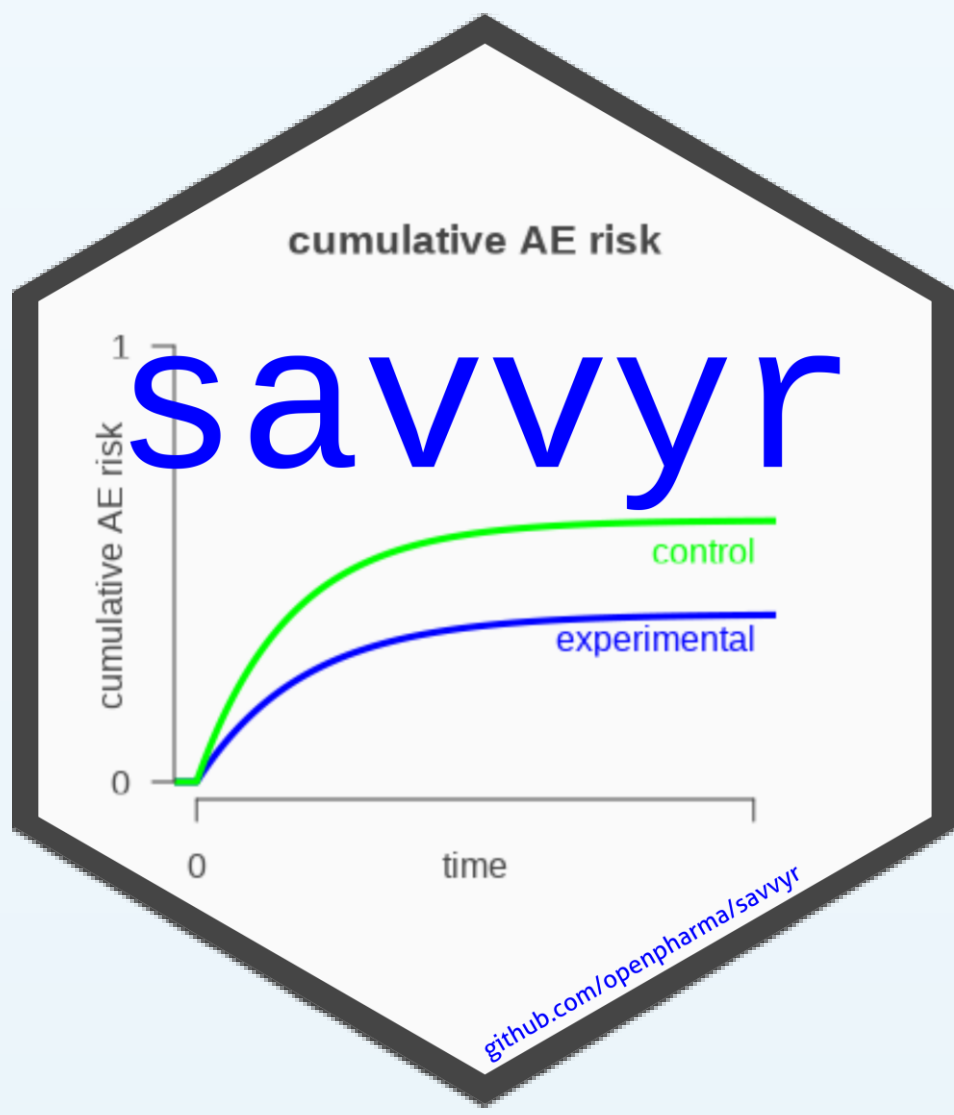


Stop the Abuse - use savvyR

The SAVVY (Survival Analysis for AdVerse Events with VarYing Follow-Up Times) project - now available as R-package



SAVVY: Survival Analysis for AdVerse Events with VarYing Follow-Up Times

- consortium of academic and pharmaceutical industry partners
- aims to improve the analysis of adverse event data in clinical trials
- spread and advertise the use of more appropriate methodology in the analysis of adverse events, especially Aalen-Johansen
- demonstrate how the use of standard methods can lead to biased results and wrong decision making
- facilitate the use of more appropriate methodology by providing readily available tools

Estimator	Accounts for censoring	Makes no constant hazard assumption	Accounts for CEs
Incidence proportion	No	Yes	Yes
Probability transform incidence density ignoring CEs	Yes	No (AE Hazard)	No
1-Kaplan-Meier	Yes	Yes	No
Probability transform incidence density accounting for CEs	Yes	No (AE and CE Hazard)	Yes
Death only AJE	Yes	Yes	Yes (Death only)
Gold-standard AJE	Yes	Yes	Yes

CE = competing event; AJE = Aalen-Johansen estimator

savvyR

- recently, the code used in the SAVVY project was implemented into an **R package** to make it readily available for wider use: **savvyR**
- collaborative effort of Daniel Sabanes-Bove (RCONIS), Kaspar Rufibach (Merck) and Thomas Künzel (Roche)
- incidence proportion, 1-Kaplan Meier, incidence density, incidence density accounting for competing events and Aalen-Johansen are available as separate functions
- data generating routine for testing purposes available

Links:

Github:

BugReports:



Reference manual:

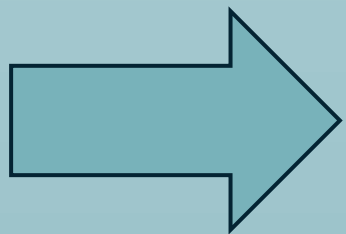
Vignettes:

CRAN:



Example

id	Time to event	Type of event	Censoring time
1	45.69	1	424.51
2	197.51	1	266.01
3	36.85	2	650.43
4	115.06	2	164.62
5	220.76	1	994.17
6	8.49	0	8.49
7	833.04	0	833.04
8	37.38	1	987.24
9	82.24	2	556.46
10		...	...



```
ip <- inc_prop(dat1, tau)
id <- prop_trans_inc_dens(dat1, tau)
km <- one_minus_kaplan_meier(dat1, tau)

idce_2 <- prop_trans_inc_dens_ce(dat1, ce = 2, tau)

aj_2 <- aalen_johansen(dat1, ce = 2, tau)

idce_3 <- prop_trans_inc_dens_ce(dat1, ce = 3, tau)
aj_3 <- aalen_johansen(dat1, ce = 3, tau))
```



References

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► Stegherr, R., Schmoor, C., Lubbert, M., Friede, T. and Beyersmann, J. (2021c). " Estimating and comparing adverse event probabilities in the presence of varying follow-up times and competing events. *Pharm Stat* 20 1125–1146.

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► Schumacher, M., Ohneberg, K. and Beyersmann, J. (2016). Competing risk bias was common in a prominent medical journal. *Journal of clinical epidemiology* 80 135–136.

► Stegherr, R., Beyersmann, J., Jehl, V., Rufibach, K., Leverkus, F., Schmoor, C. and Friede, T. (2021a). Survival analysis for adverse events with varying follow-up times (savvy): Rationale and statistical concept of a meta-analytic study. *Biometrical journal. Biometrische Zeitschrift* 63 650–670.

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Method	Outcome	Estimated probability	Variance
incidence proportion	AE	0.370	0.00117
probability transform incidence density ignoring competing event	AE	0.872	0.00094
1 - Kaplan-Meier	AE	0.806	0.00380
probability transform incidence density (death only)	AE	0.636	0.00190
Aalen-Johansen (death only), AE risk	AE	0.623	0.00261
probability transform incidence density (all CEs)	AE	0.436	0.00144
Aalen-Johansen (all CEs), AE risk	AE	0.436	0.00147
Aalen-Johansen (death only), CE risk	CE	0.252	0.00148
Aalen-Johansen (all CEs), CE risk	CE	0.542	0.00150