, with a 95% confidence interval (Figures 2 and 3).

The model assumptions were graphically evaluated with the DHARMA package⁽⁸⁾. All the analyses were conducted with R version 4.2.2.

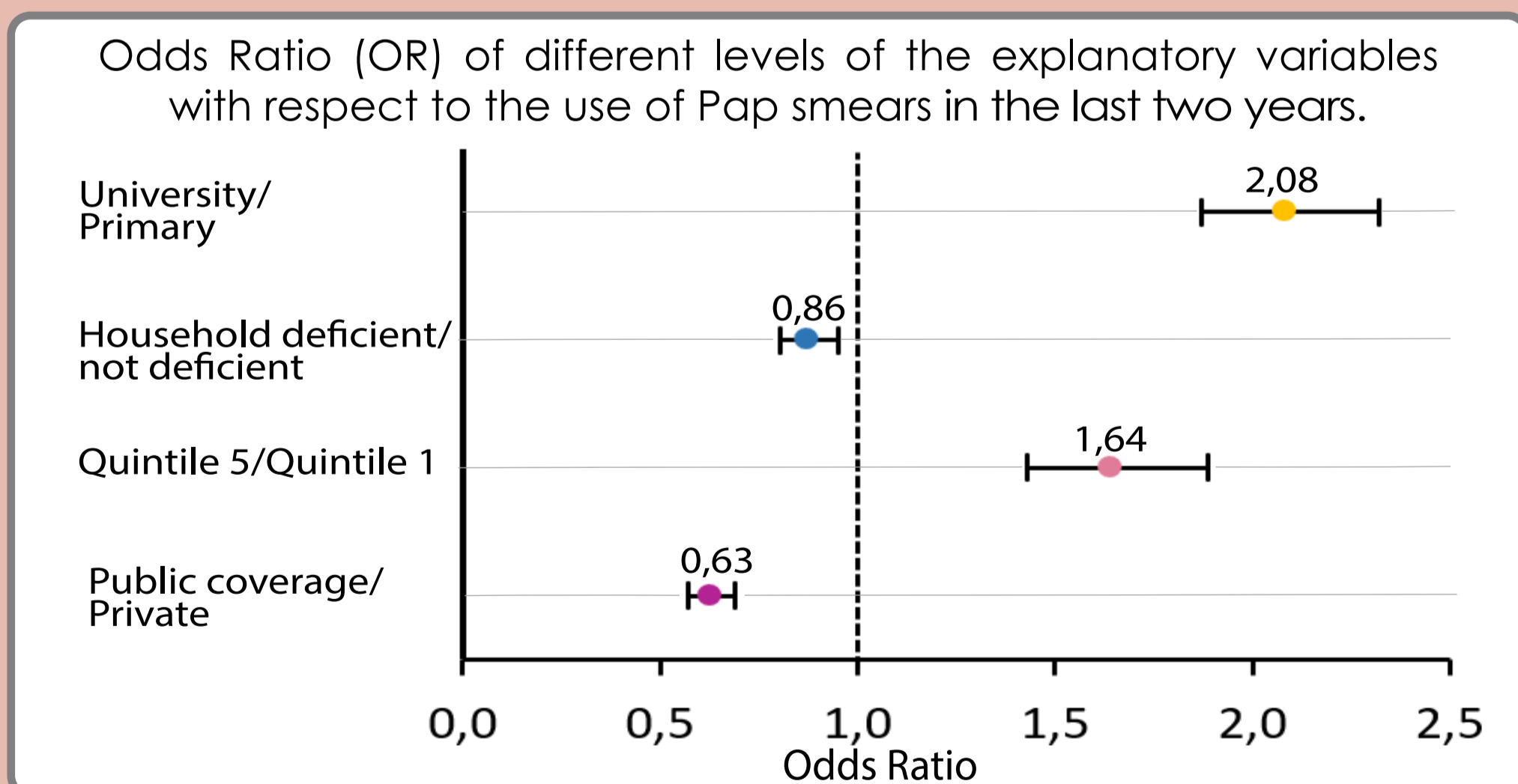


Figure 2: Odds Ratio (OR) scaled plot of different levels of the explanatory variables with respect to the use of Pap smears, with a 95% confidence. The bars indicate the confidence interval. The OR are adjusted with the other explanatory variables.

The relationship of every explanatory variable with the probability of having had a Pap smear in the last 2 years was significant ($p < 0.05$).

Having a higher income, a non deficient household, private healthcare, or a higher level of education is positively related to the use of Pap smear (Figures 3-A, B, C and E). This probability diminishes with age, the lowest being the range of 65 years or older (Figure 3-D).

Results and Discussion

Prediction Graphs

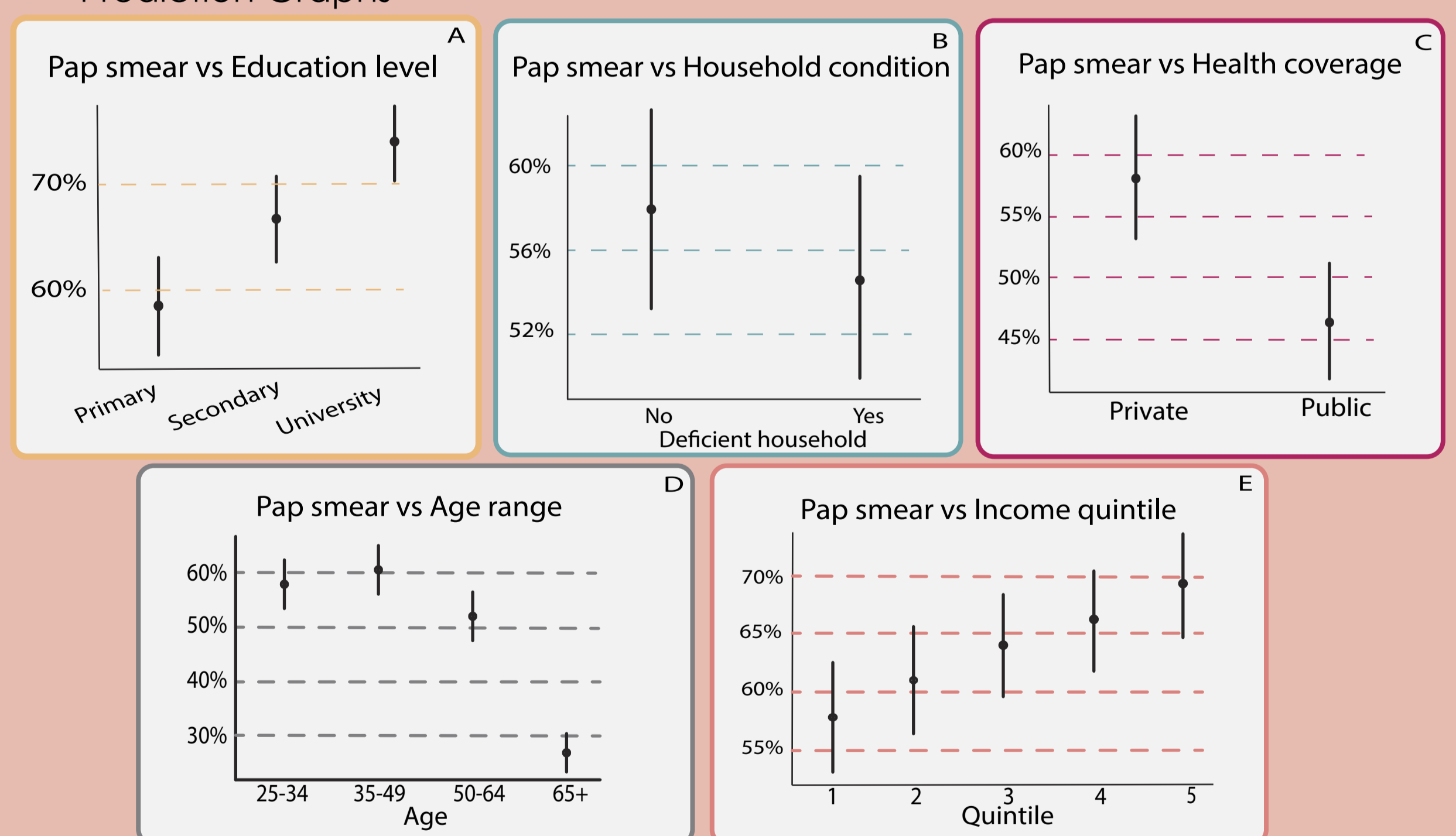


Figure 3: Pap smear use estimated percentage according to each of the analyzed explanatory variables, with a 95% confidence, adjusting with the other explanatory variables.

Conclusions

It was evidenced that all the studied variables (income, level of education, household condition and health coverage) are inequity sources in women's health regarding the use of Pap smears in the last 2 years. Although this preventive practice is free of charge in public healthcare centers, it is necessary to implement measures, such as an awareness plan, with the objective of reducing cervical cancer related deaths in the Argentinian population.