Assignment

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Introduction

Table 1: Descriptive statistics in the dataset

Variables	Min	Max	Mean	N
vacc	0	1	0.740400	40000
age	65	104	75.654900	40000
sex	0	1	0.619075	40000
cvd	0	1	0.493925	40000
pulm	0	1	0.123425	40000
DM	0	1	0.065450	40000
contact	2	146	14.752800	40000
hosp	0	1	0.006350	40000

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 >=65 years).

- Selection of confounders? or in methods

Methods

- Selection of confounders? or in intro?

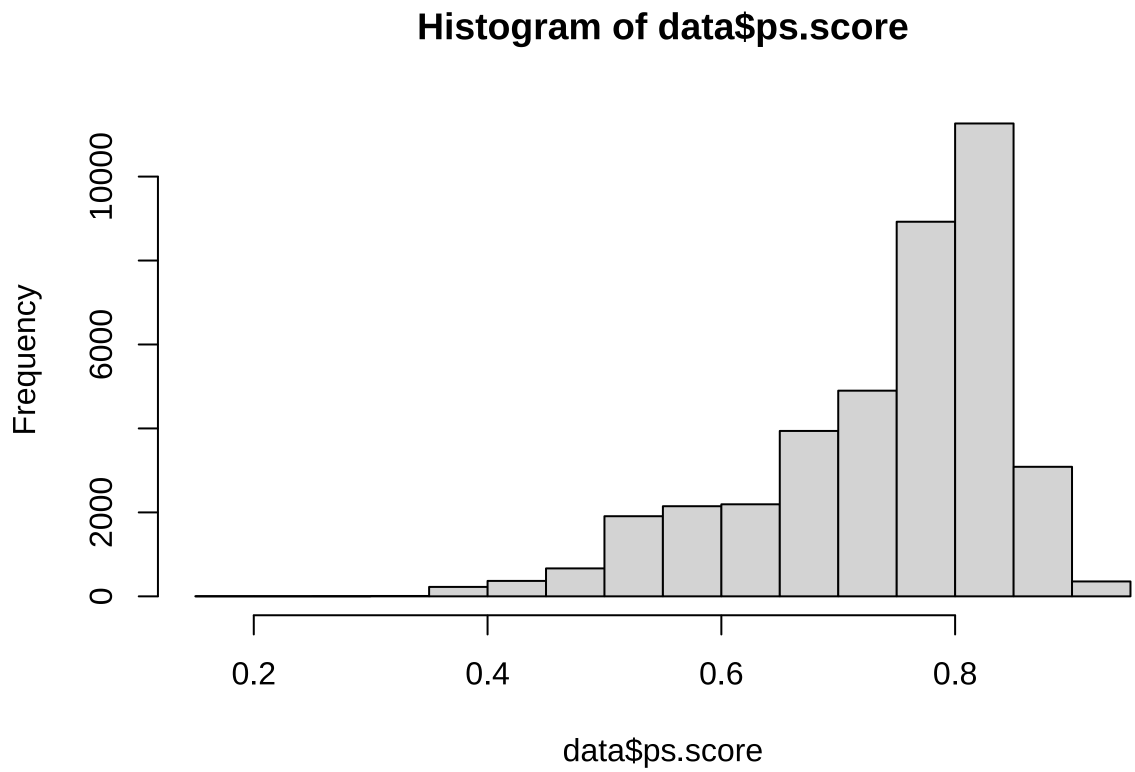
I'd say we use `age`, `cvd`, `DM contact`, based on a DAG?

- 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=0.65) –> Add some interpretation here.

$$\log\left[\frac{P(\text{vacc}=1)}{1-P(\text{vacc}=1)}\right] = \alpha + \beta_1(\text{rcs}(\text{age})_{\text{age}}) + \beta_2(\text{rcs}(\text{age})_{\text{age}'}) + \beta_3(\text{rcs}(\text{age})_{\text{age}''}) +$$
$$\beta_4(\text{rcs}(\text{age})_{\text{age}'''}) + \beta_5(\text{cvd}) + \beta_6(\text{DM}) + \beta_7(\text{rcs}(\text{contact})_{\text{contact}}) +$$
$$\beta_8(\text{rcs}(\text{contact})_{\text{contact}'}) + \beta_9(\text{rcs}(\text{contact})_{\text{contact}''}) + \beta_{10}(\text{rcs}(\text{contact})_{\text{contact}'''}) + \beta_{11}(\text{DM} \times \text{rcs}(\text{contact}$$
$$\beta_{12}(\text{DM} \times \text{rcs}(\text{contact})_{\text{contact}'}) + \beta_{13}(\text{DM} \times \text{rcs}(\text{contact})_{\text{contact}''}) + \beta_{14}(\text{DM} \times \text{rcs}(\text{contact})_{\text{contact}'''})$$



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

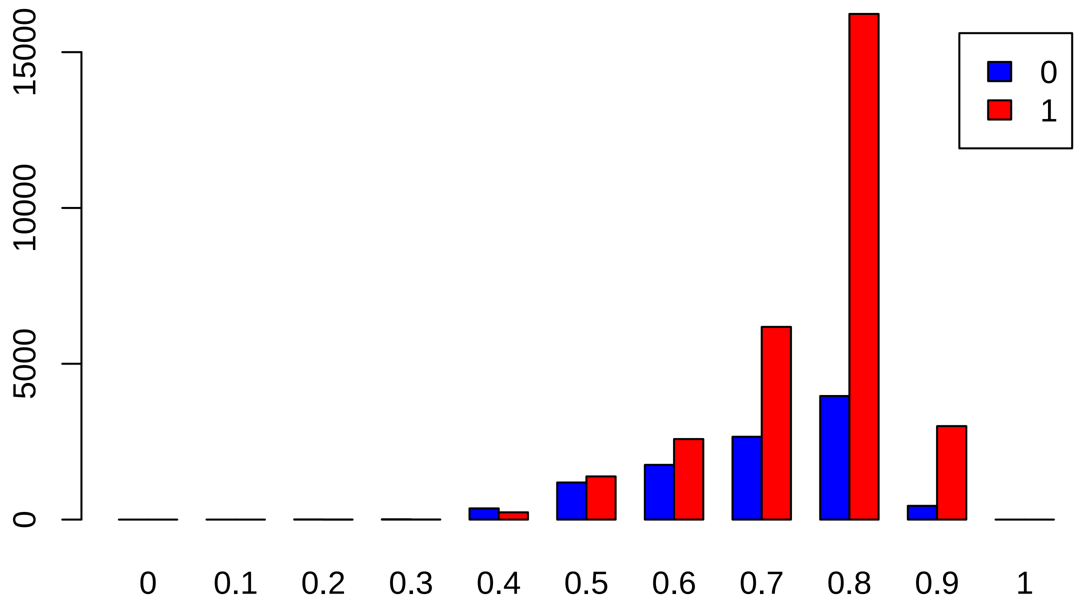
Assignment These are the unstabilised weights of the inverse probability score.

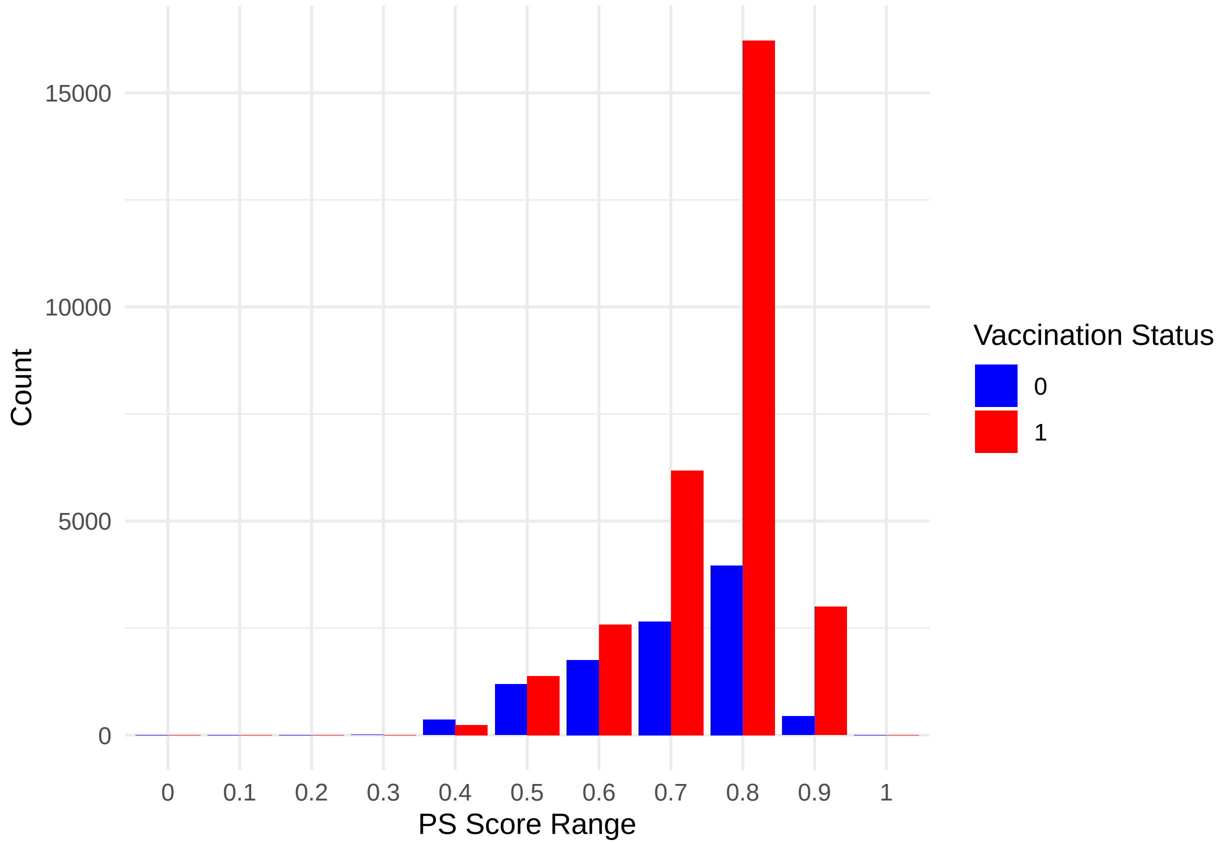
We can use stabilised weights as well

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.

Deze barplot kunnen we waarschijnlijk wel mooier maken


15000
10000
5000
0
0
1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1



There is non-positivity

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

Results

- 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 0.92 (95% CI: 0.70, 1.21), 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)