

Lifesaver

Survival Analysis

Übersicht



Motivation



Explorative Analyse
der Daten



Deskriptive Analyse
der Daten



Kritische
Auseinandersetzung

Motivation

- Zusammenhänge zwischen einer Herzkrankheit und Attributen erkennen, um Vorsorgemaßnahmen anpassen zu können
 - Optimierte medizinische Versorgung
 - Ziel: Modell, welches die Überlebenschancen vorhersagt



Unser Datensatz



Patienten mit Herzkrankheit
ab Einweisung



Betrachtungszeitraum:
6 Jahre



Überlebenswahrscheinlichkeit

Deskriptive Analyse der Daten

- Worcester Heart Attack Study
- 500 Patienten

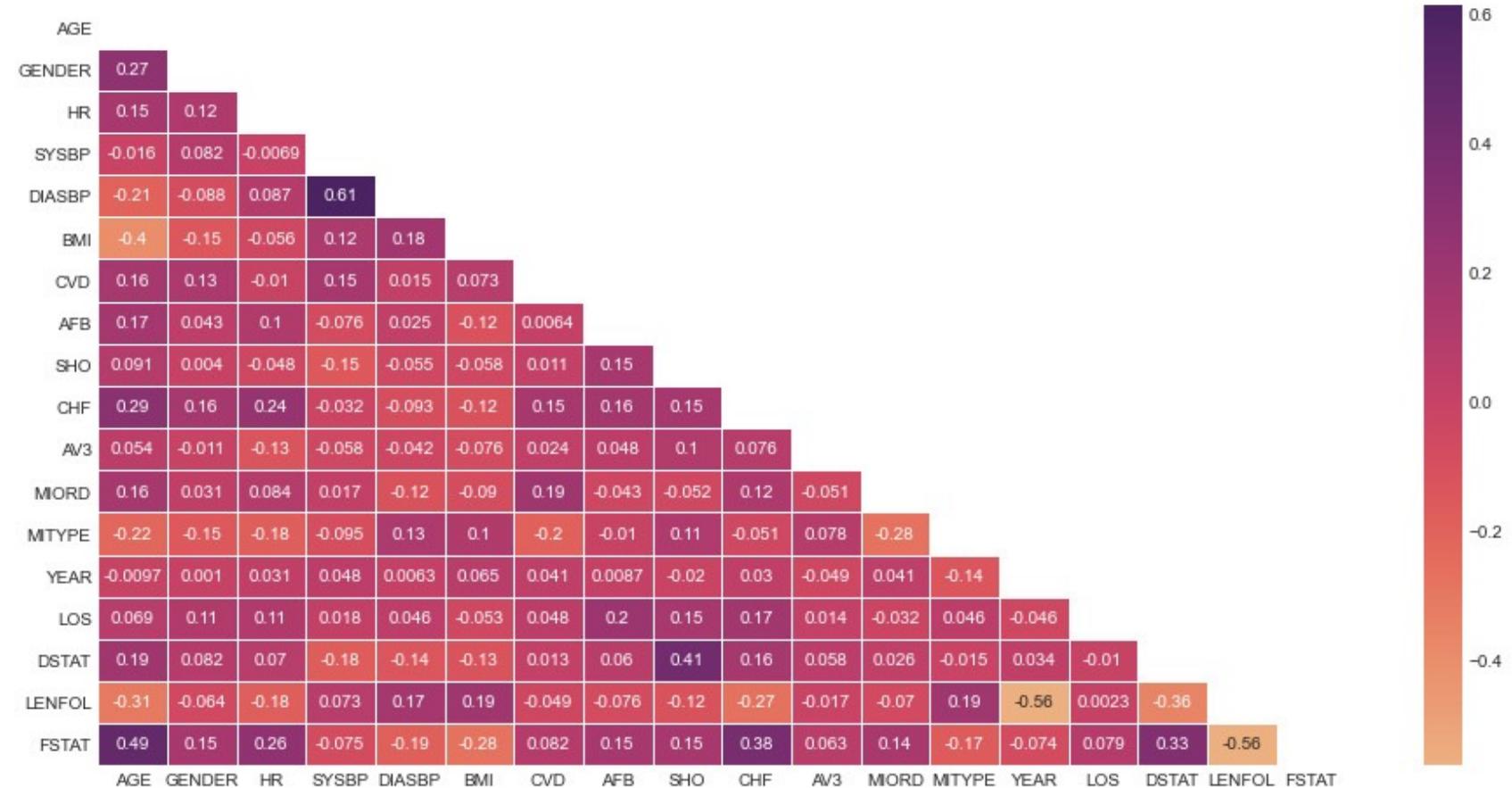


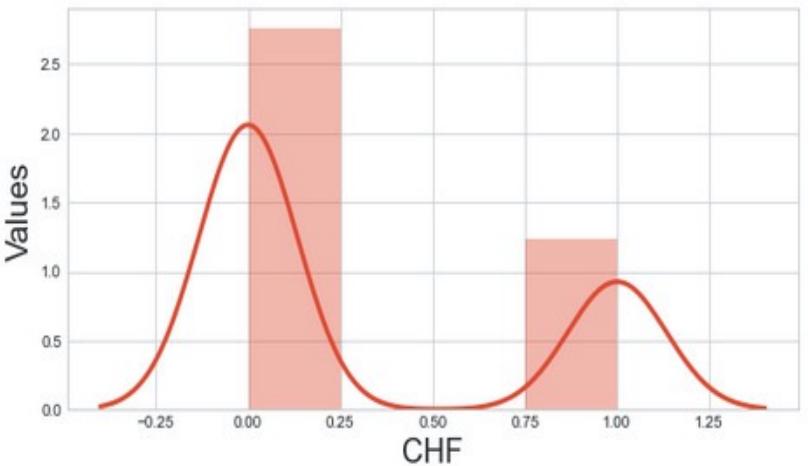
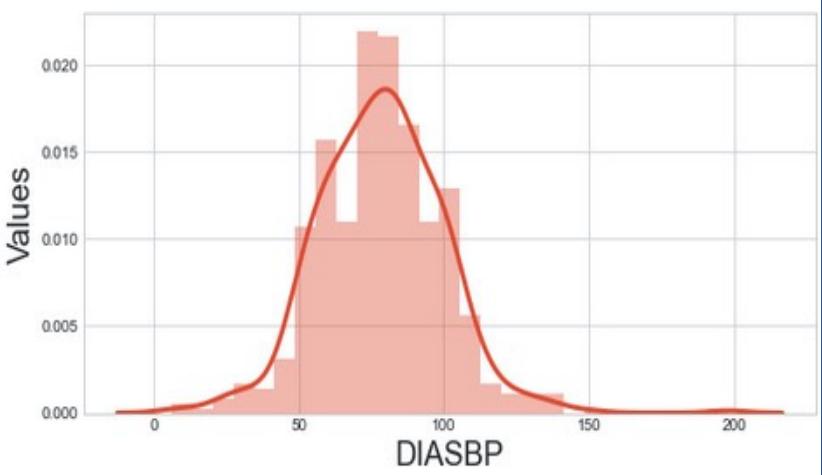
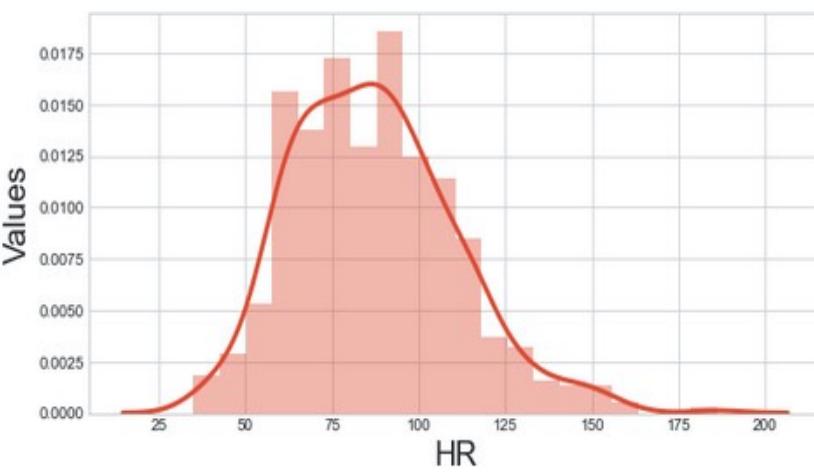
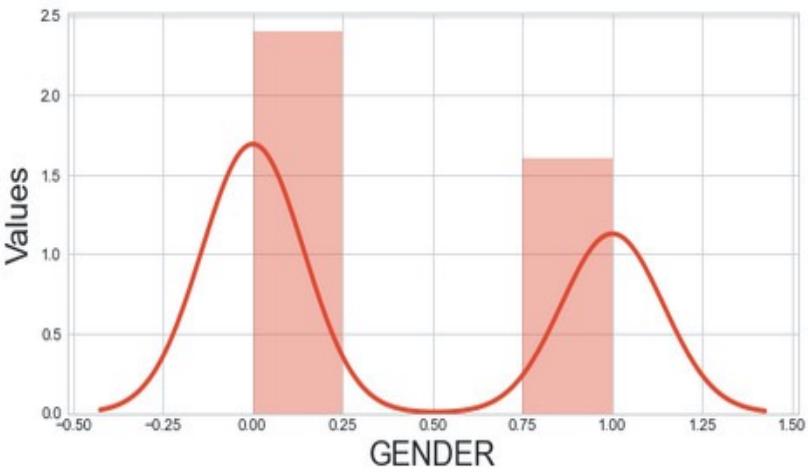
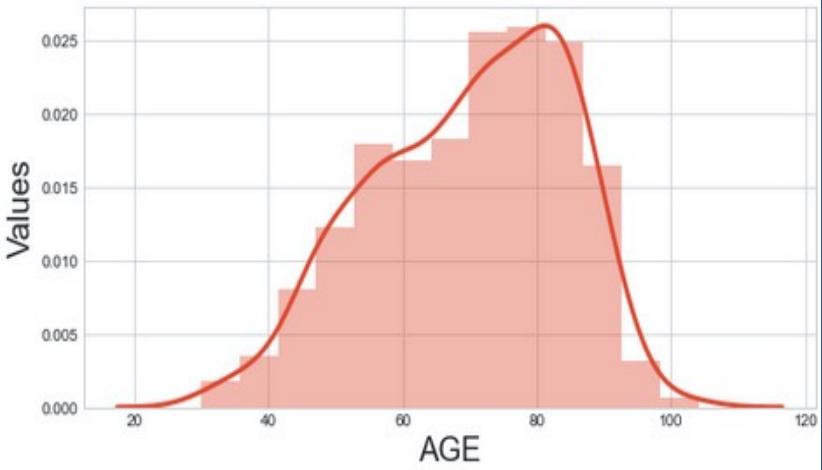
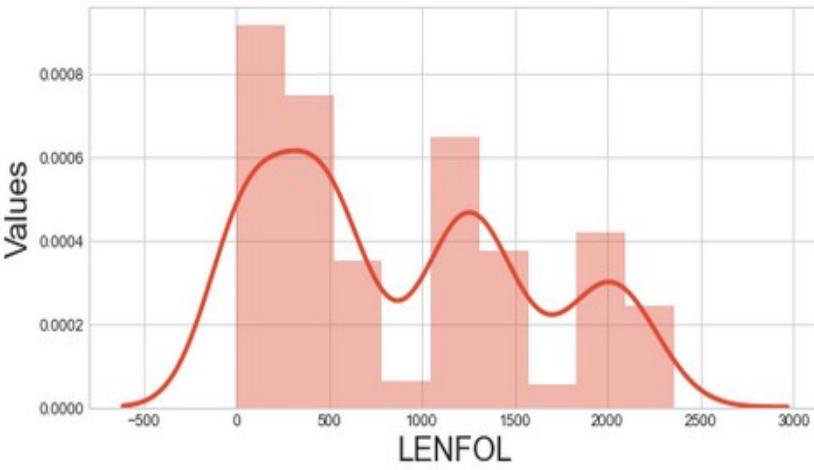
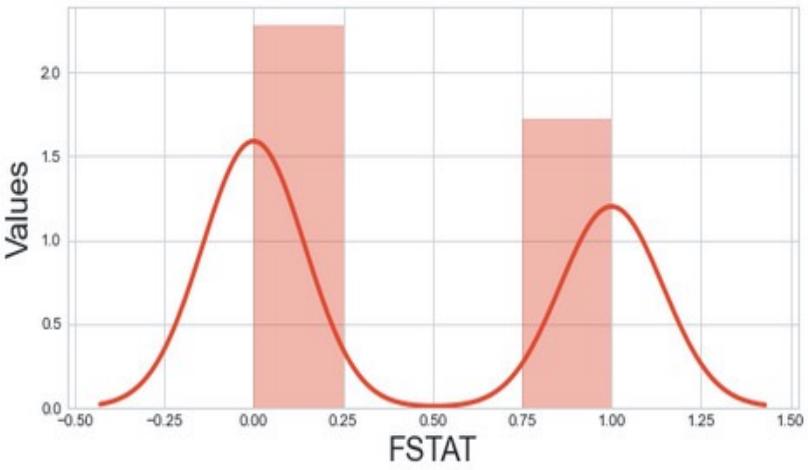
	AGE	GENDER	HR	SYSBP	DIASBP	BMI	CVD	AFB	SHO	CHF	AV3	MIORD	MITYPE	YEAR	LOS	DSTAT	LENFOL	FSTAT
count	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	500.000000	
mean	69.846000	0.400000	87.018000	144.704000	78.266000	26.613780	0.750000	0.156000	0.044000	0.310000	0.02200	0.342000	0.306000	1.984000	6.116000	0.07800	882.436000	0.430000
std	14.491456	0.490389	23.586231	32.294865	21.545293	5.405655	0.433446	0.363219	0.205301	0.462956	0.14683	0.474855	0.461291	0.790566	4.714127	0.26844	705.665133	0.495572

Auszug aus unserem Datensatz

ID	AGE	GENDER	HR	SYSBP	DIASBP	BMI	CVD	AFB	SHO	CHF	AV3	MIORD	MITYPE	YEAR	LOS	DSTAT	LENFOL	FSTAT
1	83	0	89	152	78	25.540510	1	1	0	0	0	1	0	1	5	0	2178	0
2	49	0	84	120	60	24.023979	1	0	0	0	0	0	1	1	5	0	2172	0
3	70	1	83	147	88	22.142900	0	0	0	0	0	0	1	1	5	0	2190	0
4	70	0	65	123	76	26.631870	1	0	0	1	0	0	1	1	10	0	297	1
5	70	0	63	135	85	24.412550	1	0	0	0	0	0	1	1	6	0	2131	0

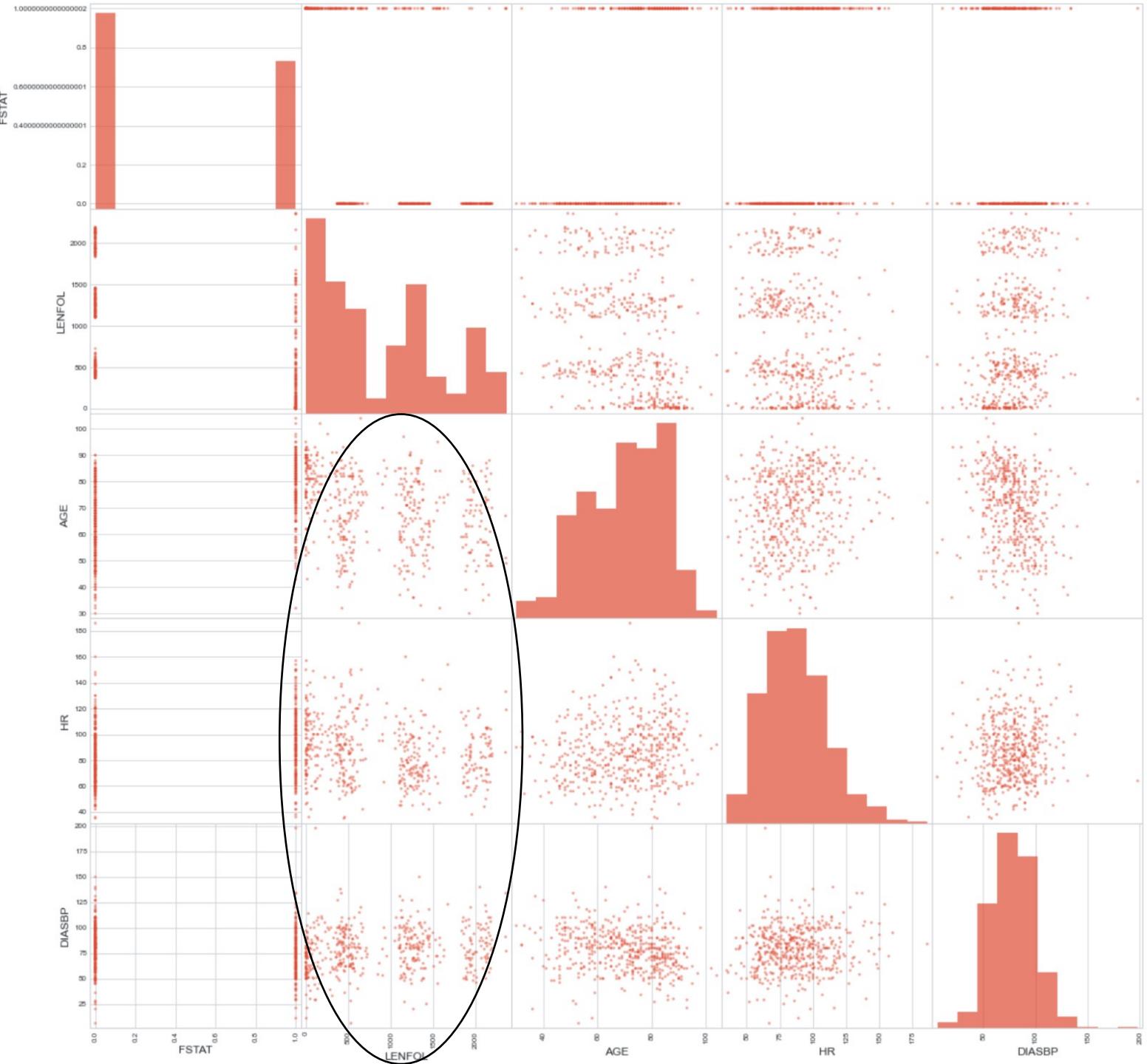
Korrelations-tabelle



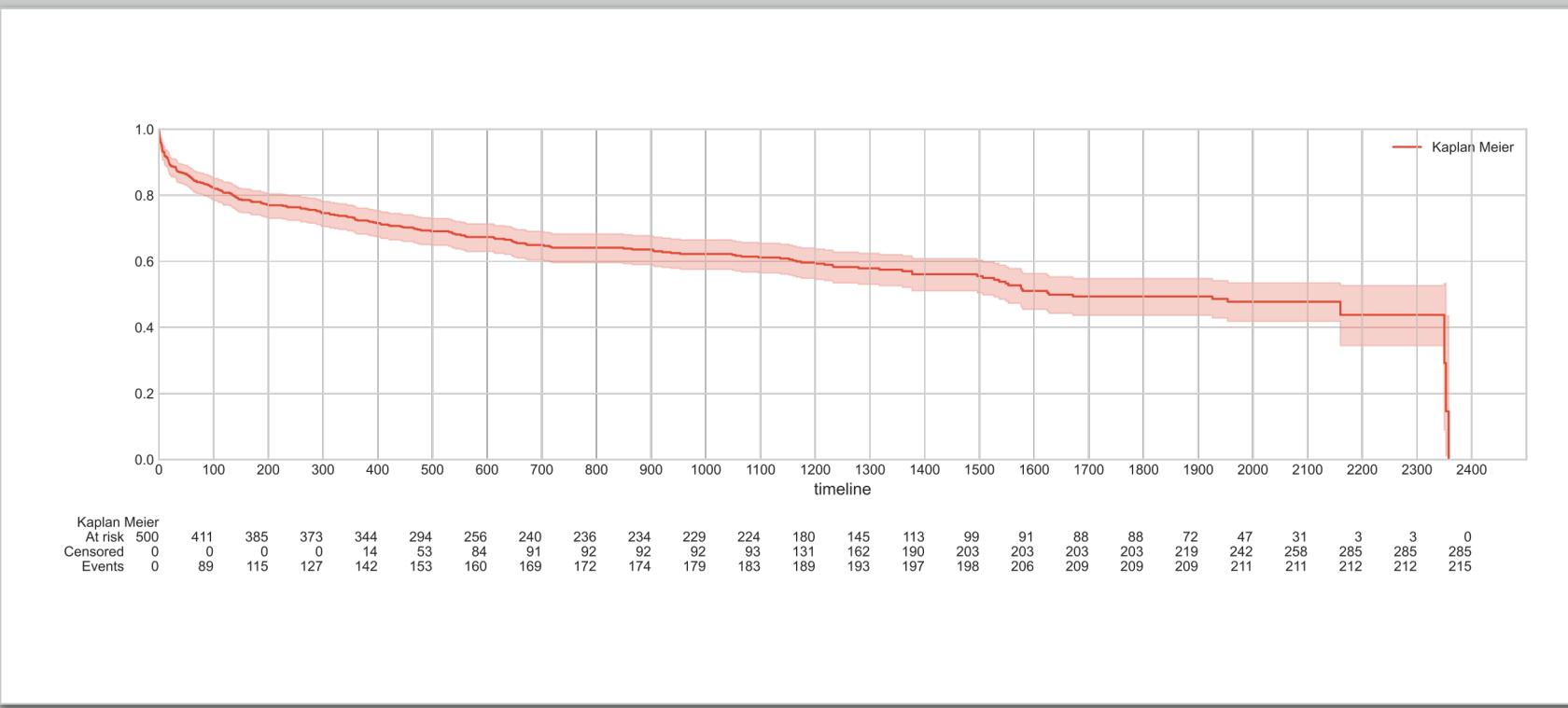


Verteilung
der Attribute

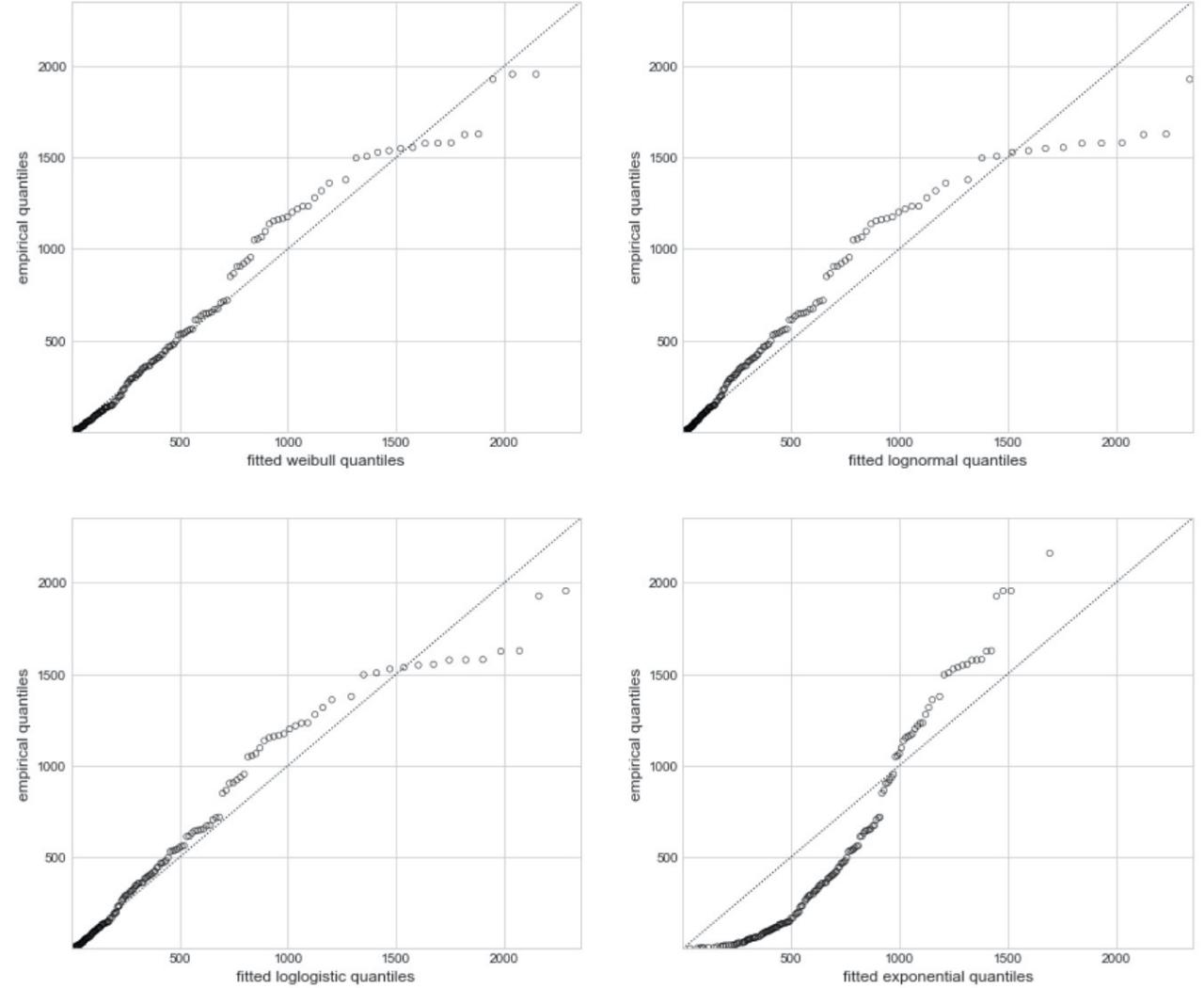
Scatter-matrix



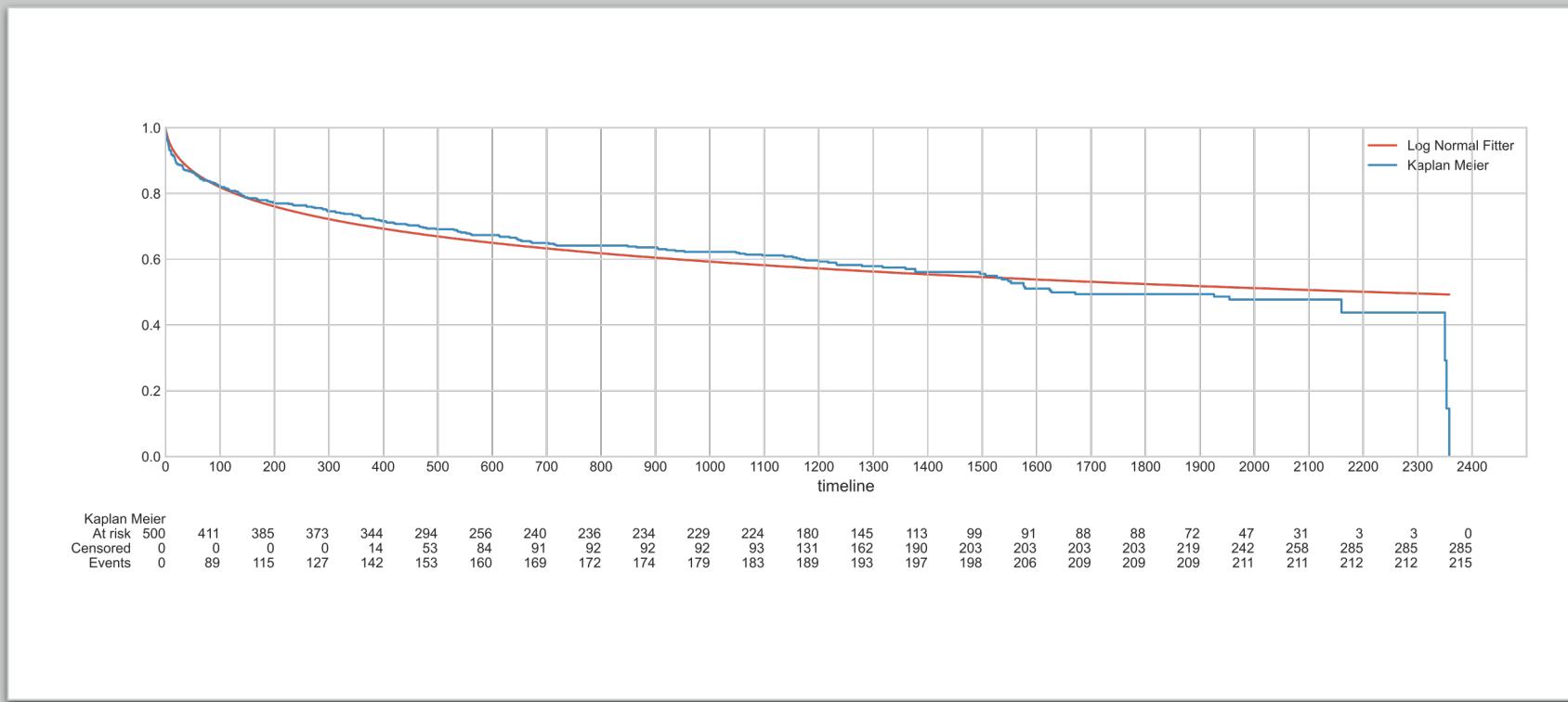
Explorative Analyse



Auswahl der Modelle



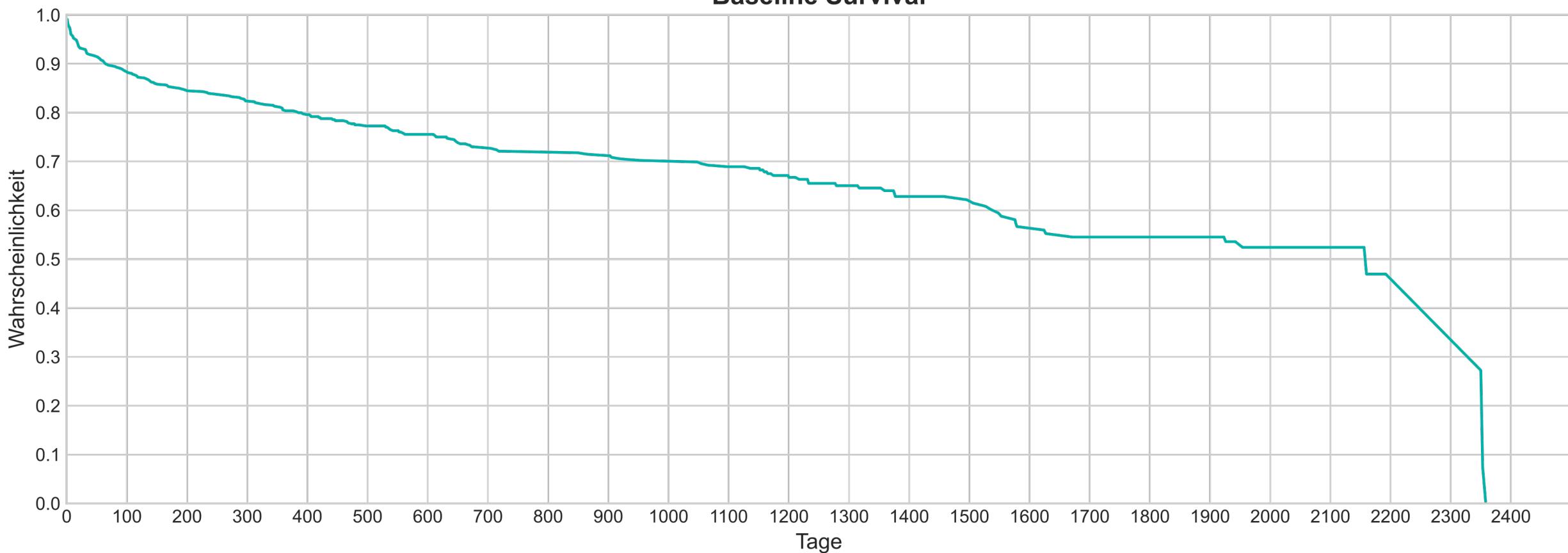
Vergleich Kaplan Meier mit Log Normal



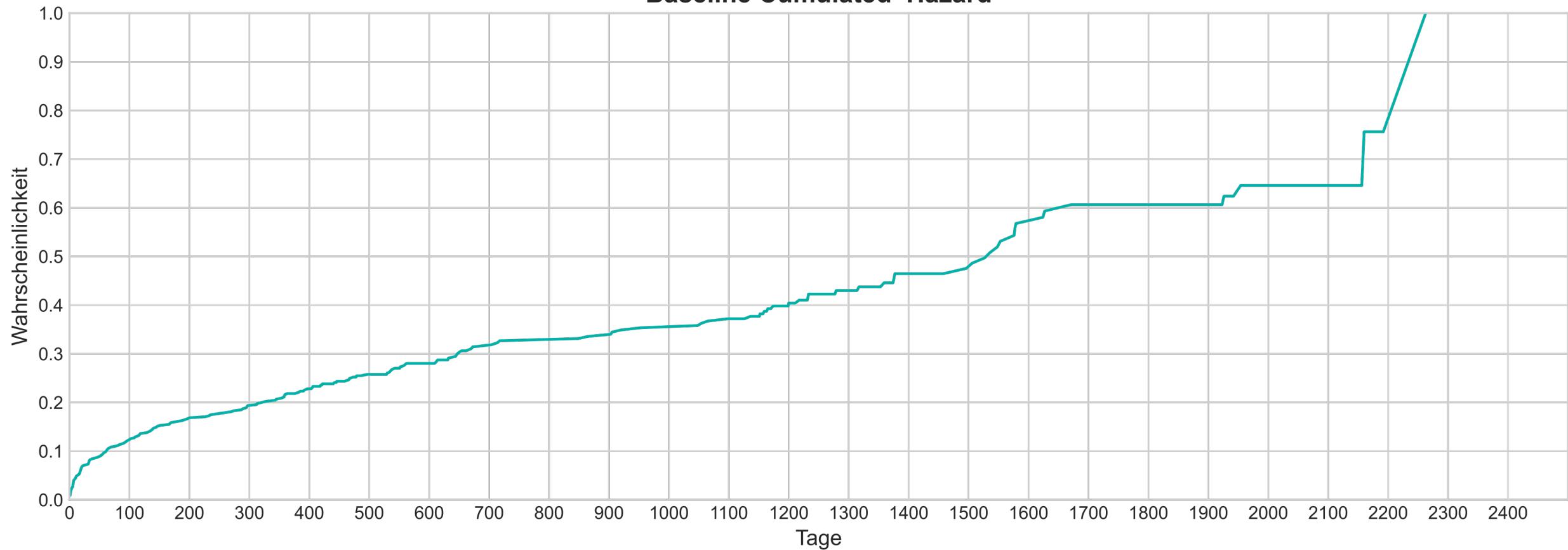
Cox Proportional Hazard Model

- Bsp. Gender:
 - 0 – männlich
 - 1 – weiblich
 - $\exp(\text{coef})$ gibt das Verhältnis zwischen männlichen und weiblichen Personen, bezüglich Auftreten des Events, an
 - $$\frac{\text{Weiblich}}{\text{Männlich}} = \frac{0,78}{1}$$

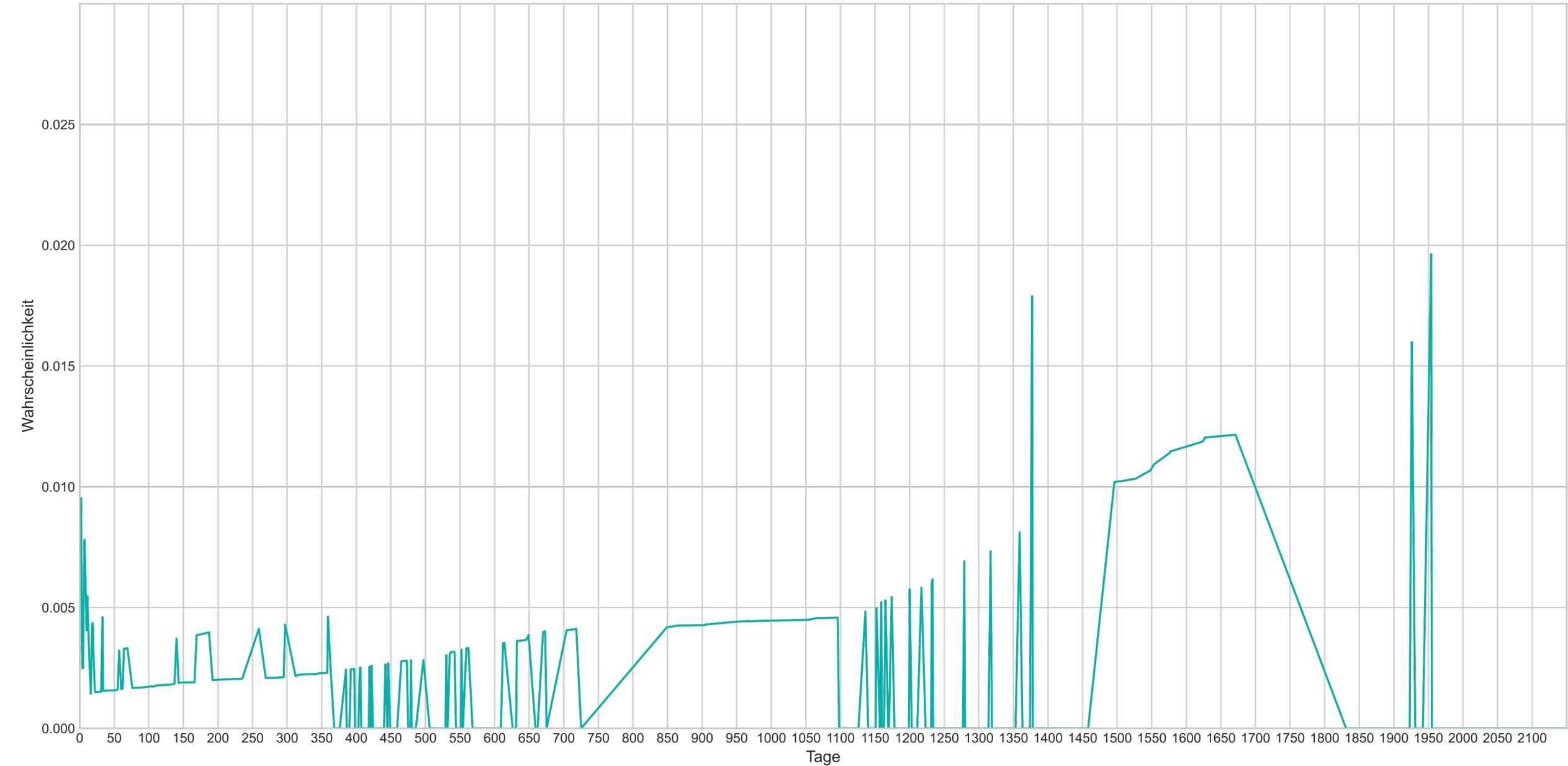
Baseline Survival

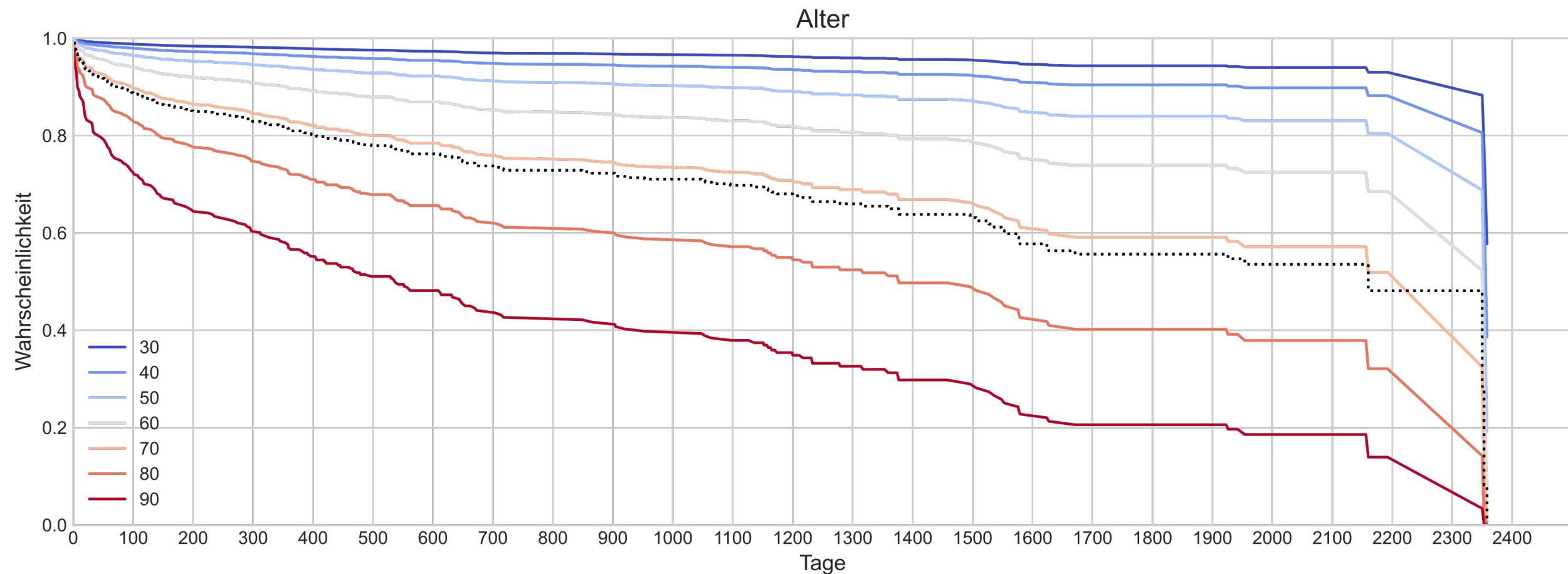


Baseline Cumulated Hazard

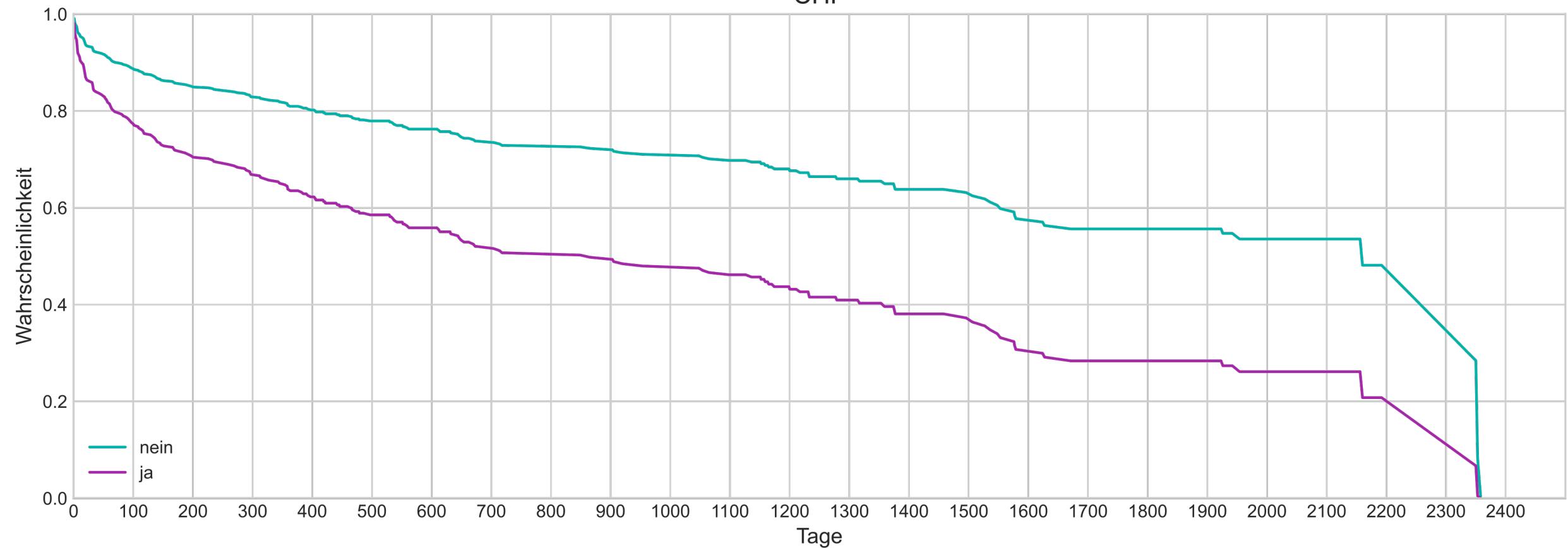


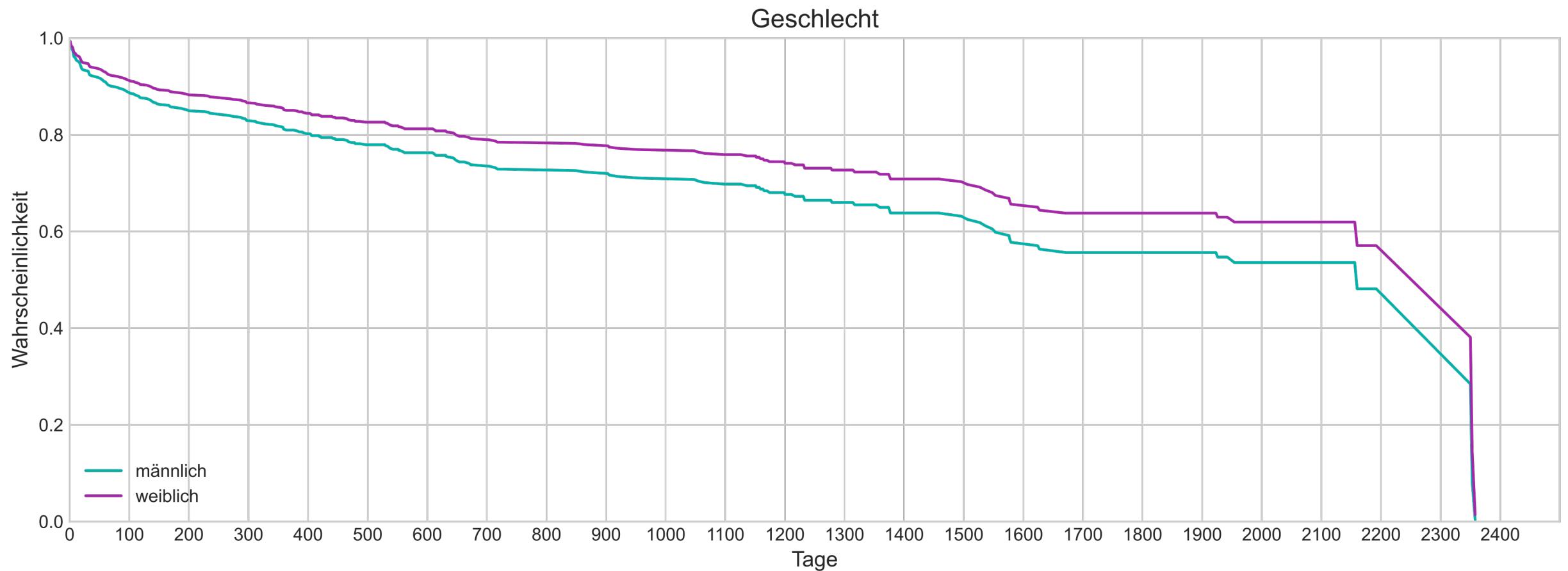
Baseline Proportional Hazard



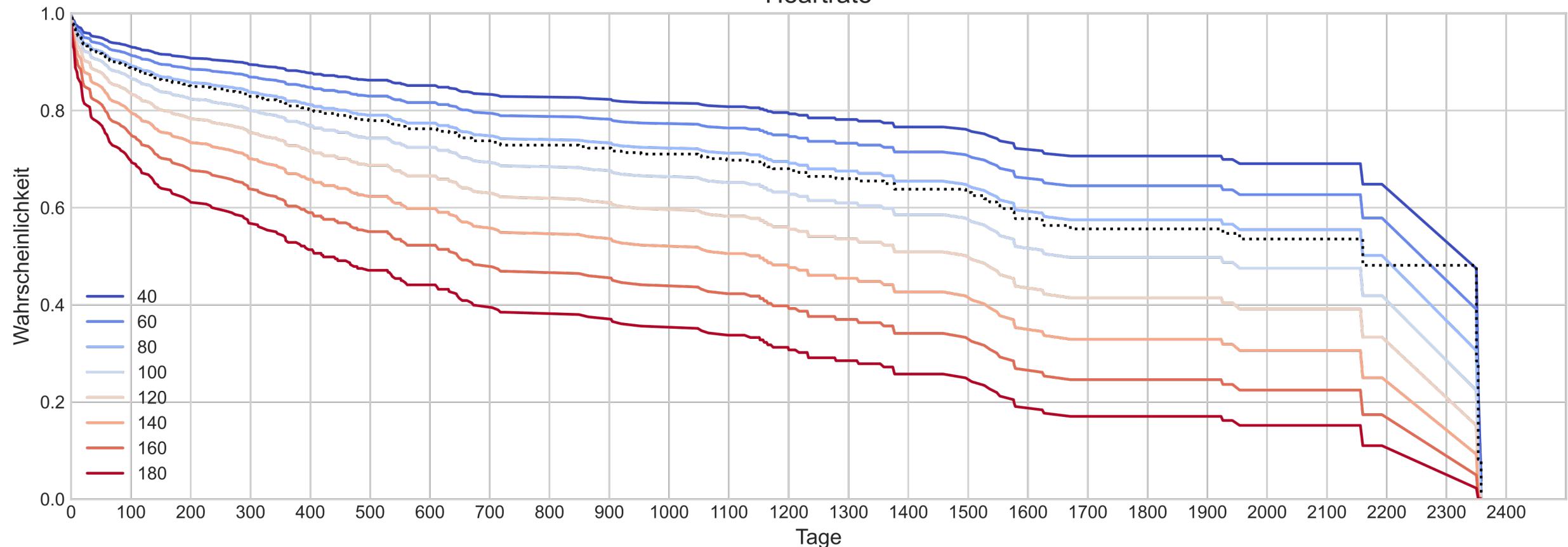


CHF





Heartrate

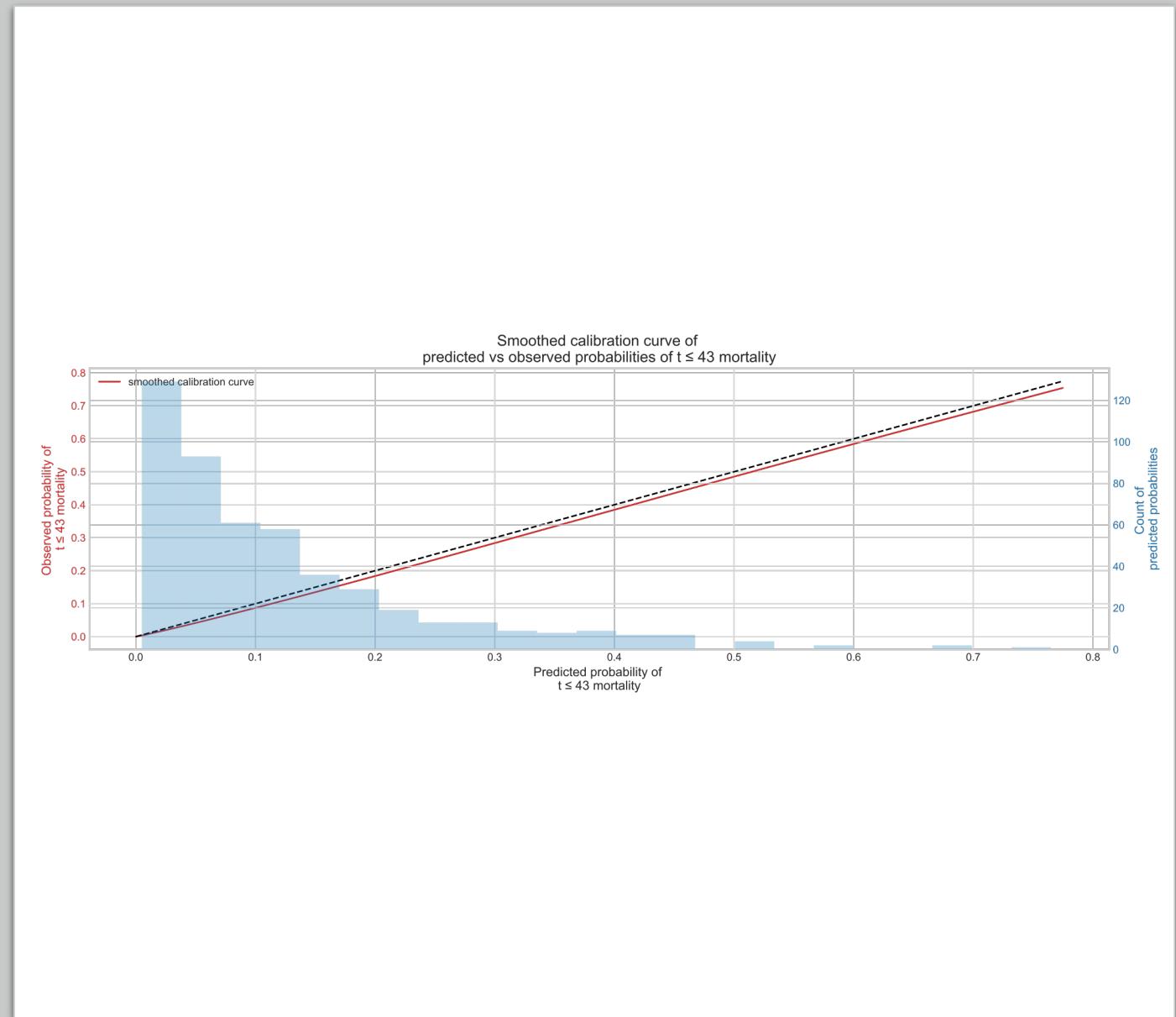


Survival Probability Calibration

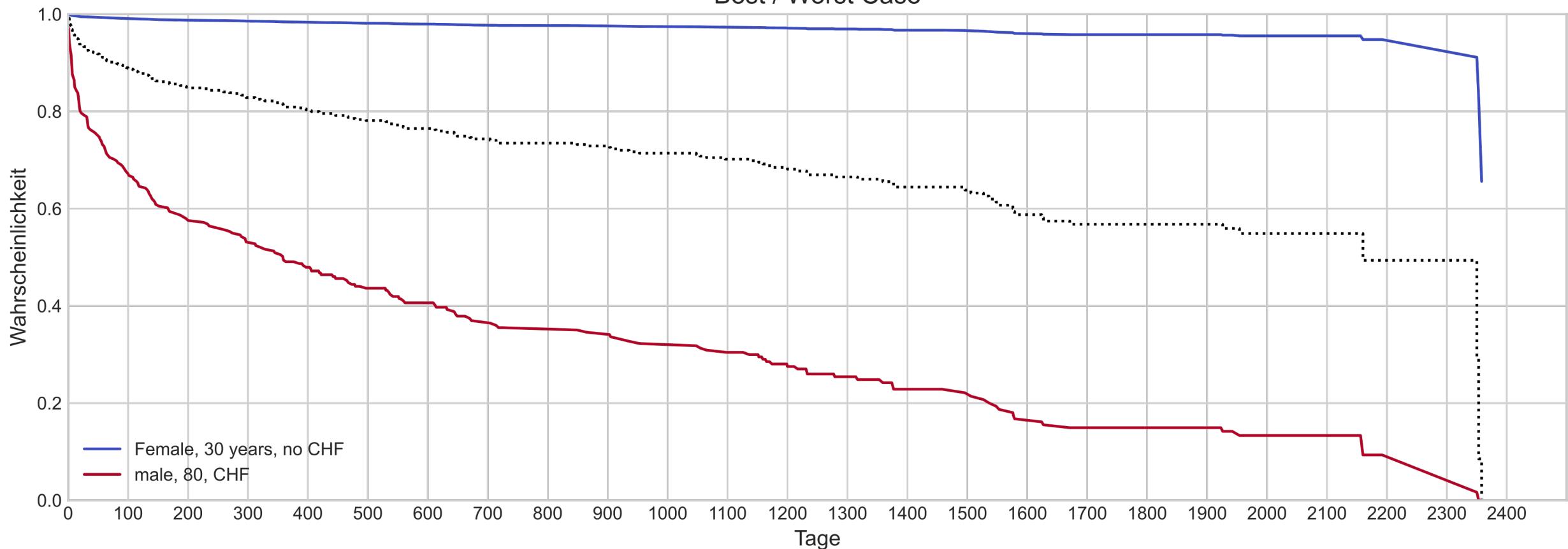
Partial log-likelihood: -1127.44

Concordance: 0.77

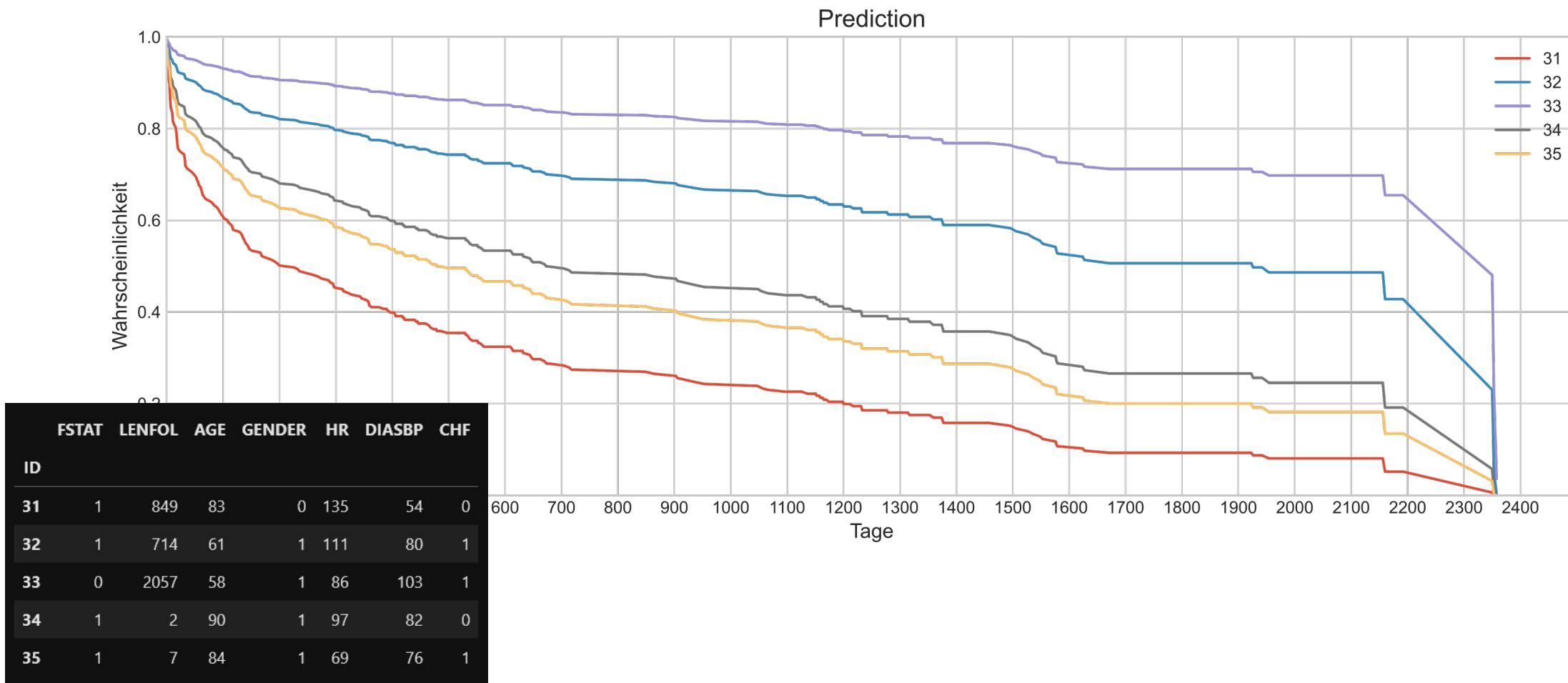
Partial AIC: 2264.89



Best / Worst Case



Vorhersage von zufälligen Personen

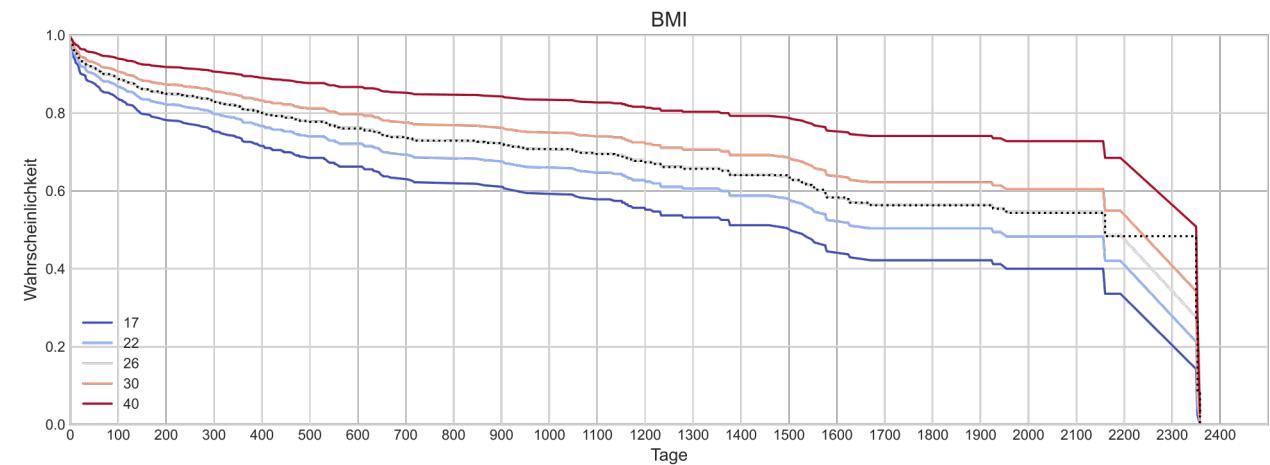


Kritische Auseinandersetzung

Nicht-lineare
Assoziation zwischen
Kovariaten und Modell

Fallende
Vorhersagegenauigkeit
mit der Zeit

Komplexität der
Survival Analysis
Modelle





Fragen?

Vielen Dank für die Aufmerksamkeit! 😊