Case Study

Thomas Debray

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Case study data

We selected patients from MS PATHS that received DMF or FTY and constructed their treatment sequences by identifying consecutive visits on the same DMT. We focused on treatment sequences that started at a follow-up visit (not at the initial MS PATHS visit) and assumed that the baseline visit corresponded to treatment initiation. In this section, we focus on the data of 456 patients with complete baseline data. Details are depicted below:

Parameter	DMF	FTY
Sample size, n		
Total sample size	254	202
Complete cases	254	202
Age		
Median, years (IQR)	44 [37 - 52]	40 [32 - 47]
Gender		
Male, n (%)	49 [19%]	47 [23%]
Female, n (%)	205 [81%]	155 [77%]
Years of education		
Median, years (IQR)	14 [12 - 17]	15 [12 - 16]
Disease duration		
Median, years (IQR)	8 [3 - 14]	6 [3 - 12]
MS type, n (%)		
Relapsing MS (remitting / progressive)	199 [78%]	175 [87%]
Primary Progressive MS	12 [5%]	8 [4%]
Secondary Progressive MS	43 [17%]	19 [9%]
Number of relapses in previous year, n (%)		
0	121 [48%]	104 [51%]
1	69 [27%]	52 [26%]
2	38 [15%]	28 [14%]
>=3	26 [10%]	18 [9%]
Primary DMT efficacy in previous year, n (%)		
High	10 [4%]	15 [7%]
Medium	13 [5%]	26 [13%]
Low	105 [41%]	77 [38%]
None	126 [50%]	84 [42%]
Medical history, n (%)		
Cardiovascular disease	99 [39%]	65 [32%]
Diabetes	21 [8%]	11 [5%]

Parameter	DMF	FTY
PDDS score, n (%)		
0 - 1	160 [63%]	152 [75%]
2 - 3	51 [20%]	36 [18%]
4 - 5	31 [12%]	8 [4%]
>= 6	12 [5%]	6 [3%]
Visit count, n (%)		
1 visit	62 [24%]	40 [20%]
2 visits	98 [39%]	50 [25%]
3 visits	45 [18%]	48 [24%]
4 visits	24 [9%]	23 [11%]
>= 5 visits	25 [10%]	41 [20%]

The median number of visits per patient in MS PATHS is 2, with an interquartile range from 2 to 3. A total of 354 patients have more than one visit. The figure below depicts the distribution of number of days between consecutive visits for 192 new DMF users and 162 new FTY users having at least one follow-up visit beyond baseline.

Interval between consecutive visits; N = 354 patients
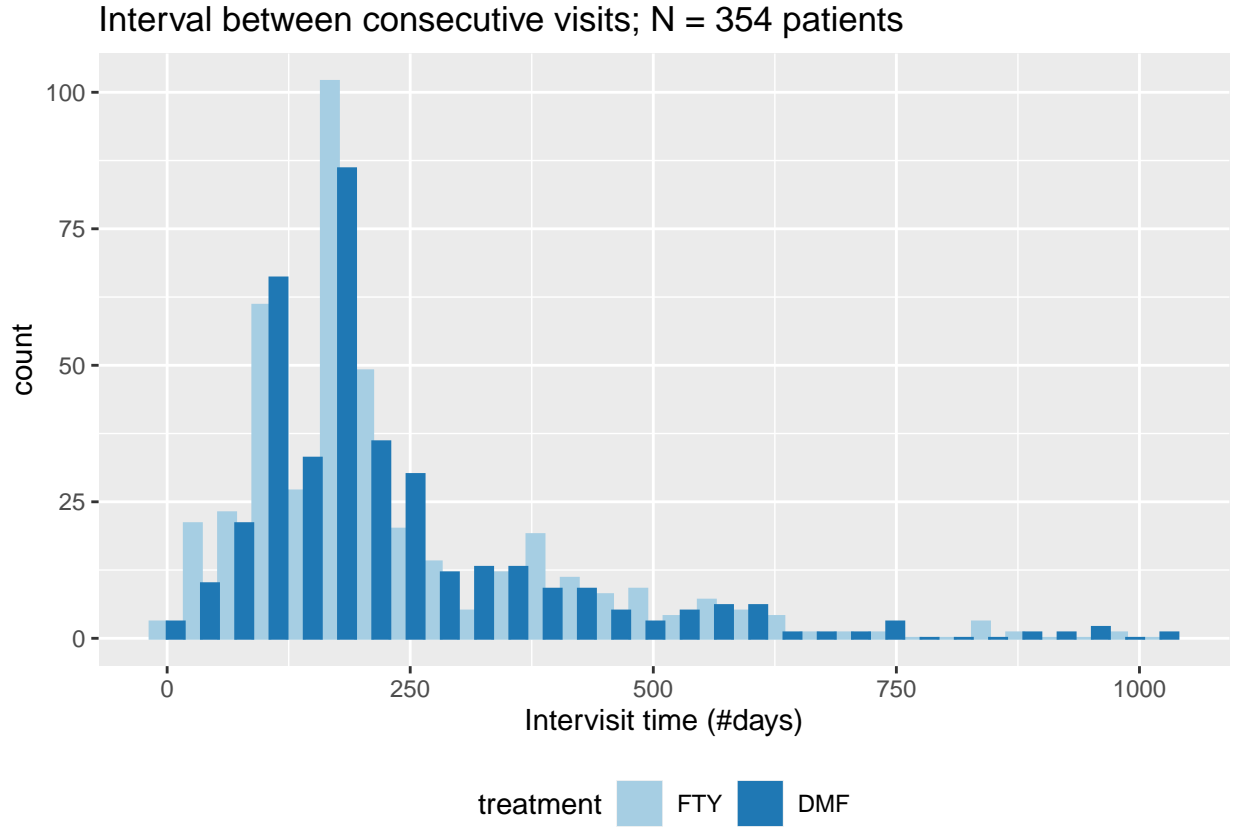
Propensity score weighting

Figure 1 depicts covariate balance measured by standardized mean difference (SMD) in the cohort of 1245 patients with complete baseline data before and after weighting. The inverse probability weights are based

on the following baseline covariates: age, sex, MS type, years of education, disease duration, PDDS score, self-reported number of relapses in the past 12 months, prior DMT efficacy, history of cardiovascular disease, and history of diabetes.
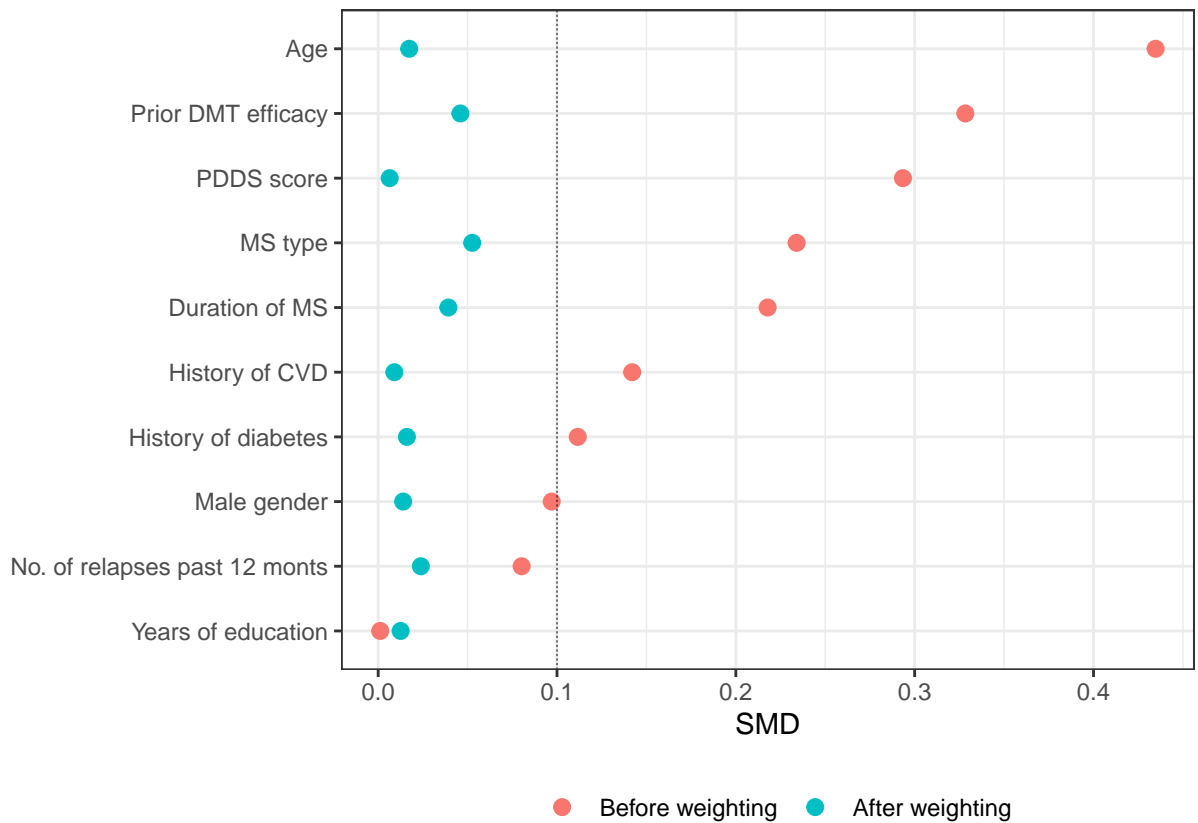

Figure 1: Covariate balance before and after weighting, as assessed with standardized mean differences (SMDs). An absolute SMD below 0.10 (dashed line) is considered satisfactory balance.

Preparing the dataset for multiple imputation

We reconstructed the entire PDDS trajectories following pre-specified grids of visits every 3 months. To this purpose, we add rows at missing time points up to 90 days after the last visit.

```
ds_c3 <- add_imp_rows(ds, window_size = 3*30, confirmation_window = 1)
```

TODO: Show example trajectory with missing and observed data