

# COVID-19 vaccination uptake among Syrian Refugees in a suburb of Beirut, Lebanon: a nested cross-sectional study

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## BACKGROUND

- Since early 2020, the global pandemic of COVID-19 has worsened inequalities amongst vulnerable populations.
- Refugees, in particular, are disproportionately vulnerable to exclusion, stigma and discrimination and may lack access to COVID-19 vaccination. Indeed, globally, racial discrimination has been found to be associated with vaccine hesitancy.

### Aim

- 1) To examine the relationship between nationality (Lebanese and Syrian) and COVID-19 vaccination in a suburb of Beirut,
- 2) Describe the reasons for lack of vaccine uptake and,
- 3) Develop a prediction model for vaccine uptake for Syrian and Lebanese populations.

## METHODS

**Design:** Nested cross-sectional analysis from a longitudinal telephone survey from June to October 2022 in Sin-El-Fil, Beirut, Lebanon.

**Sampling frame:** Our target population was individuals with physiological and/or socio-economic vulnerabilities to COVID-19. Areas of lower socio-economic level in Sin-El-Fil were identified geographically through consultations with community stakeholders. A listing of all households was completed from which all Syrian refugees and pregnant women were contacted to participate, while a random sample of the remaining population was selected (adults aged 60 years or older and other individuals from those low socio-economic areas).

**Sample:** 2,045 participants, 79% were Lebanese (n=1,322), 18% Syrians (n=664), and 3% other nationalities (n=59).

**Outcome:** Data on socio-demographics, COVID-19 vaccination and reasons for non-vaccination were collected. The outcome was the uptake of COVID-19 vaccination and was binary.

**Analysis:** The analysis accounted for the complex design and non-response.

- 1) Logistic regression was used to assess the association between nationality and COVID-19 vaccination uptake, after accounting for confounders identified using a Directed Acyclic Graph.
- 2) Reasons for non-uptake of vaccination were presented graphically.
- 3) LASSO (cross-validation) logistic regression model was used to identify the predictors of vaccine uptake for each nationality (Lebanese and Syrian), the models were internally validated using cross-validation (10-folds). All analyses were performed using Stata 18.0.

## RESULTS

1) COVID-19 vaccination uptake in our study population was 77% (95%CI:75-79) and was higher among Lebanese (85% (95%CI:82-86)) compared to Syrians (47% (95%CI:43-51)) (P<0.001) (Figure 1); adjusted odds ratio (OR) 6.8 (95% CI:5.5-8.4).

2) The most common reasons reported for vaccine non-uptake were: (1) **not believing the vaccine is essential** and (2) **preferring to follow other precautions** among both Lebanese (51% and 25%, respectively) and Syrians (45% and 23%, respectively) (Figure 2).

3) For **Lebanese**, identified predictors of vaccine uptake were greater age, the presence of an older adult in the household, having attended school, greater asset-based wealth index, having healthcare coverage, feeling susceptible to COVID-19, believing in the safety and efficacy of vaccines and having previously taken the flu vaccine (Figure 3).

**While among Syrians**, vaccine uptake predictors found were greater age, male sex, having completed school or higher education, receiving cash assistance, having co-morbidities, believing in the safety and efficacy of vaccines, having previously taken the flu vaccine, and having regularized residency in Lebanon (Figure 4).

Indeed, having legal documentation doubled the odds of vaccine uptake compared to not being documented (adjusted OR:1.9 (95%CI:1.3– 3.0)).

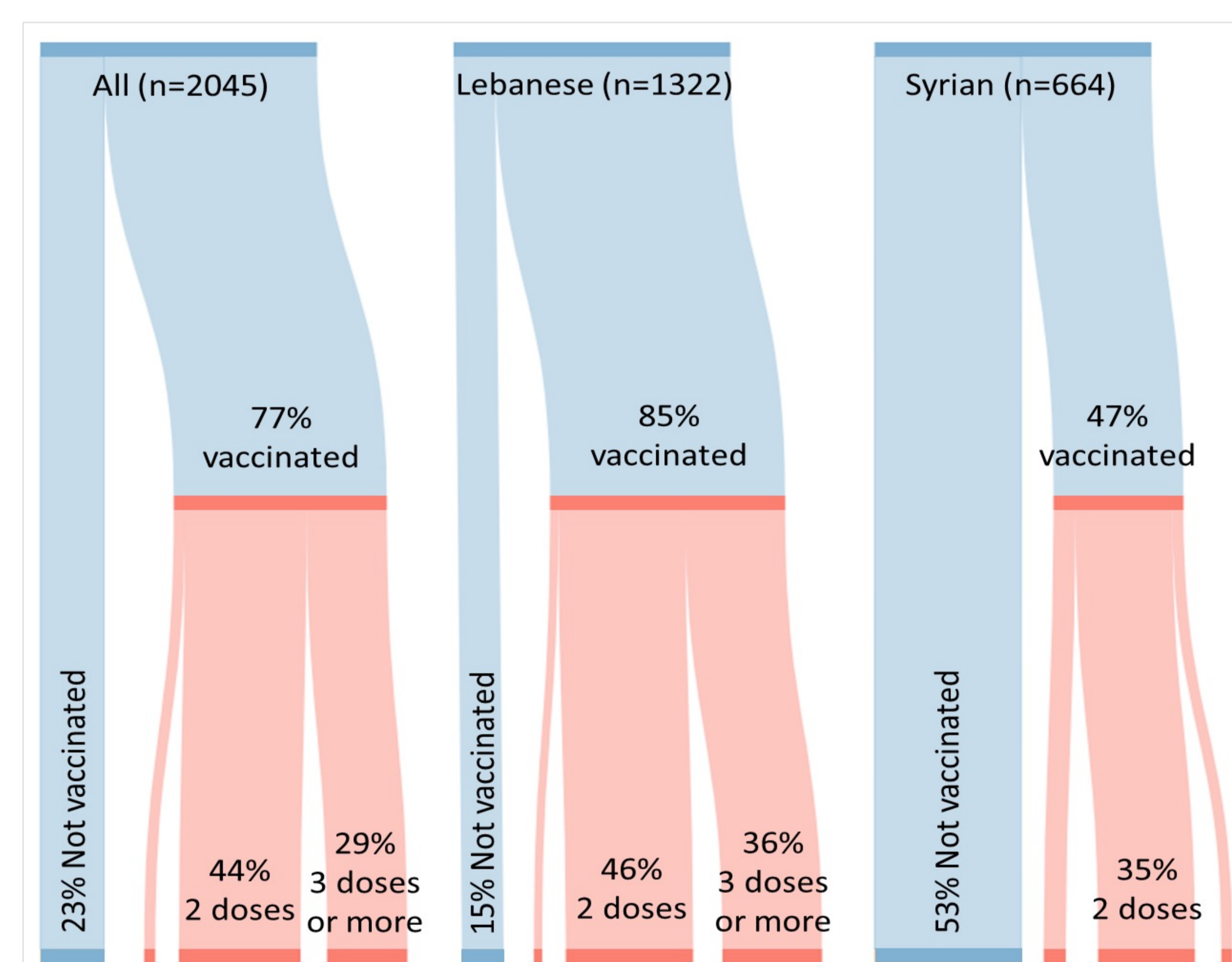


Figure 1. Vaccine uptake

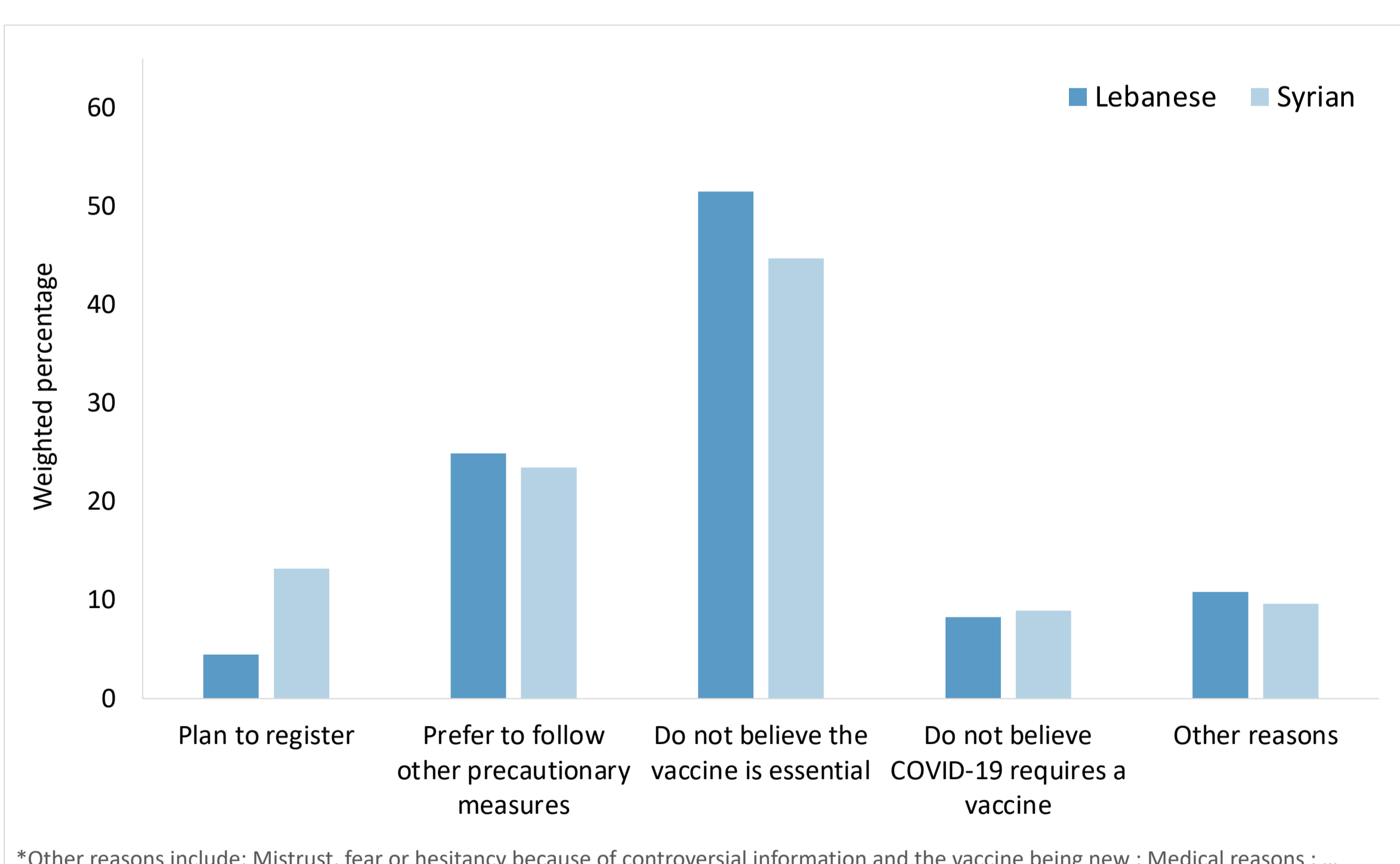


Figure 2. Reported reasons for lack of vaccine uptake by nationalities

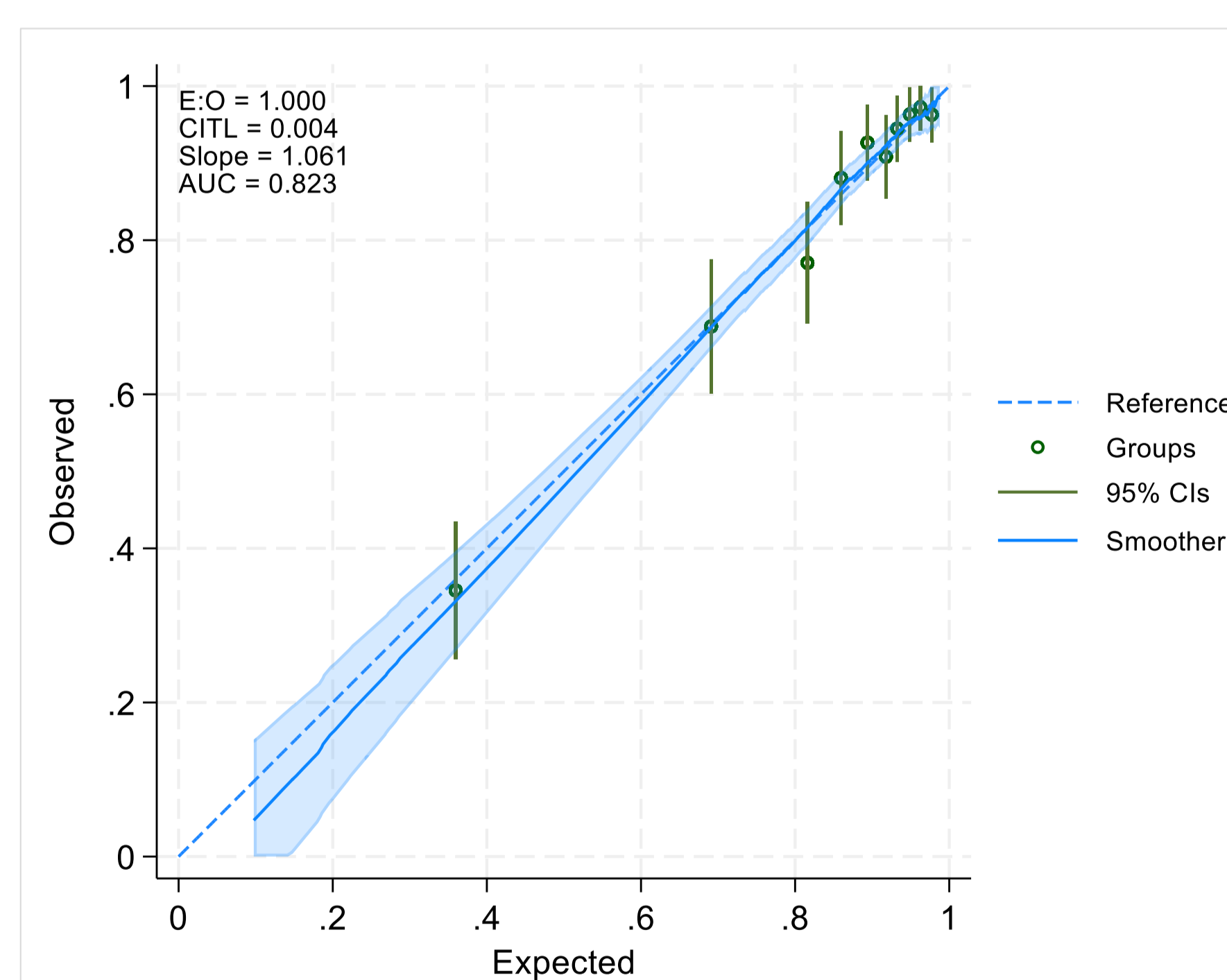


Figure 3. Calibration plot for the Lebanese sample

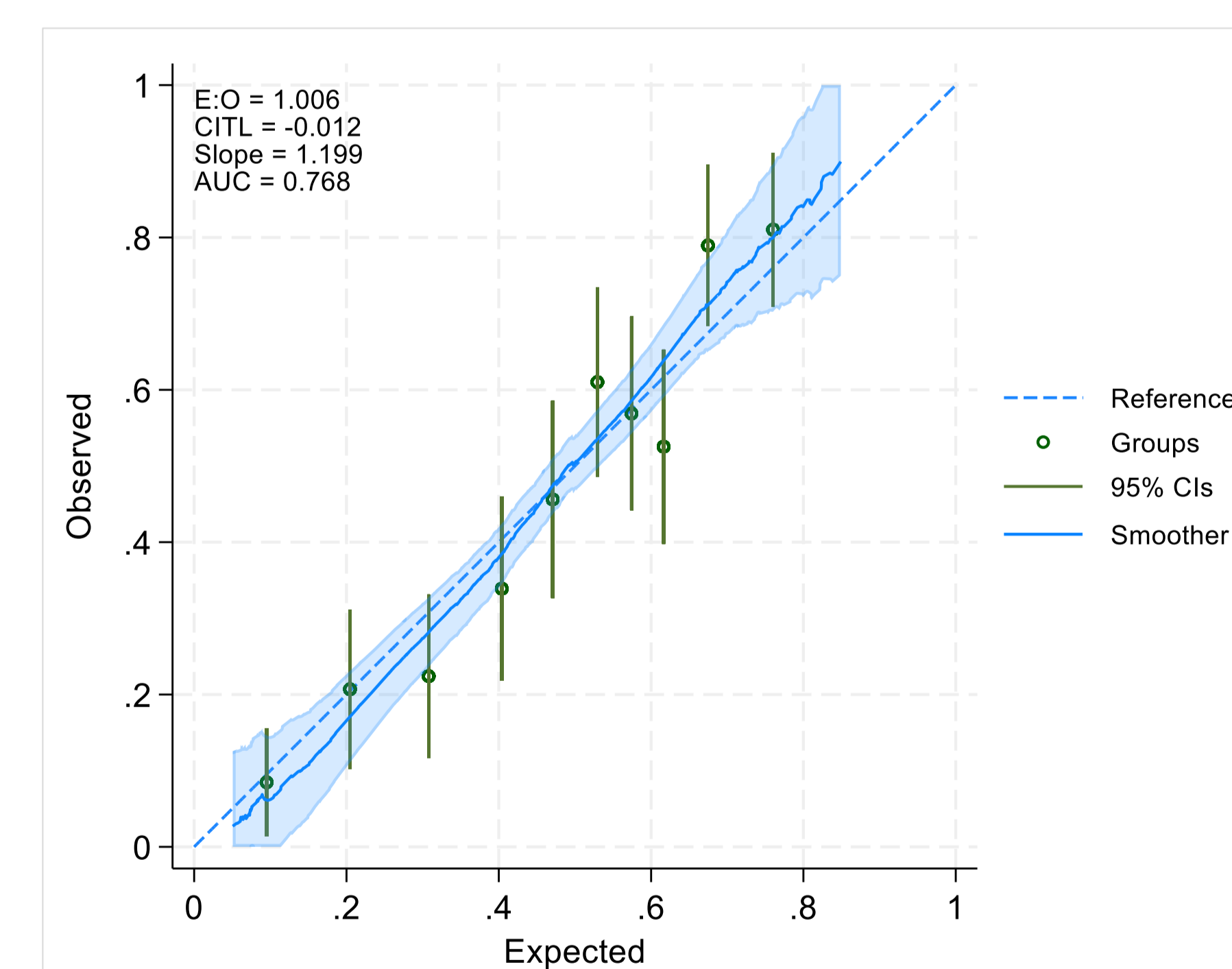


Figure 4. Calibration plot for the Syrian sample

## CONCLUSION

- As of Autumn 2022, more than half the Syrian refugees living in a low socio-economic area of a suburb of Beirut were still not vaccinated against COVID-19 despite the availability of vaccines free of charge to everyone in Lebanon.
- Both models showed good discrimination, while the model for the Lebanese population had good calibration. The model for the Syrian population was not as well calibrated indicating that a larger sample size is needed. Predictors for both populations include age, educational level, socio-economic status, and general attitude toward vaccination.
- The findings indicate barriers for vaccine uptake in Syrians, including legal status, and calls for urgent action to enable access to vaccines.