

# Assignment

Martijn Koster, 6234119      Jurrian van de Kraats, student nr  
Tim Poorthuis, student nr

2023-02-15

## Introduction

Write here a short motivation with a RQ

- well articulated RQ

**The aim of the study is to assess whether annual influenza vaccination reduces the risk of hospitalization among elderly (i.e., people aged  $\geq 65$  years).**

## Methods

- Selection of confounders? or in intro?

*Write here something about the confounders and the DAG*

We based our variables on the

*Propensity score Model*

Based on the DAG model in Figure @fig{fig:dag} - Methods to control for (observed/unobserved confounding)

We will develop a propensity score model and calculate Inverse probability weighting

The confounders are moderately related with the exposure of interest ( $C=0.66$ )  $\rightarrow$  Add some interpretation here.

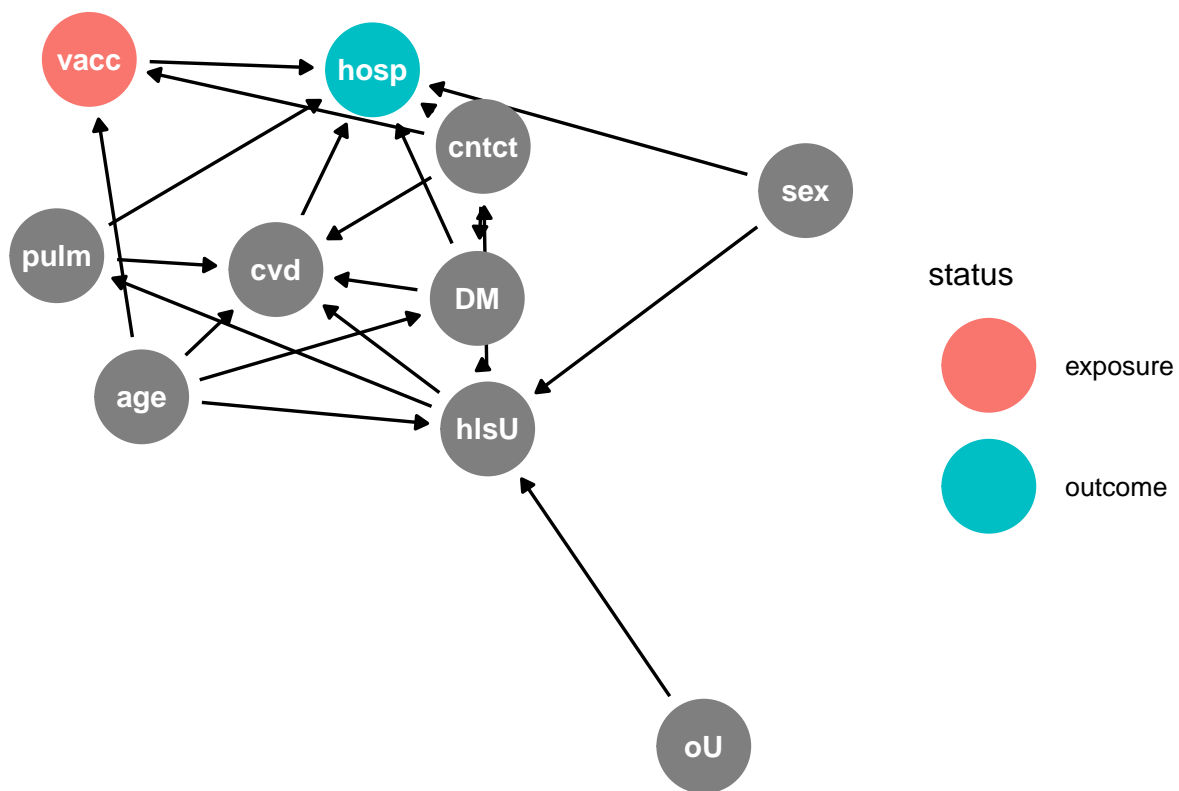
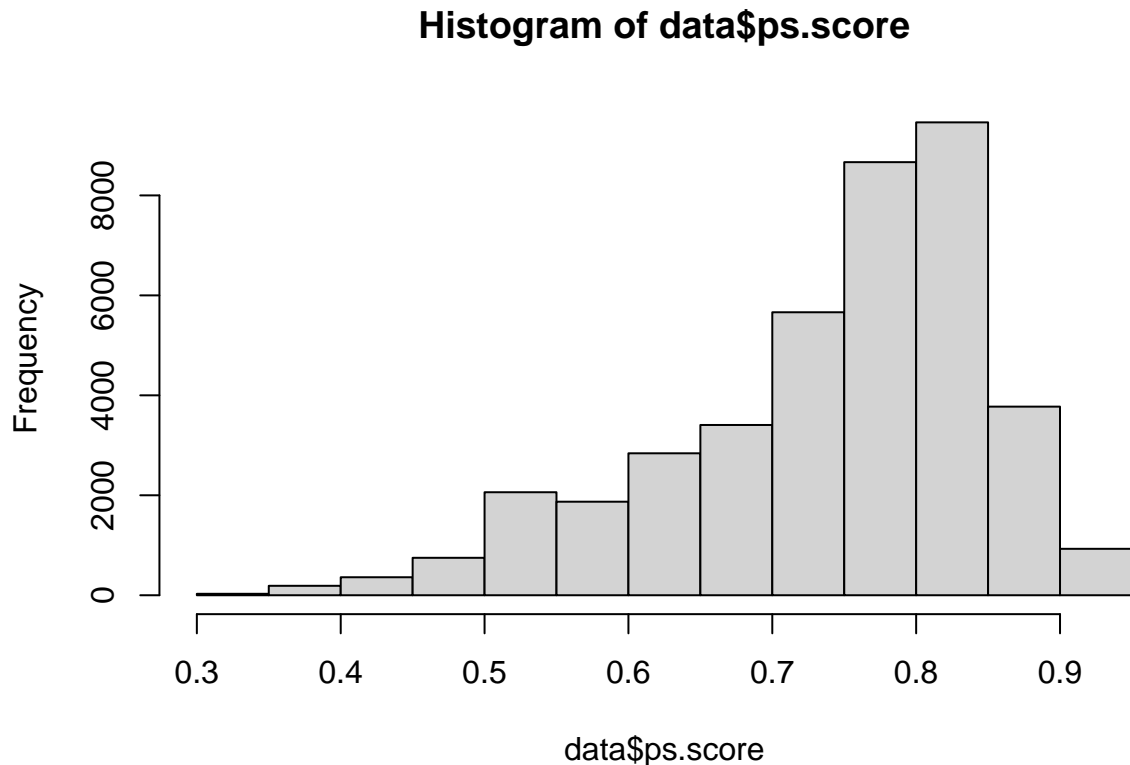


Figure 1: DAG model with Vaccine as exposure and hospitalization as outcome



We see that the mean propensity score for the ones who are vaccinated is higher (As expected)

Assignment These are the unstabilised weights of the inverse probability score.

We can use stabilised weights as well

What's the difference compared to unstabilized weights? *The difference is in the numerator of the weights. Here, the results are equal, because the numerator is just a constant. However, the numerator model can include confounders too, in which case the stabilized weight yield more stable estimates.*

WE need to check for positivity:

The positivity assumption means that both exposed and unexposed individuals need to be present in all sub-populations defined by the combinations of covariate values -> Westreich, D., & Cole, S. R. (2010). Invited commentary: positivity in practice. American journal of epidemiology, 171(6), 674-677.

There is non-positivity

- Checking assumptions of method to control for confounding
- Implementation of methods to control for (observed/unobserved) confounding

## Results

### Baseline Characteristics

Table 1 presents the baseline characteristics of 40,000 individuals who were included in the study. The mean age 75.65 and the majority of the study population 61.91% were female. Approximately half of the respondent have Cardiovascular disease, whereas 12.34 percent have Pulmonary disease and 6.54% have Diabetes

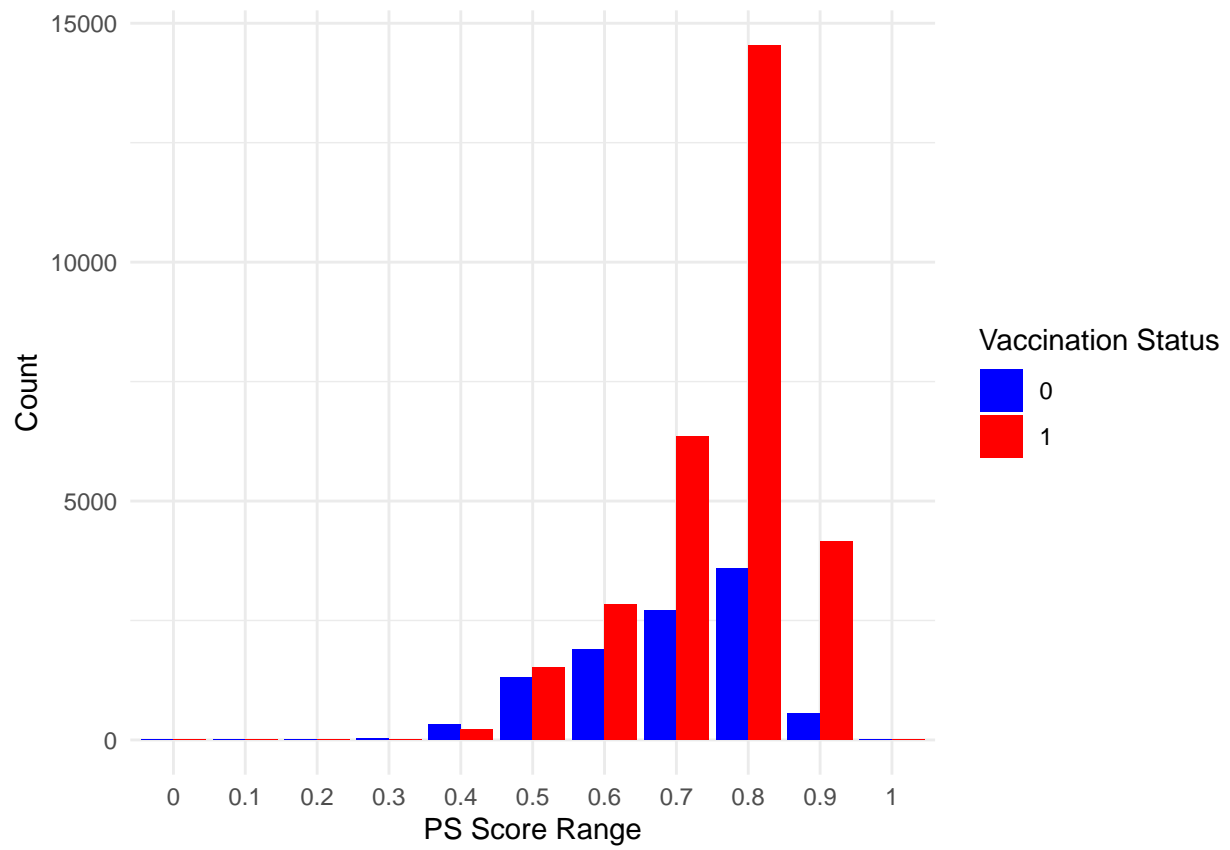


Figure 2: Checking for non-positivity

Mellitus.

A total of 29616 (74.04%) respondents were vaccinated, whereas 10384 (25.96%) were not vaccinated. People who received a vaccination had on average more often pulmonary disease (14.33% vs 6.67%), cardiovascular disease (53.02% vs 39.05%) and diabetes (7.51% vs 3.8%).

Baseline characteristics stratified by the study outcome indicate that 254 of the respondents were hospitalized as opposed to 39746 who were not. Respondents who were hospitalized were older (79.68 vs 75.63), had more often contact with the GP (21.08 vs 14.71), were on average less often a female (48.43% vs 61.99%), had on average more often cardiovascular disease (72.05% vs 49.25%) and on average more often Diabetes (11.42% vs 6.51%).

Table 1: Baseline Characteristics stratified by Influenza vaccination received and Hospitalisation

Characteristics	Total	Influenza vaccination received		Hospitalized	
		Yes	No	Yes	No
N	40000	29616	10384	254	39746
Age, mean (SD)	75.65 (6.97)	75.9 (6.83)	74.97 (7.32)	79.68 (7.2)	75.63 (6.97)
Contact, mean (SD)	14.75 (11.54)	15.85 (11.73)	11.64 (10.38)	21.08 (15.59)	14.71 (11.5)
Female, n (%)	24763 (61.91)	18022 (60.85)	6741 (64.92)	123 (48.43)	24640 (61.99)
Pulmonary disease, n (%)	4937 (12.34)	4244 (14.33)	693 (6.67)	60 (14.33)	4877 (12.27)
Cardiovascular disease, n (%)	19757 (49.39)	15702 (53.02)	4055 (39.05)	183 (72.05)	19574 (49.25)
Diabetes mellitus, n(%)	2618 (6.54)	2223 (7.51)	395 (3.8)	29 (11.42)	2589 (6.51)
Received Influenza Vaccination, n (%)				184 (72.44)	29432 (74.05)

- Reporting characteristics of study population
- Reporting crude/adjusted effect measures

Crude measures:

The crude association between vaccination status and hospitalization was examined using logistic regression, and the odds ratio was found to be 0.921 (95% CI: 0.699, 1.214), indicating a non-significant association. The C statistic, a measure of discrimination, was 0.508, suggesting poor predictive performance of the model.

**Adjusted measures**

## Conclusion / Discussion

- Conclusions supported by data
- Other issues (both positive and negative)