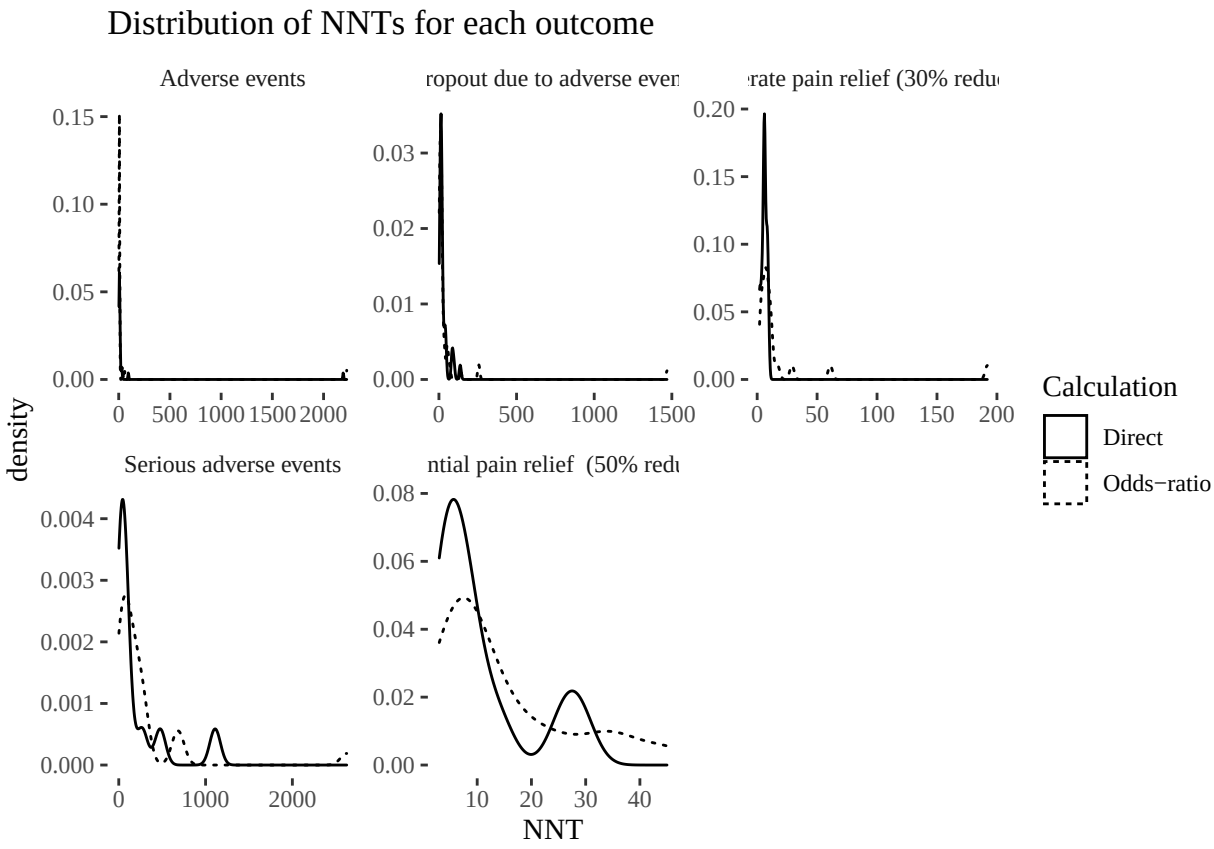
NNT

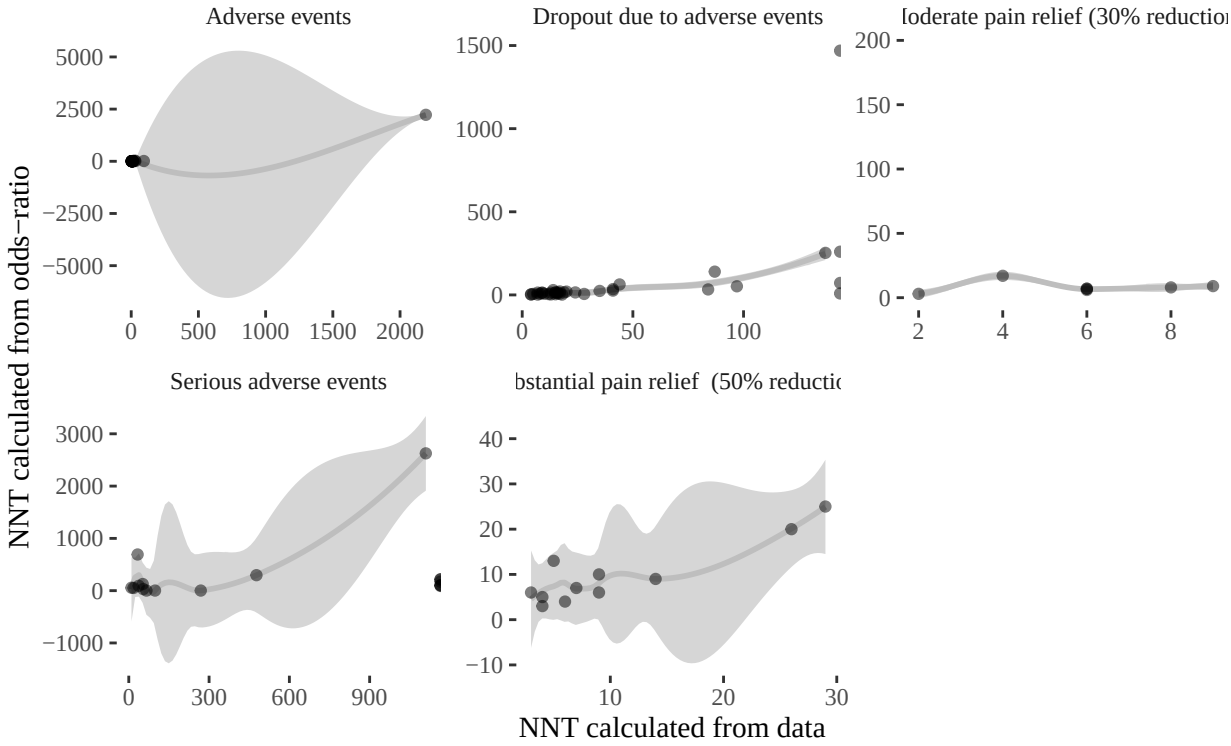
The Number Needed to Treat (NNT) is the number of patients you need to treat to prevent one additional bad outcome (death, stroke, etc.).

NNT values are not plausible?

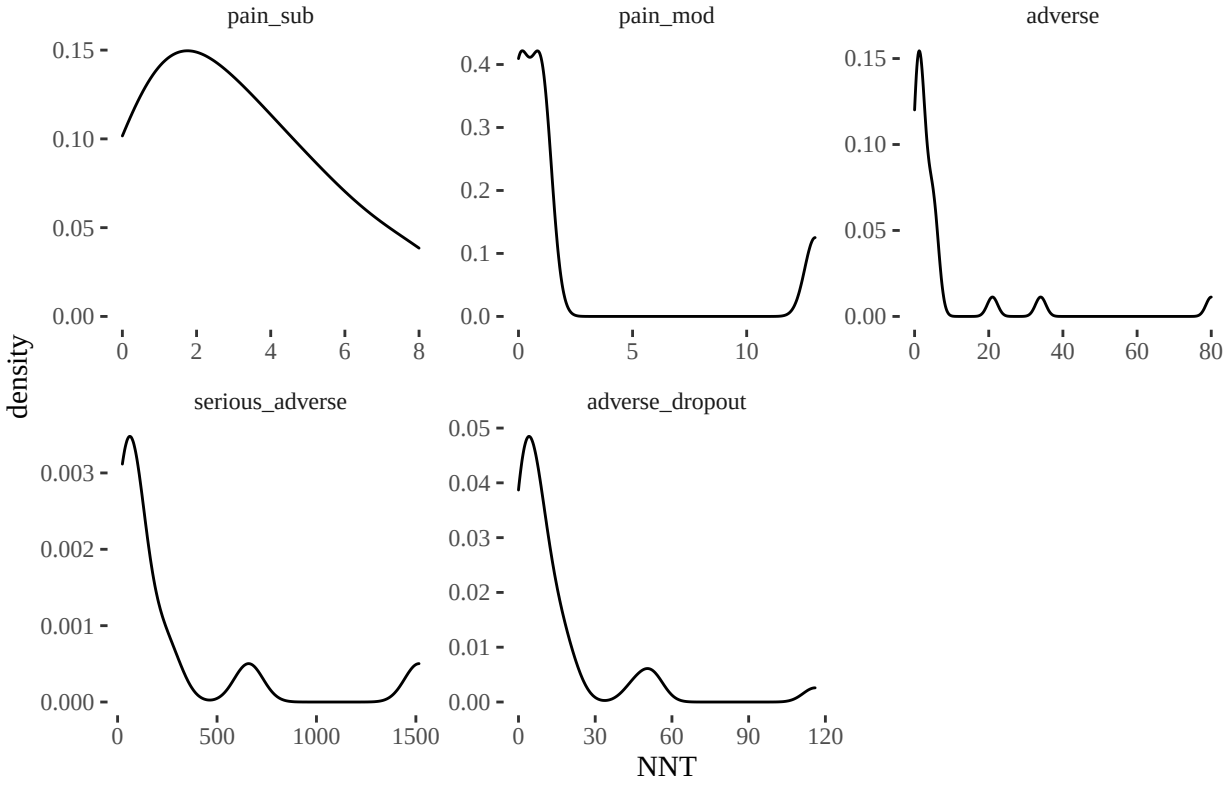


Comparison on NNT calculations for each outcome

Direct calculation vs odds−ratio calculation



Distribution of differences in NNTs for each outcome



NNT calculations

For duloxetine, milnacipran, amitriptyline

Outcome	Timepoint	Intervention	NNT direct	NNT OR	Difference of NNTs
Dropout due to adverse events	post_int	duloxetine	15	15	0
Serious adverse events	post_int	milnacipran	1110	2626	1516
Adverse events	post_int	milnacipran	10	8	2
Moderate pain relief (30% reduction)	post_int	milnacipran	8	8	0
Adverse events	post_int	duloxetine	9	8	1
Moderate pain relief (30% reduction)	post_int	duloxetine	6	7	1
Substantial pain relief (50% reduction)	post_int	duloxetine	7	7	0
Serious adverse events	post_int	duloxetine	477	296	181
Substantial pain relief (50% reduction)	post_int	milnacipran	9	10	1
Dropout due to adverse events	post_int	milnacipran	9	14	5
Dropout due to adverse events	post_int	amitriptyline	20	20	0
Adverse events	post_int	amitriptyline	10	5	5
Serious adverse events	post_int	amitriptyline	66	2	64
Substantial pain relief (50% reduction)	post_int	amitriptyline	NA	9	NA
Moderate pain relief (30% reduction)	post_int	amitriptyline	NA	8	NA

Calculating from the raw data

One way to calculate NNT is to compare the rates in the analysis data using the Absolute Risk Reduction (ARR).

$$\text{NNT} := 1/\text{Absolute risk reduction} = 1/[\text{Control event rate} - \text{Experimental event rate}]$$

So, for the ith intervention, for the kth outcome,

$$\text{NNT}_{ik} := 1/[\frac{\Sigma_{ik} r^P_{ik}}{\Sigma_{ik} n^P_{ik}} - \frac{\Sigma_{ik} r^T_{ik}}{\Sigma_{ik} n^T_{ik}}]$$

where r^P_{ik} is the rate for the placebo group for the ith intervention and kth outcome; and n^T_{ik} indicates the sample size of the treatment group for the same intervention and outcome.

Gav, does the direction of improvement alter the order of this calculation?

Calculating using odds-ratios

Cochrane example

$$\text{NNT} := 1/|ACR - (OR \times ACR)/(1 - ACR + OR \times ACR)|$$

where ACR is the assumed control risk.

There are a few ways to calculate ACR:

- from model
- from baseline data
- from all data

We are currently calculating ACR from overall rate for the placebo group across all data because baseline data is not available for most of our outcomes.

Checking function works as it should

```
library(adpain)

or <- 0.73

acr <- 0.3

nnt_cochrane <-
  ceiling(16.2)

# calculate
nnt_adpain <- nnt(or, acr)

# results
nnt_cochrane
```

```
## [1] 17
```

```
nnt_adpain
```

```
## [1] 17
```

```
# compare
nnt_adpain == nnt_cochrane
```

```
## [1] TRUE
```

Questions

- Does direction of improvement matter for calculation? i.e., NNTH and NNTB (harm vs benefit)?
- In one of the resources there are two equations?
- Do we wish to see big numbers for one and small for the other direction?
- Should this be approached by examining how ACR is calculated?