

# PERSUADE

2025-08-14

## Contents

<b>1. Kaplan-Meier</b>	<b>2</b>
<b>2. Proportional hazards assumption</b>	<b>3</b>
<b>3. Hazard function</b>	<b>4</b>
3.1 Shape of the observed smoothed hazard function . . . . .	4
3.2 Shape of the predicted hazard function . . . . .	5
<b>4 Parametric survival models</b>	<b>8</b>
4.1 Standard parametric models . . . . .	8
4.2 Parametric natural cubic spline models . . . . .	16
4.3 Parametric (non-)mixture cure models . . . . .	26
<b>5 Extrapolation</b>	<b>33</b>
5.1 Extrapolated survival . . . . .	33
5.2 Extrapolated transition probabilities . . . . .	36
5.3 Extrapolated hazard function . . . . .	39
5.4 Tabulated results . . . . .	42
<b>6. PERSUADE object information</b>	<b>45</b>
<b>7. Session information</b>	<b>48</b>

[Link to PERSUADE GitHub page](#)

# 1. Kaplan-Meier

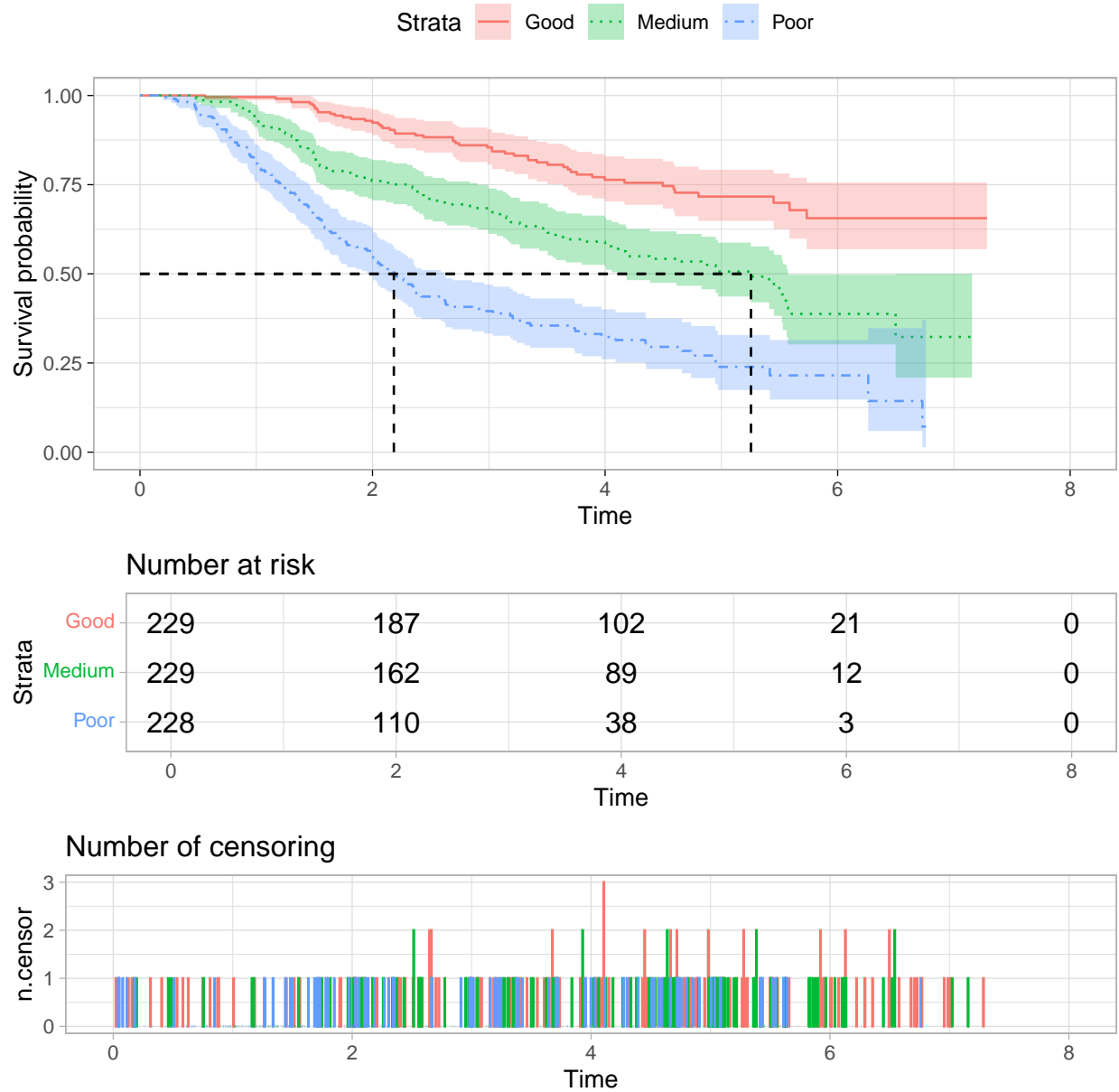
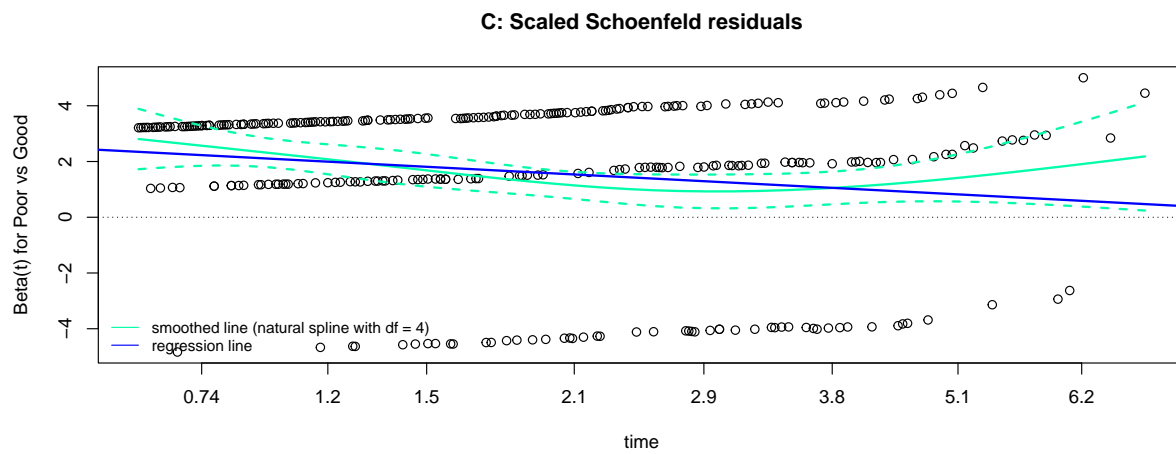
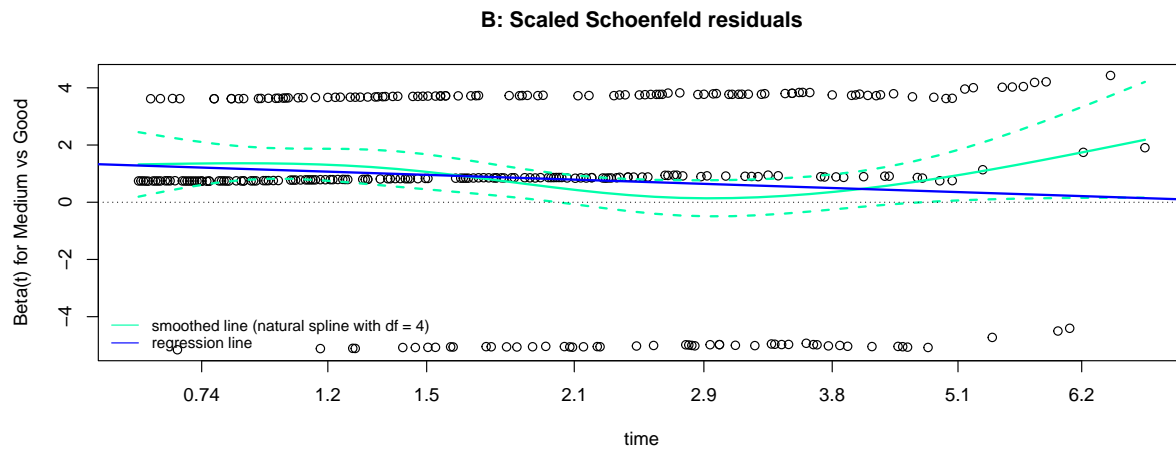
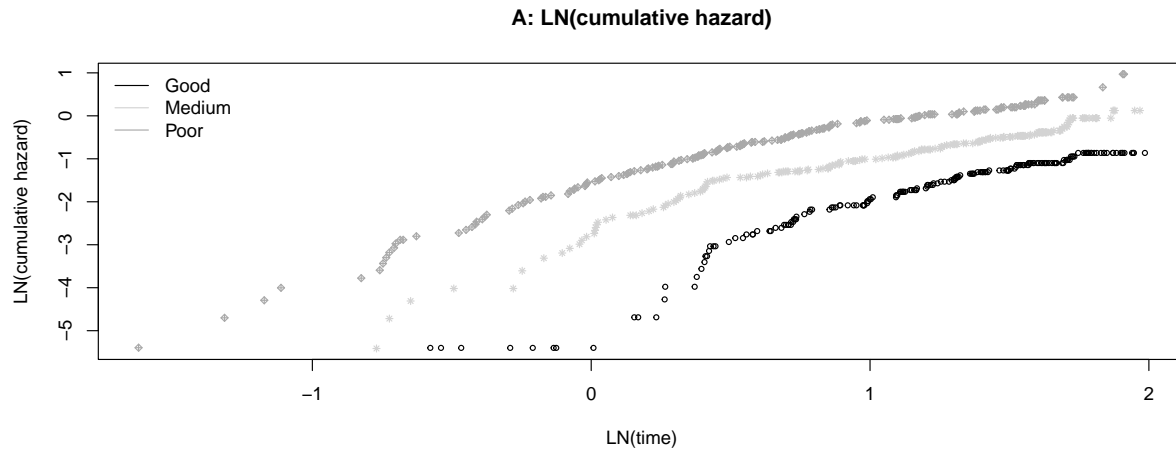


Table 1: Observed survival data

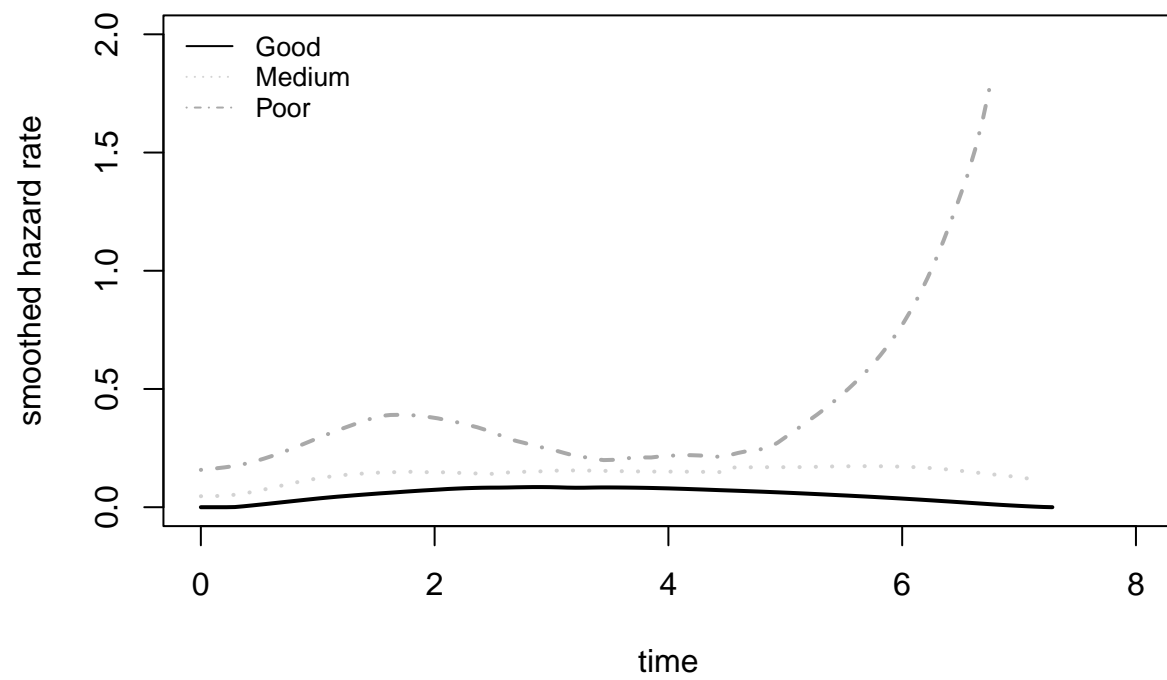
	records	n.max	n.start	events	rmean	se(rmean)	median	0.95LCL	0.95UCL
group=Good	229	229	229	51	5.934	0.1616	NA	NA	NA
group=Medium	229	229	229	103	4.601	0.1857	5.255	4.115	5.573
group=Poor	228	228	228	145	3.102	0.1773	2.184	1.978	2.619

## 2. Proportional hazards assumption



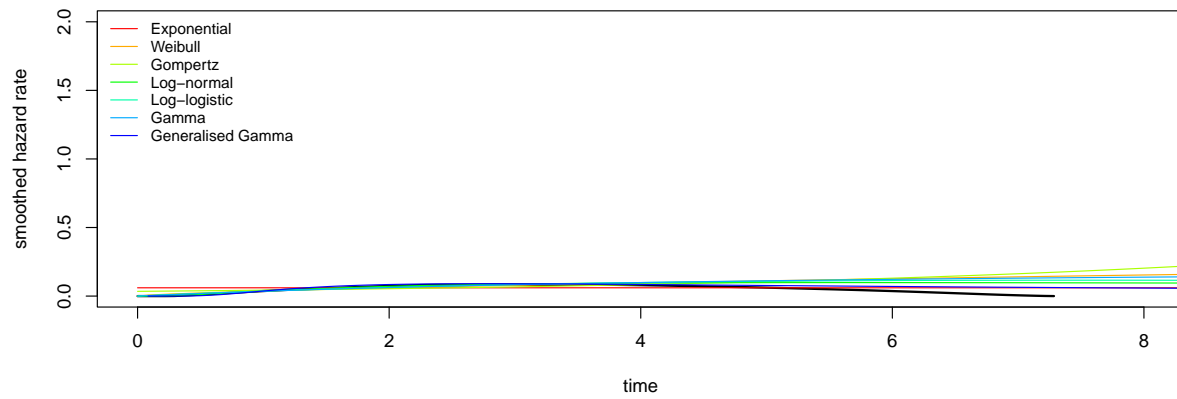
### 3. Hazard function

#### 3.1 Shape of the observed smoothed hazard function

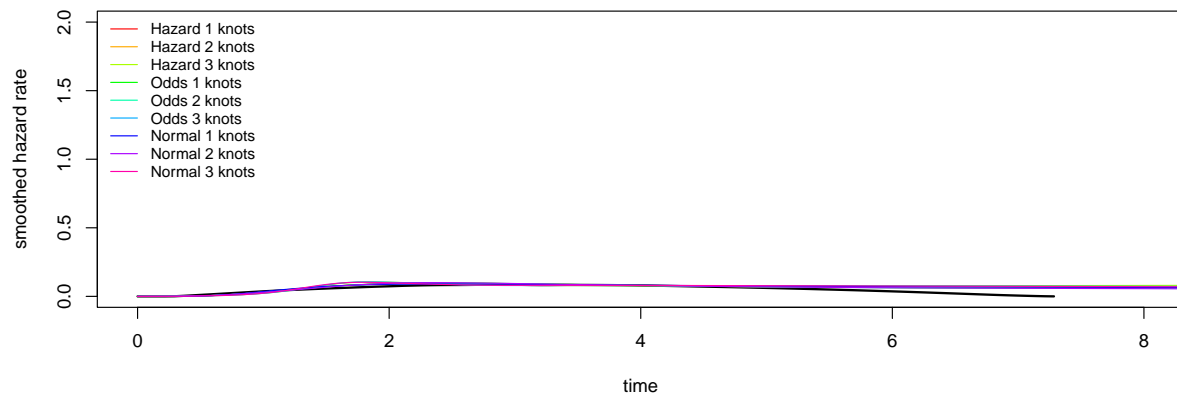


### 3.2 Shape of the predicted hazard function

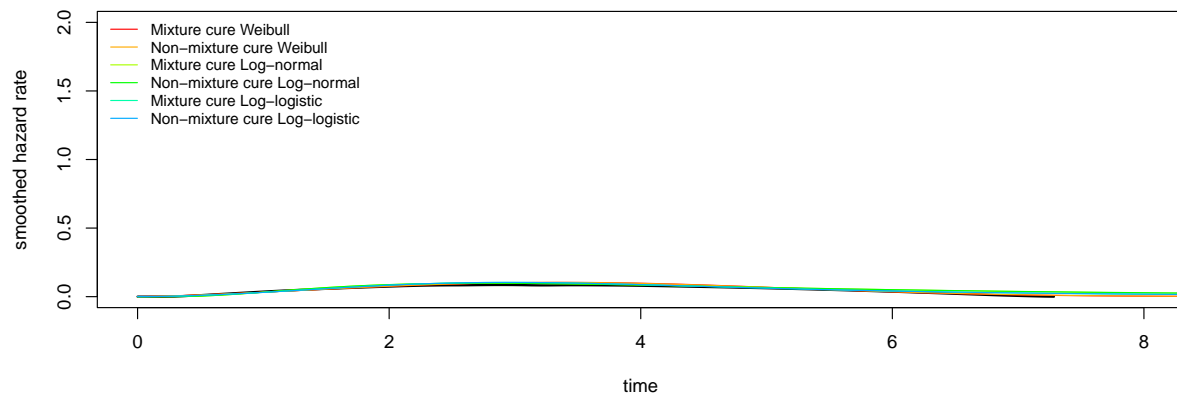
Standard parametric models, Group: Good



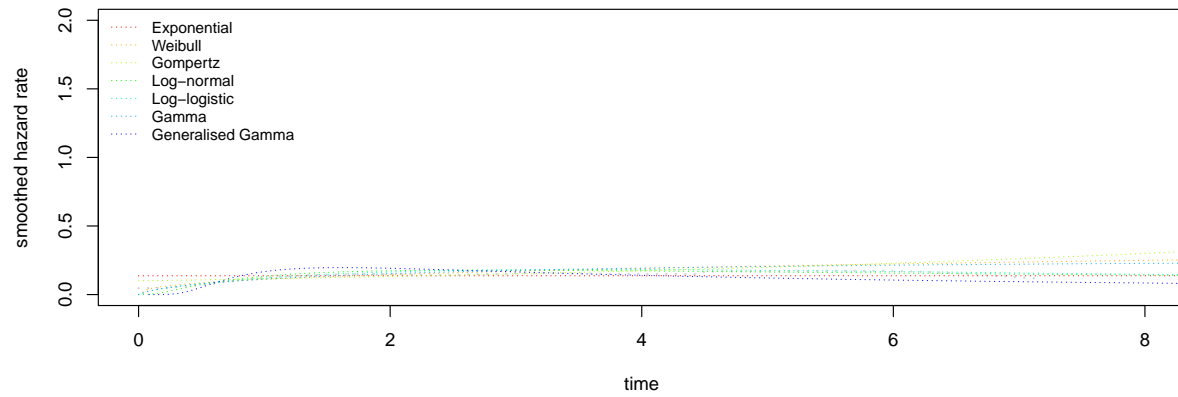
Spline models, Group: Good



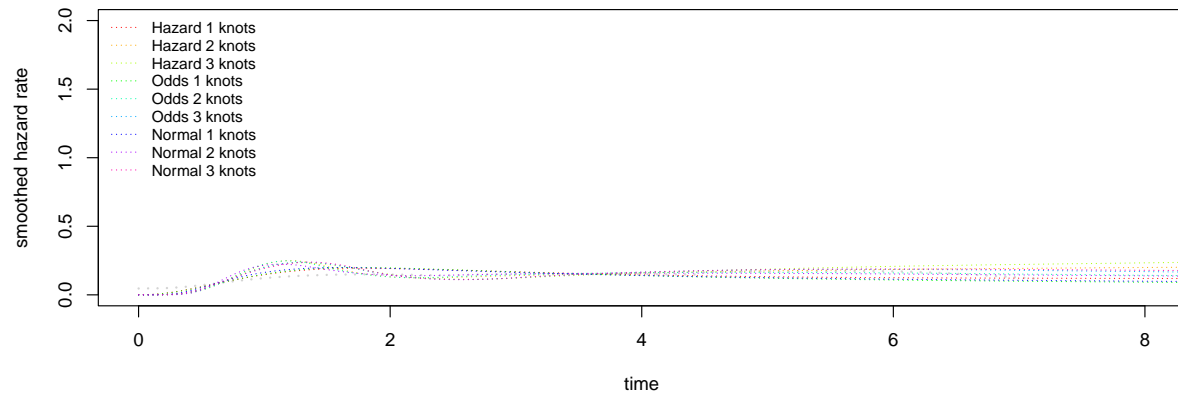
Cure models, Group: Good



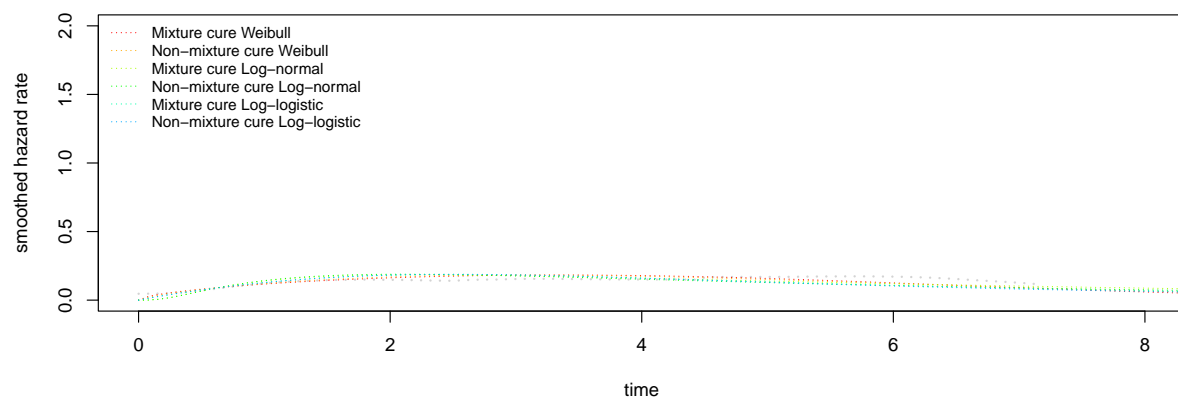
### Standard parametric models, Group: Medium



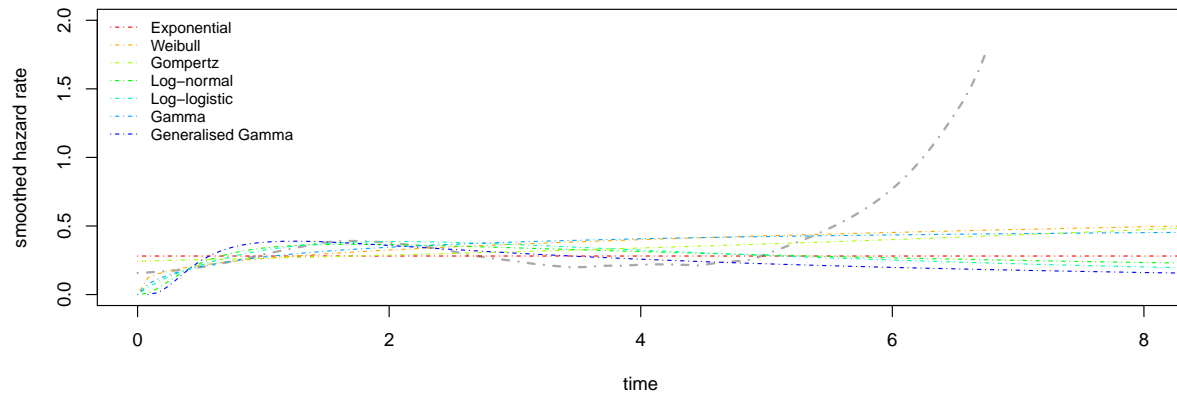
### Spline models, Group: Medium



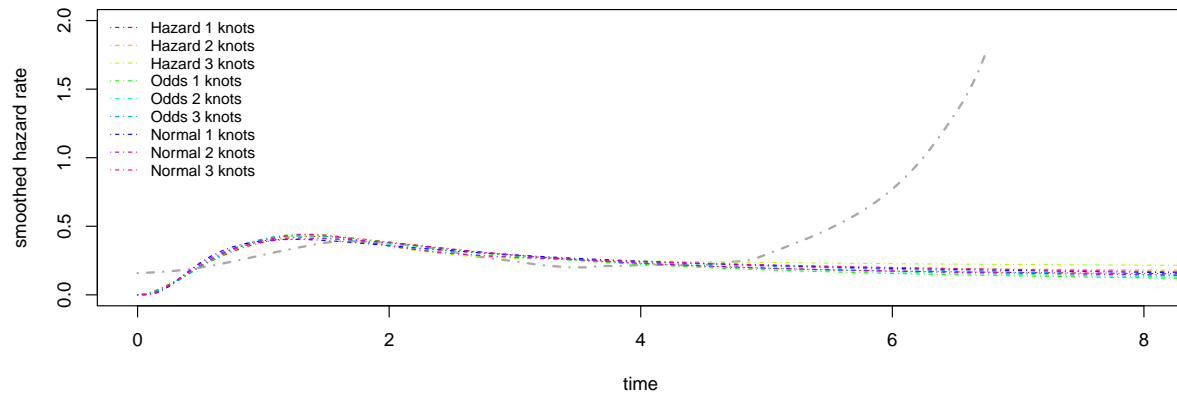
### Cure models, Group: Medium



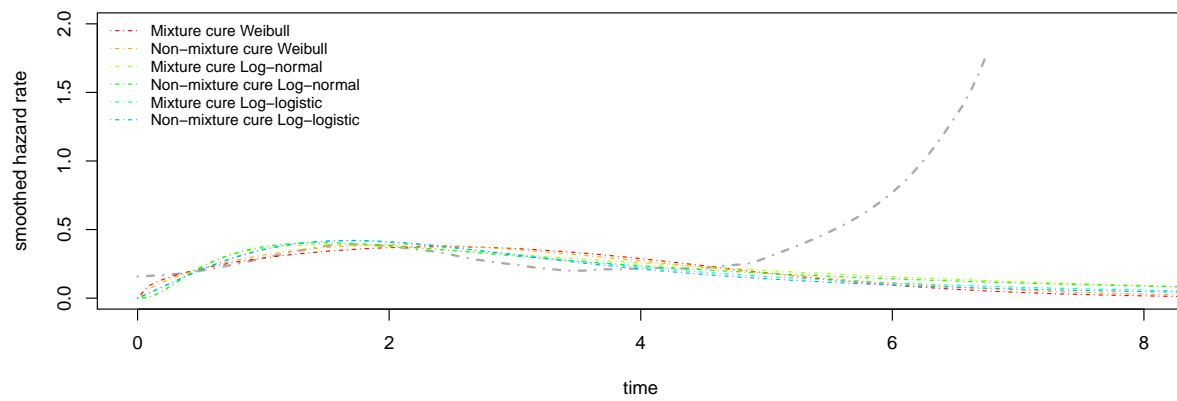
Standard parametric models, Group: Poor



Spline models, Group: Poor



Cure models, Group: Poor



## 4 Parametric survival models

### 4.1 Standard parametric models

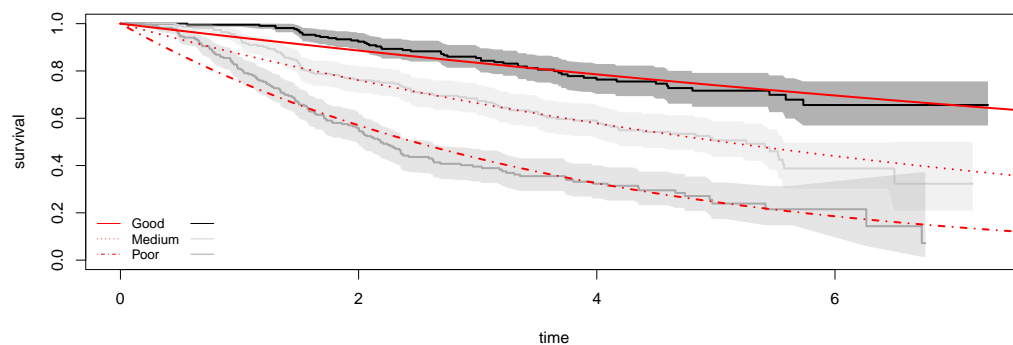
Table 2: Goodness of fit statistics

Model	AIC	BIC
Generalised Gamma	1589	1630
Log-normal	1593	1620
Log-logistic	1609	1636
Gamma	1622	1649
Weibull	1633	1660
Gompertz	1661	1688
Exponential	1668	1682

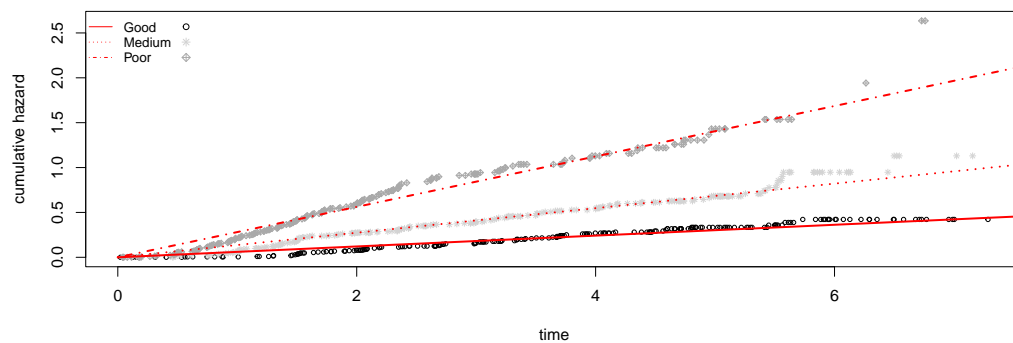


## Exponential

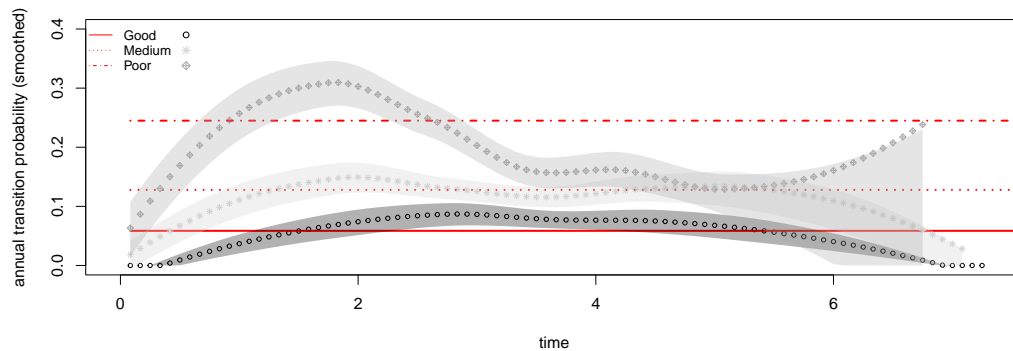
A: Kaplan–Meier (Exponential)



B: Diagnostic plot (Exponential)

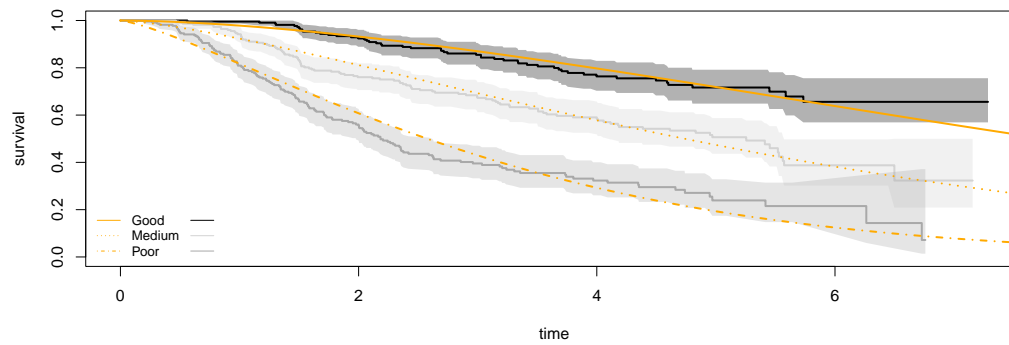


C: Annual transition probability (Exponential)

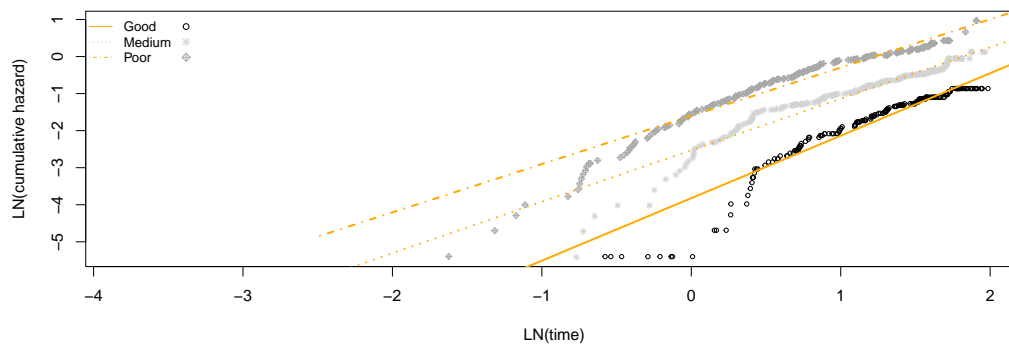


## Weibull

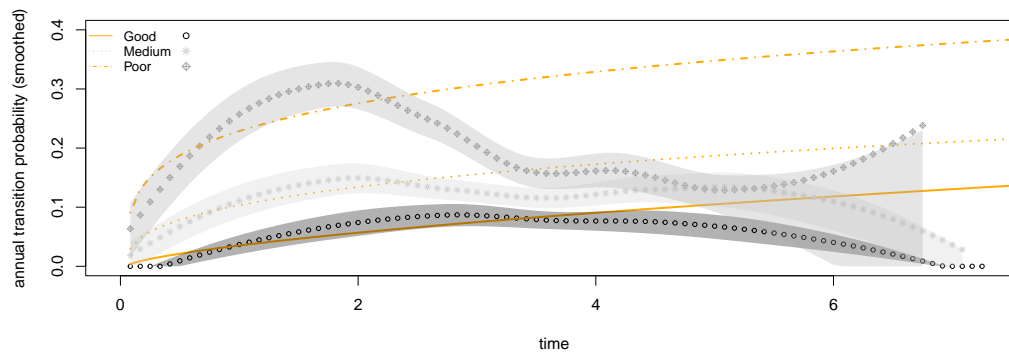
**A: Kaplan–Meier (Weibull)**



**B: Diagnostic plot (Weibull)**

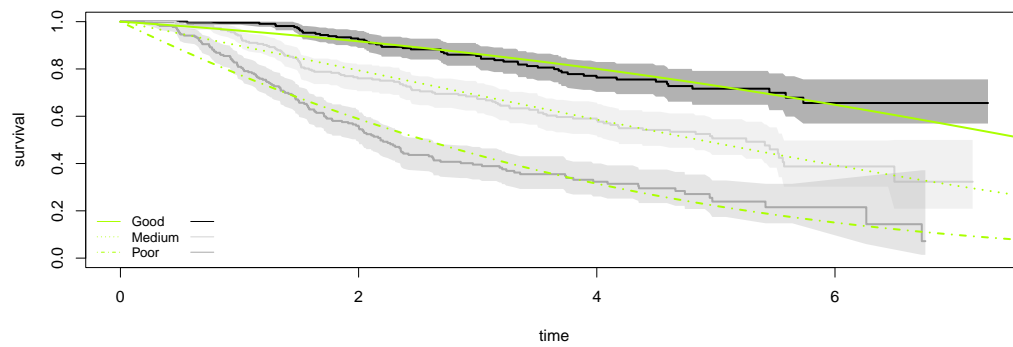


**C: Annual transition probability (Weibull)**

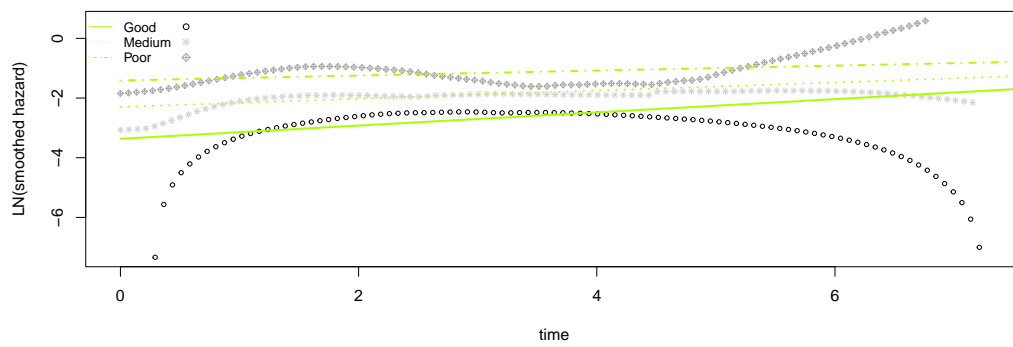


## Gompertz

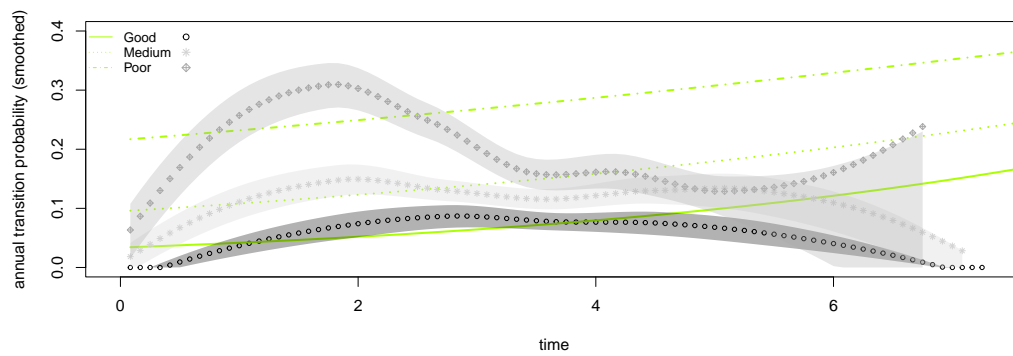
A: Kaplan-Meier (Gompertz)



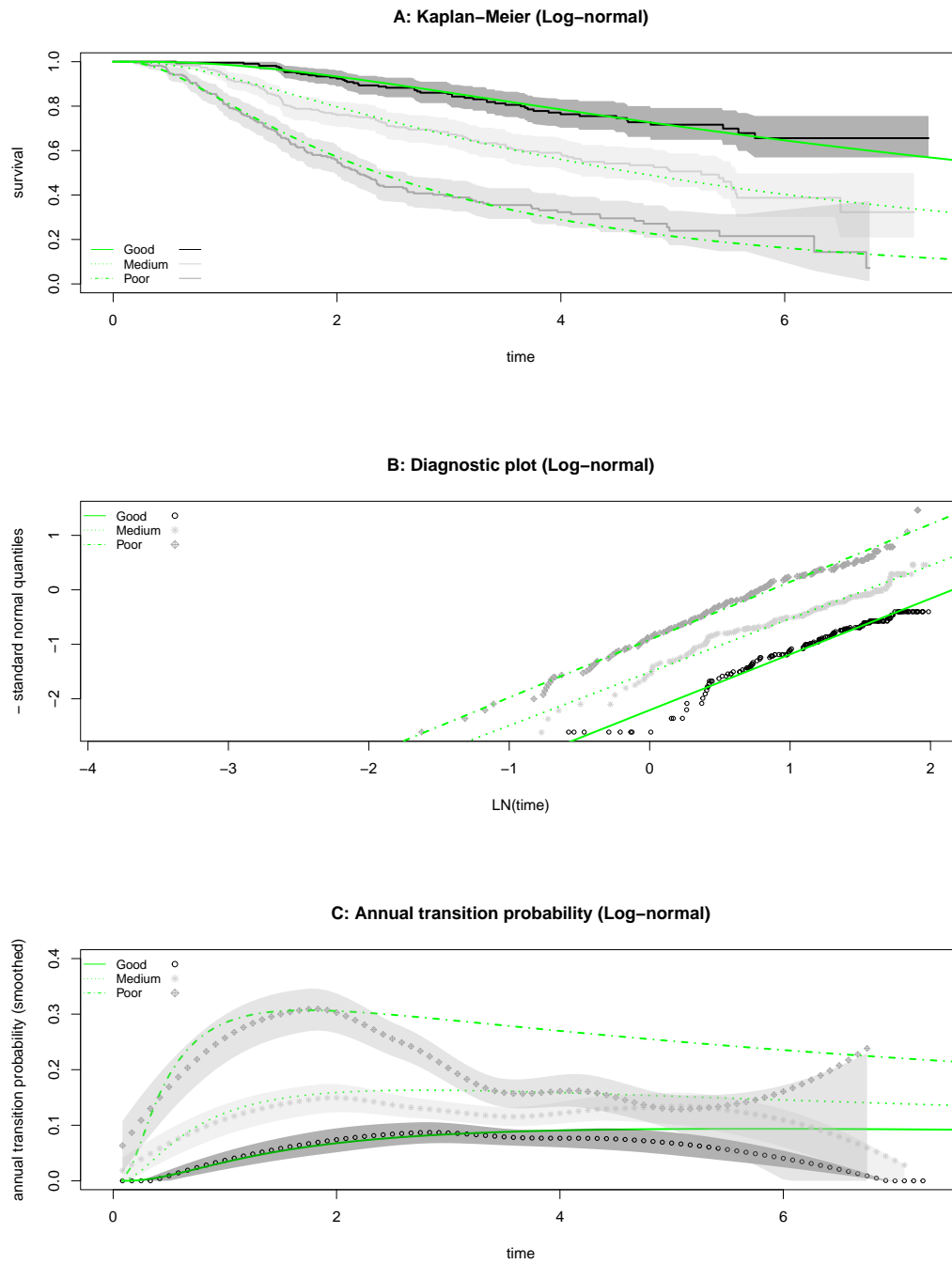
B: Diagnostic plot (Gompertz)



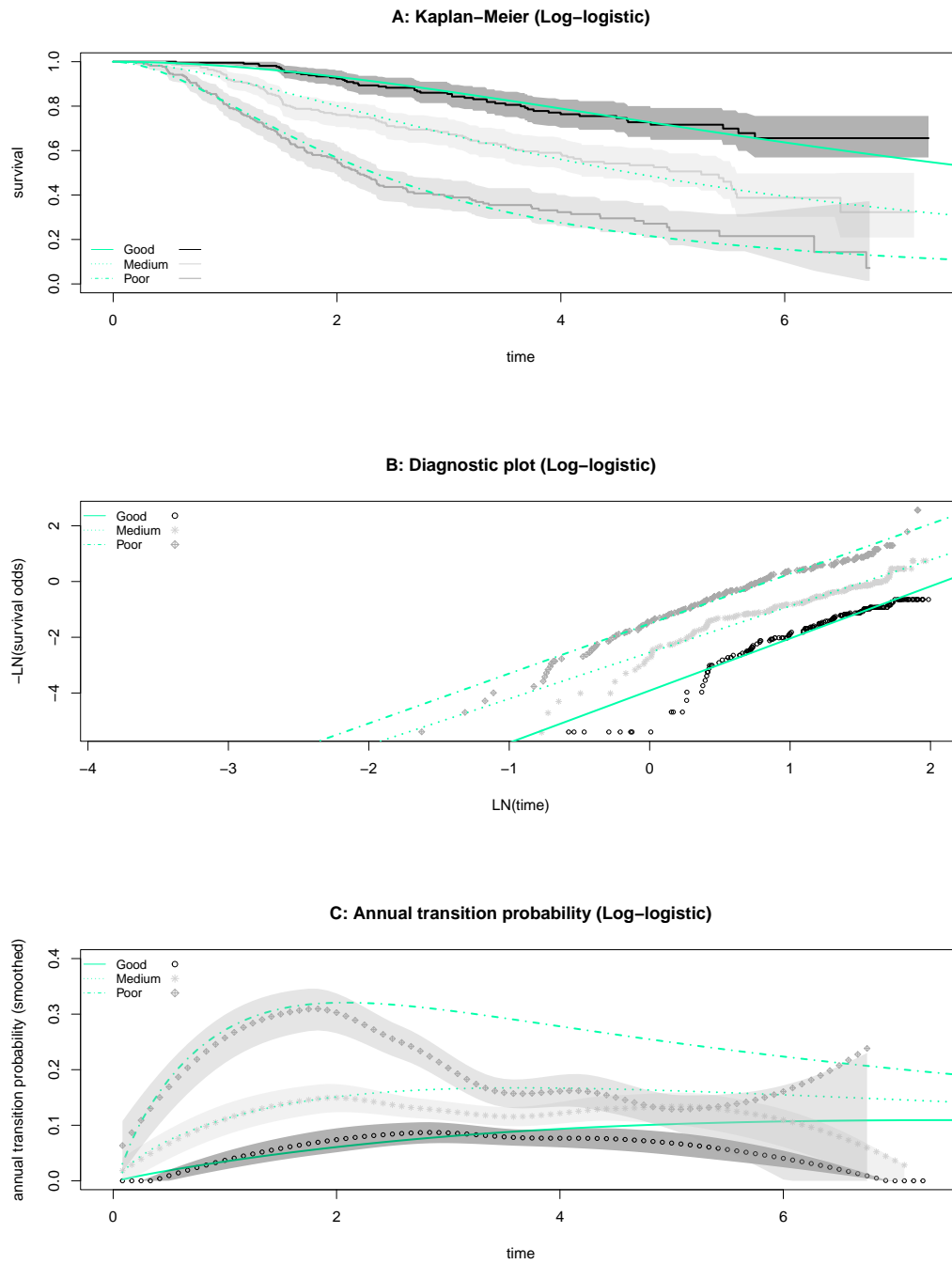
C: Annual transition probability (Gompertz)



## Log-normal

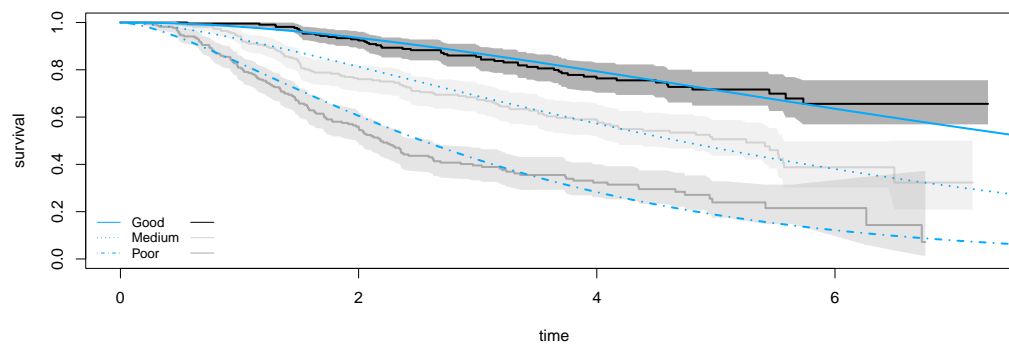


## Log-logistic

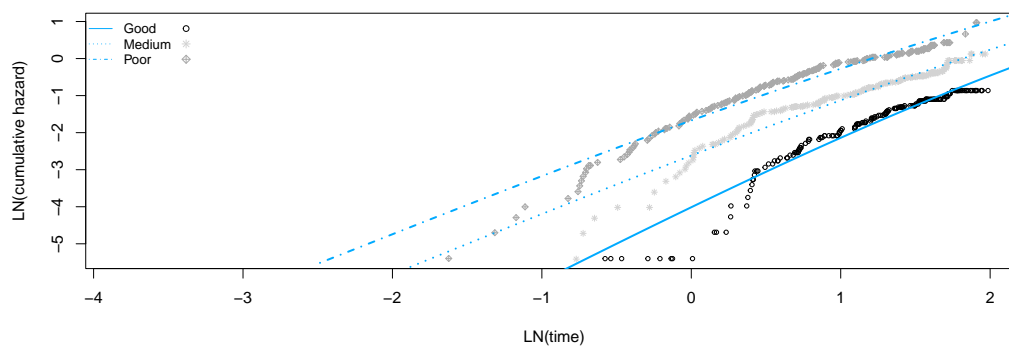


## Gamma

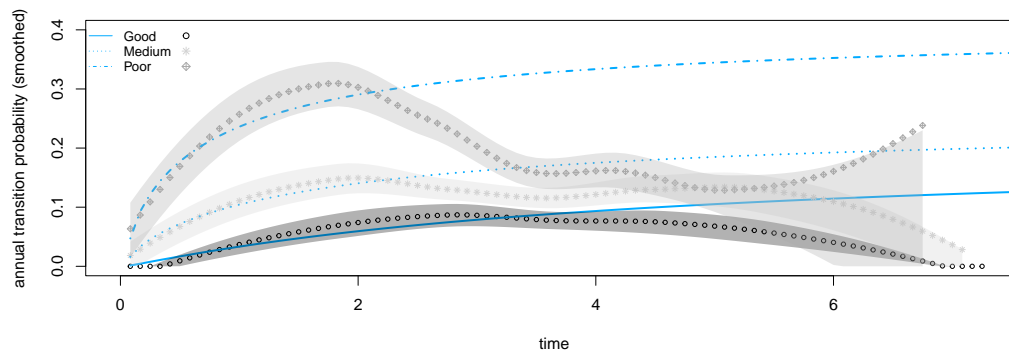
**A: Kaplan–Meier (Gamma)**



**B: Diagnostic plot (Gamma)**

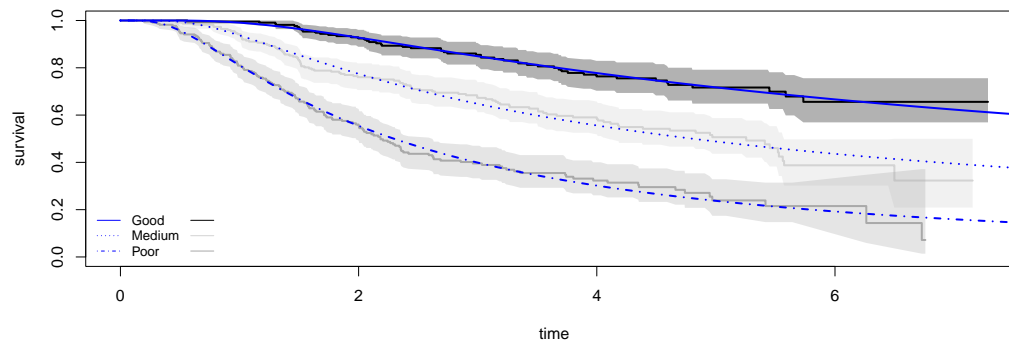


**C: Annual transition probability (Gamma)**

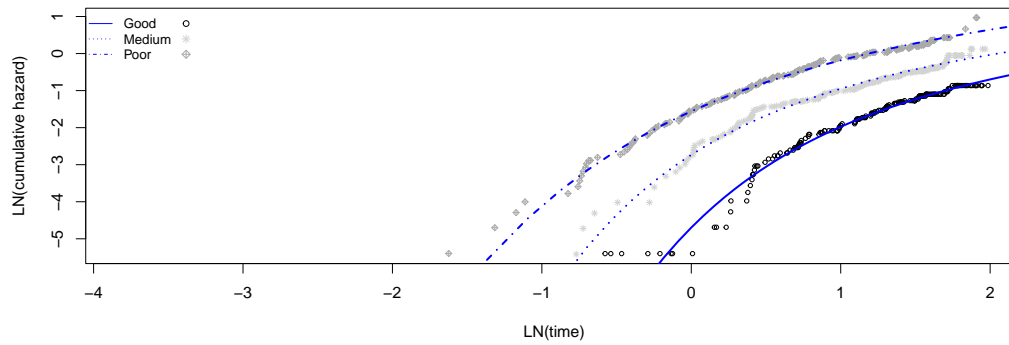


## Generalised Gamma

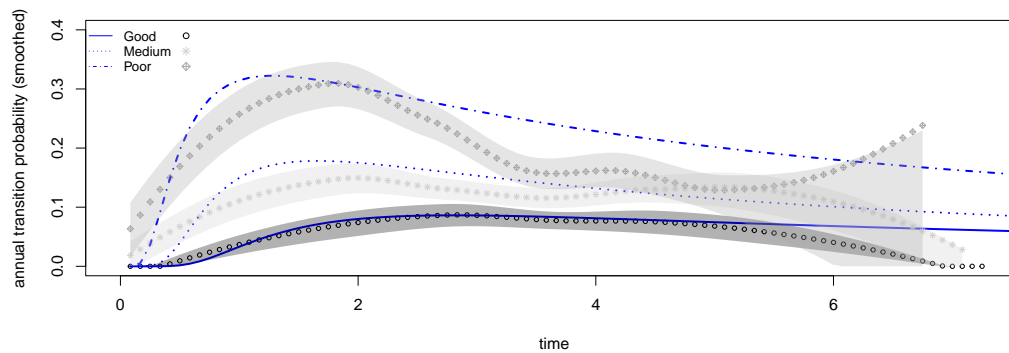
A: Kaplan–Meier (Generalised Gamma)



B: Diagnostic plot (Generalised Gamma)



C: Annual transition probability (Generalised Gamma)



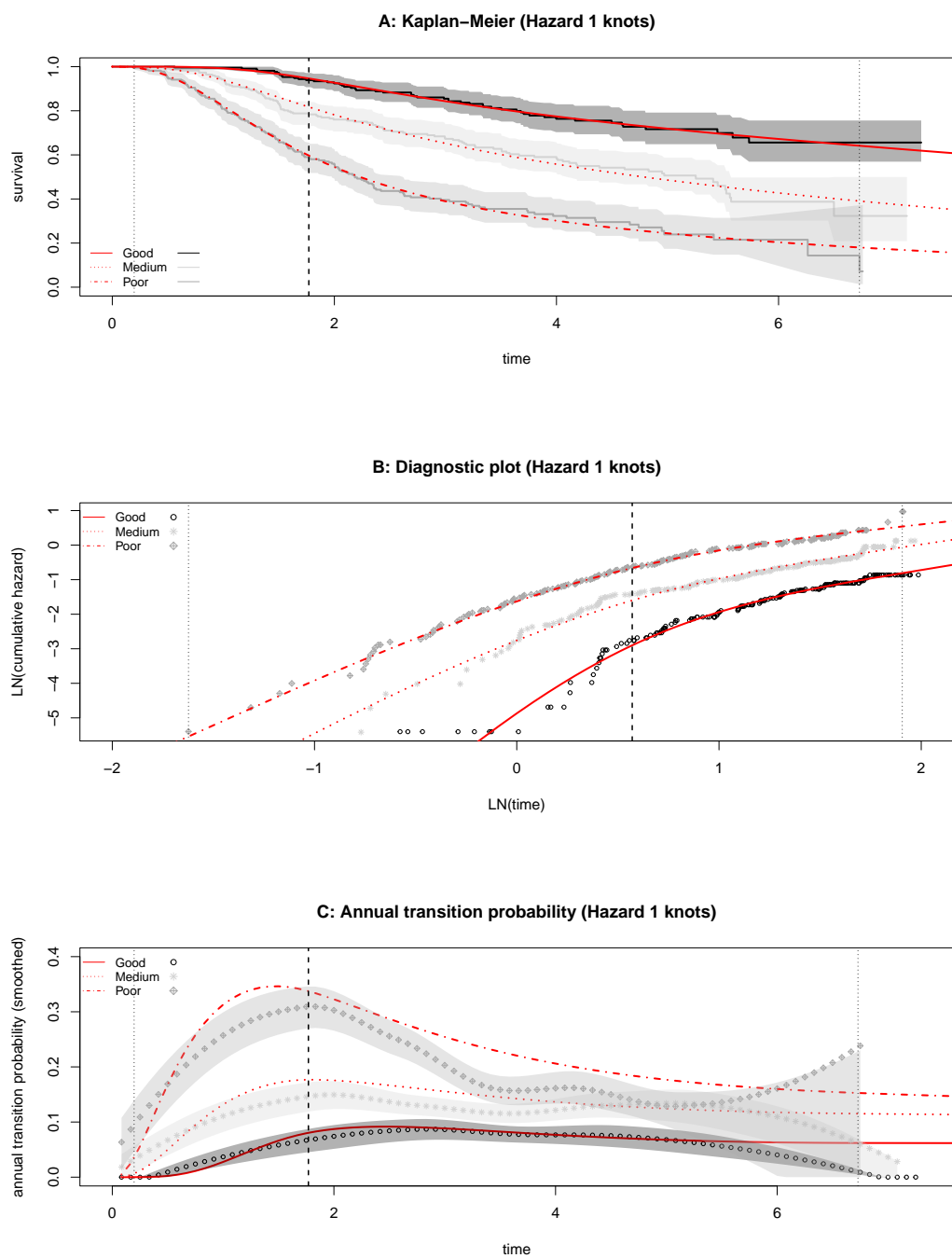
## 4.2 Parametric natural cubic spline models

Table 3: Goodness of fit statistics (including standard parametric and spline models)

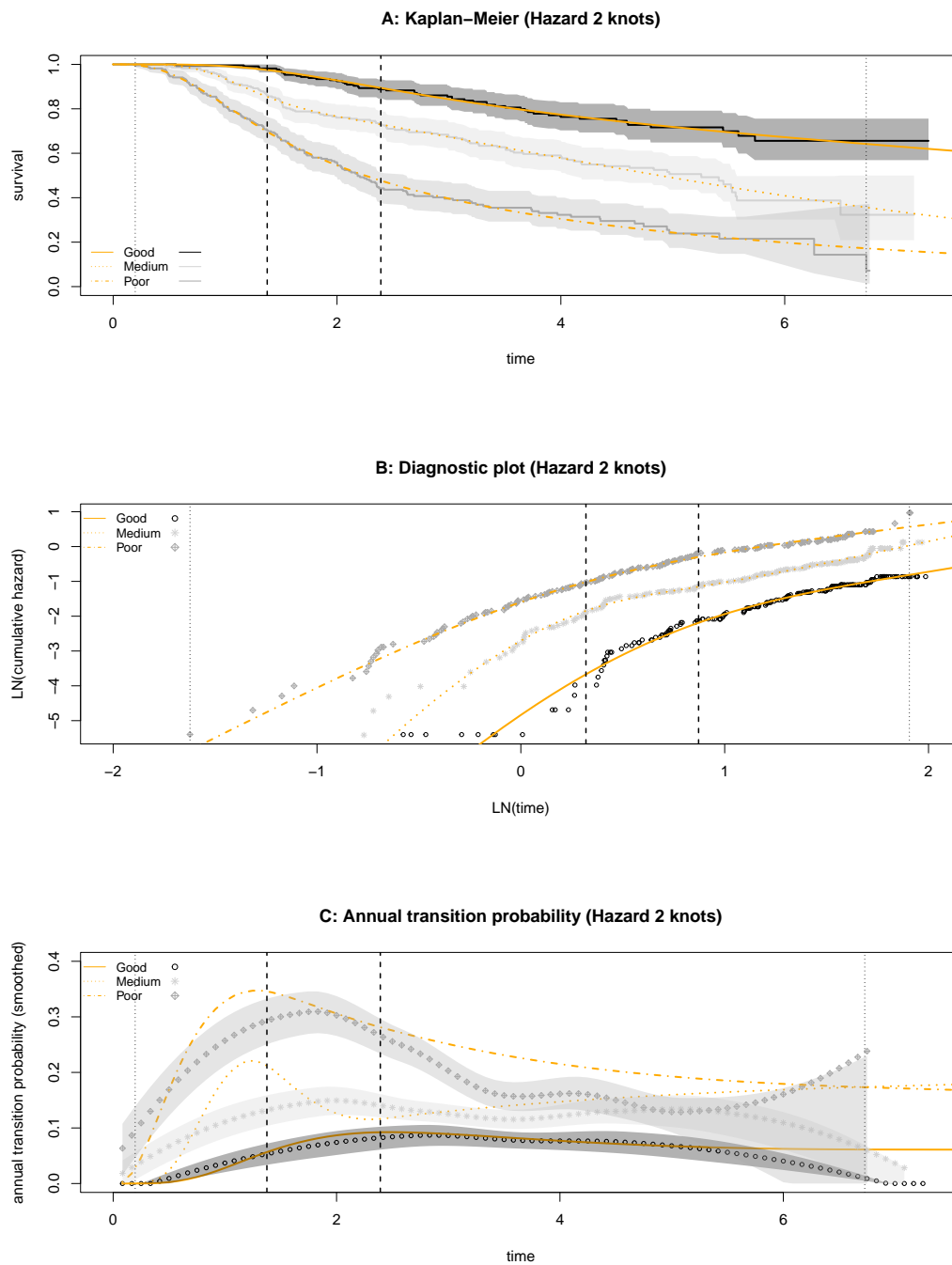
Model	AIC	BIC
Hazard 2 knots	1586	1640
Odds 2 knots	1587	1642
Normal 1 knots	1588	1628
Normal 2 knots	1588	1643
Generalised Gamma	1589	1630
Hazard 1 knots	1589	1630
Normal 3 knots	1590	1658
Hazard 3 knots	1590	1658
Odds 1 knots	1590	1631
Odds 3 knots	1591	1659
Log-normal	1593	1620
Log-logistic	1609	1636
Gamma	1622	1649
Weibull	1633	1660
Gompertz	1661	1688
Exponential	1668	1682



## Hazard 1 knots

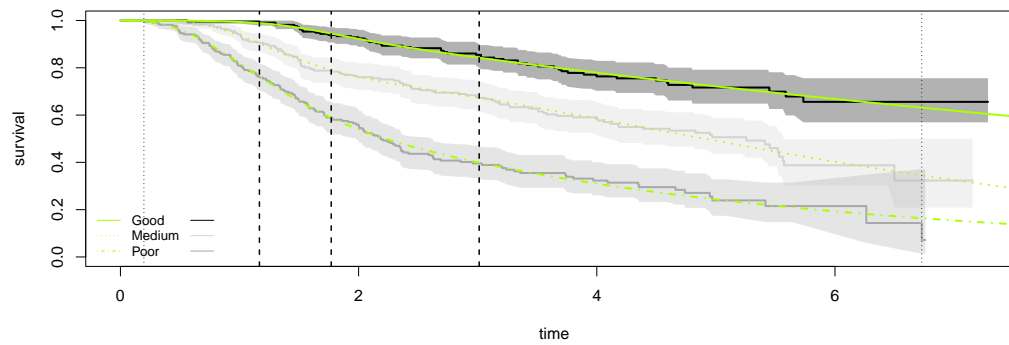


## Hazard 2 knots

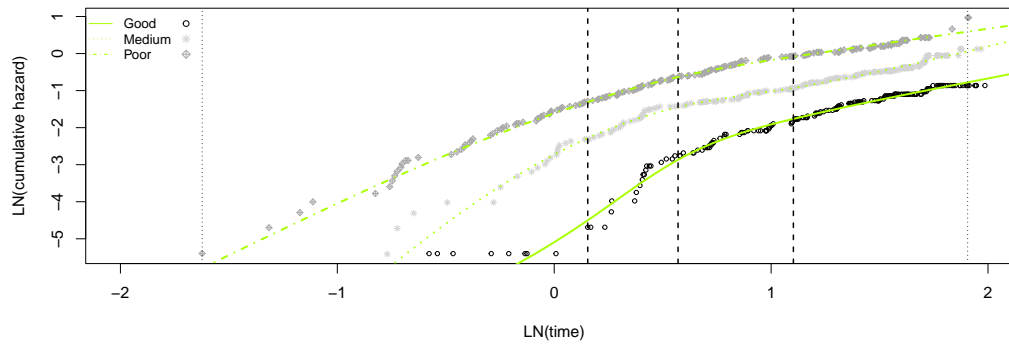


## Hazard 3 knots

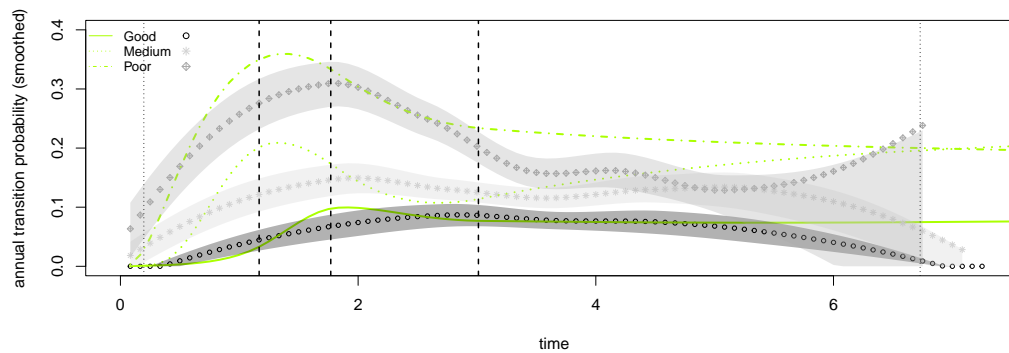
A: Kaplan-Meier (Hazard 3 knots)



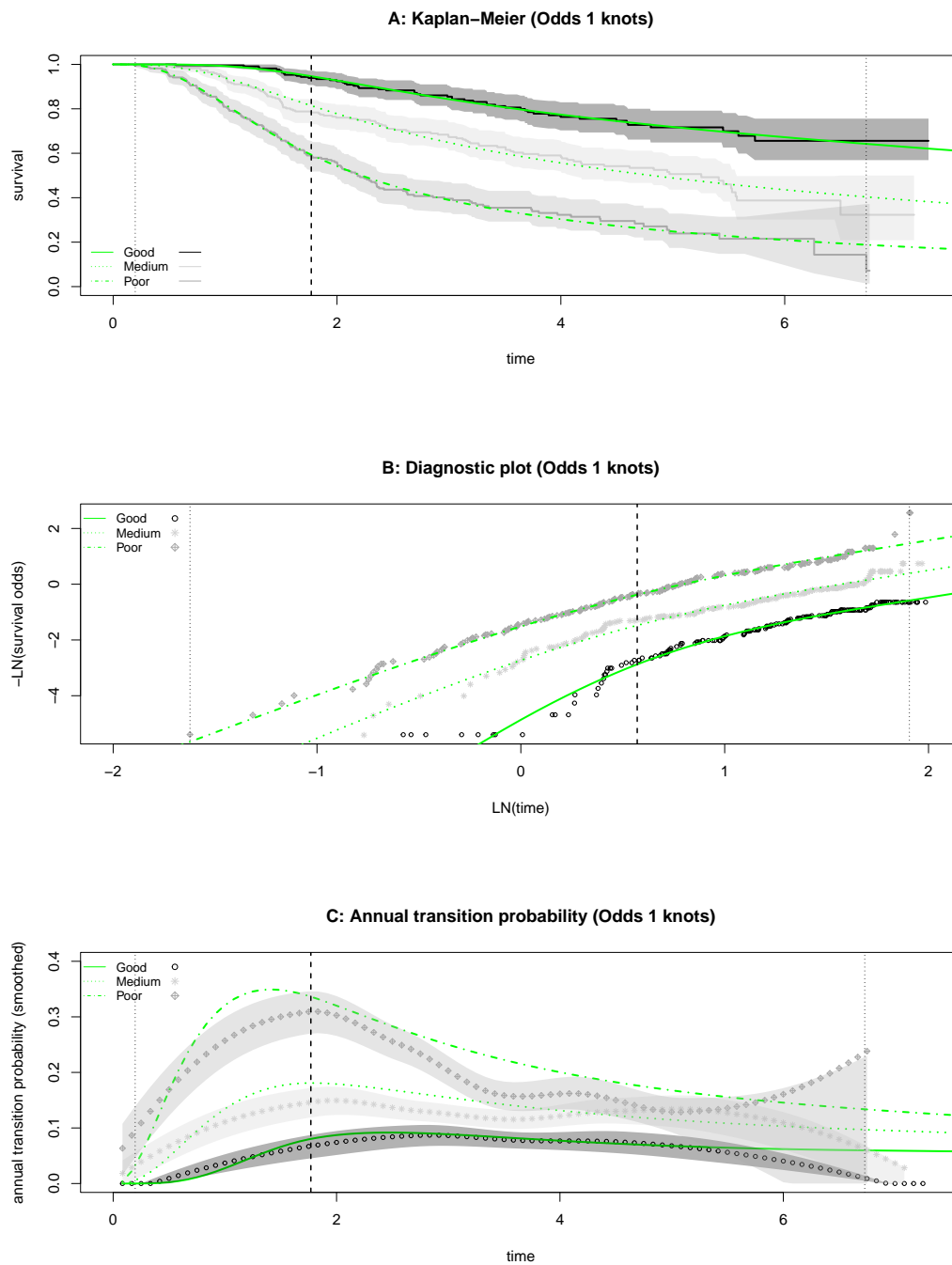
B: Diagnostic plot (Hazard 3 knots)



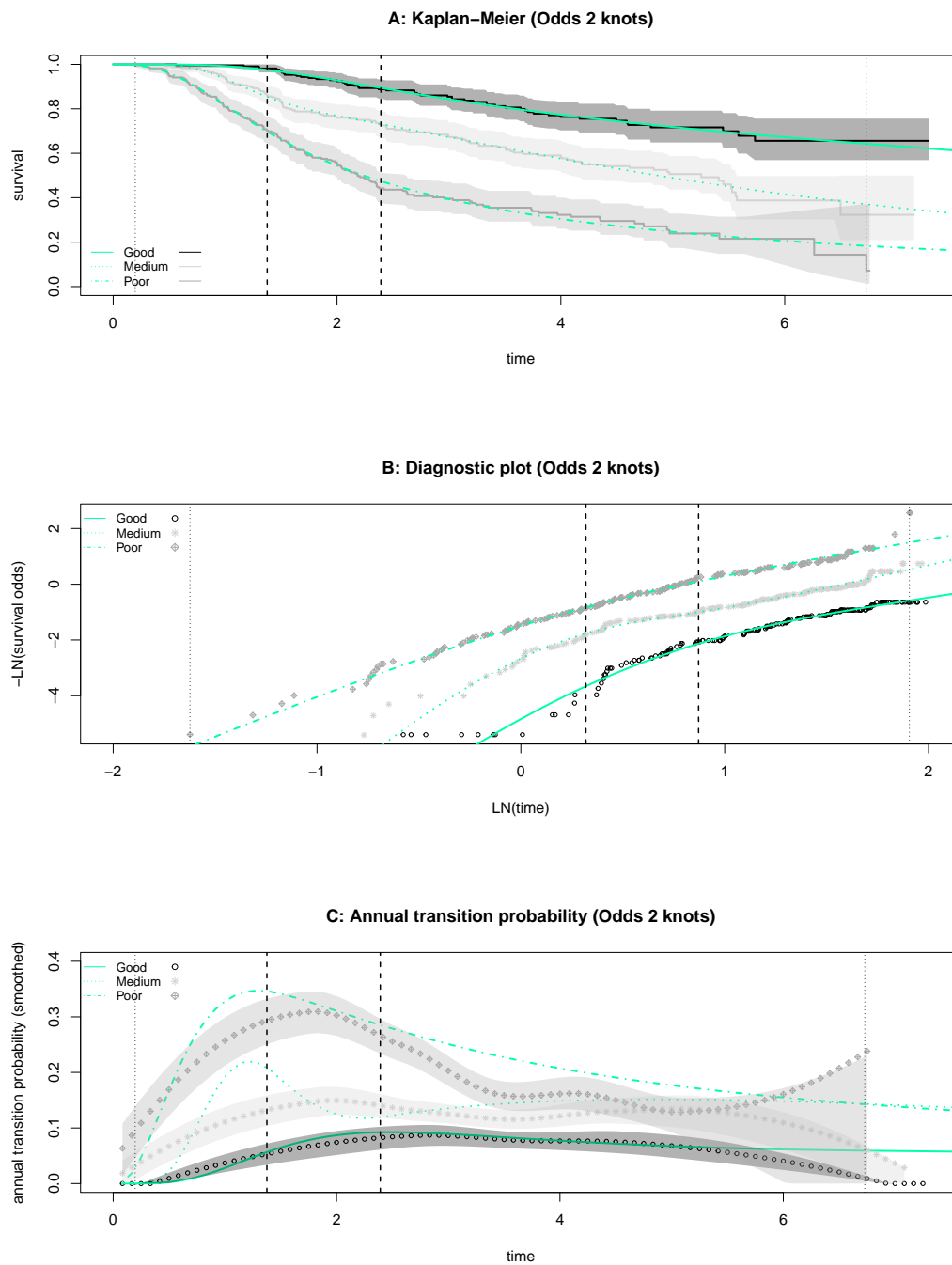
C: Annual transition probability (Hazard 3 knots)



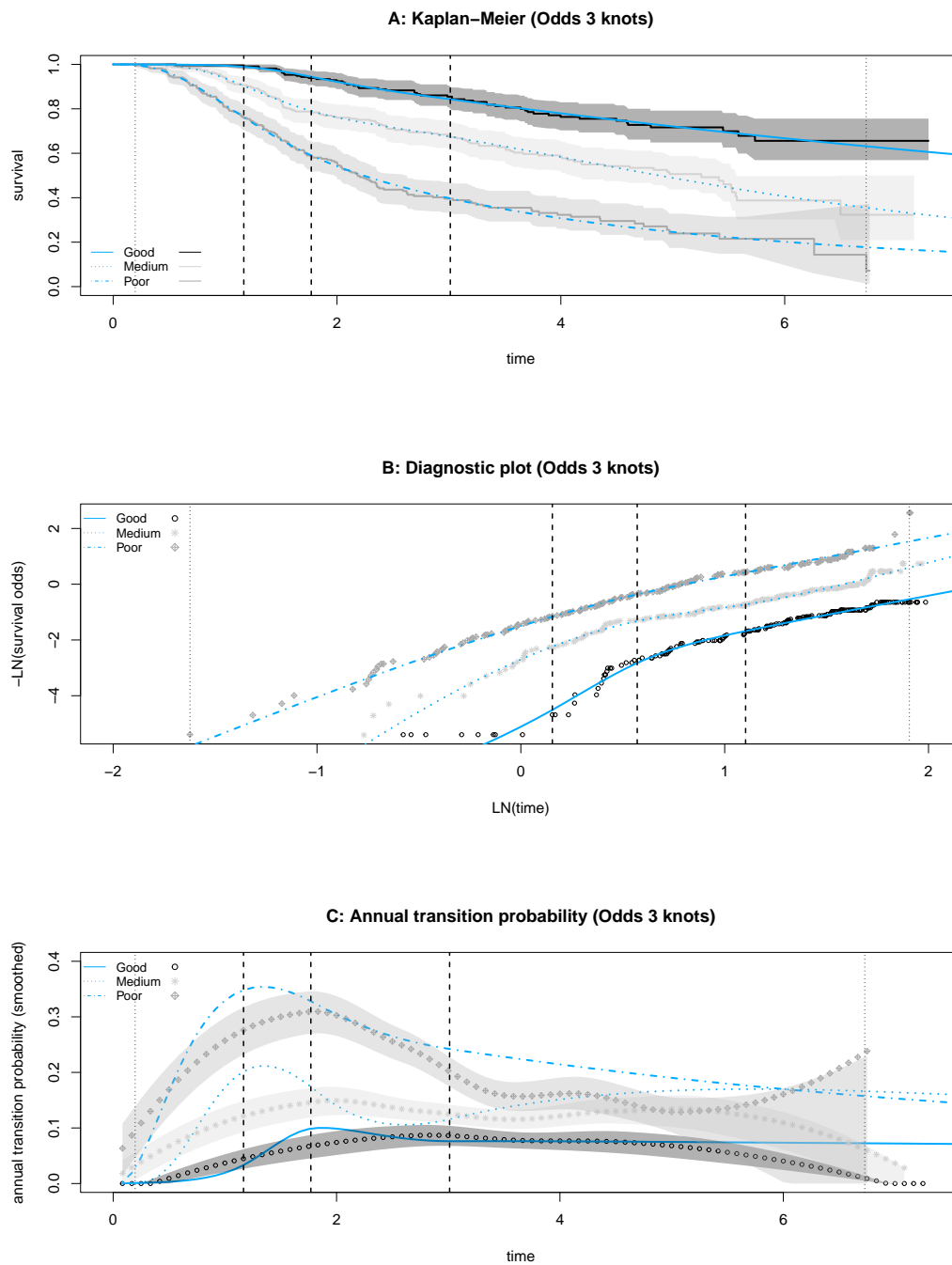
## Odds 1 knots



## Odds 2 knots

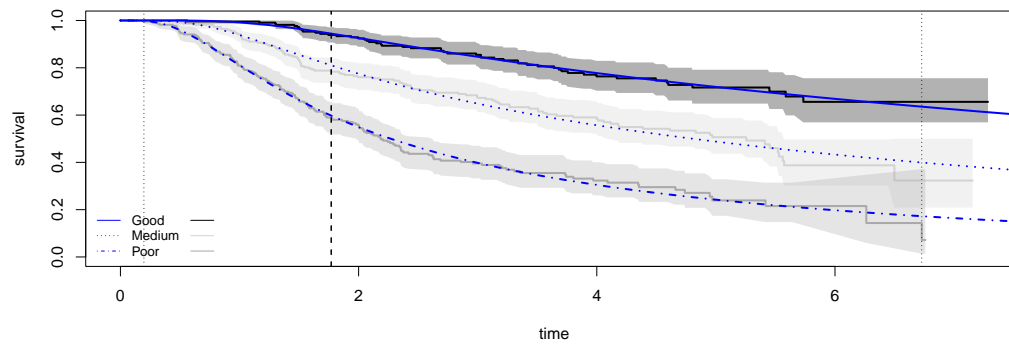


## Odds 3 knots

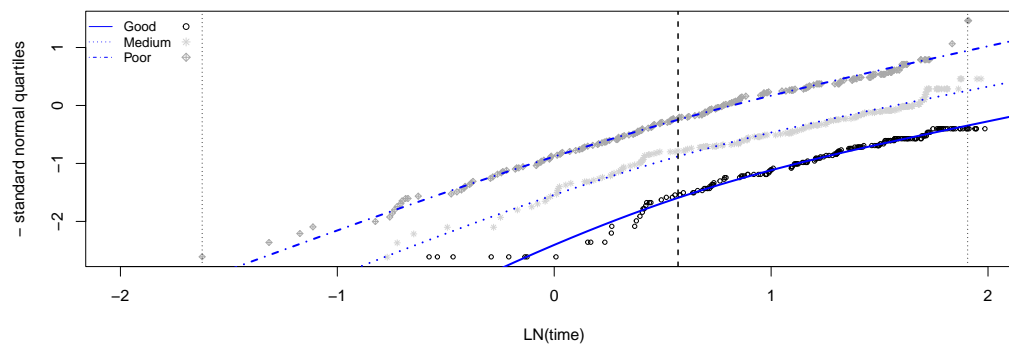


## Normal 1 knots

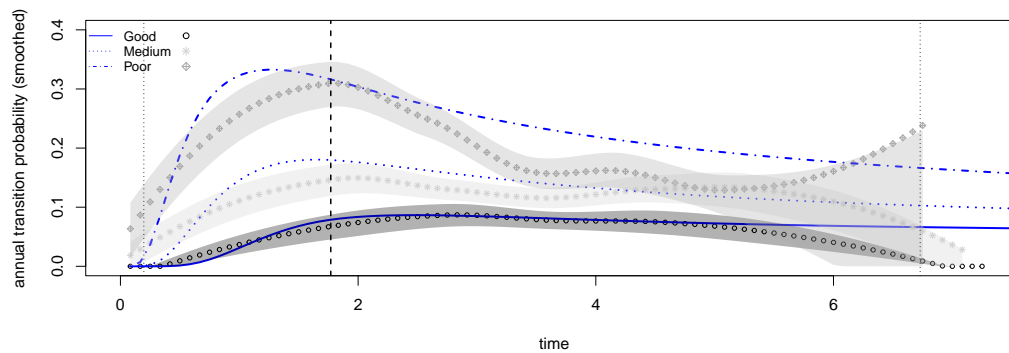
**A: Kaplan–Meier (Normal 1 knots)**



**B: Diagnostic plot (Normal 1 knots)**

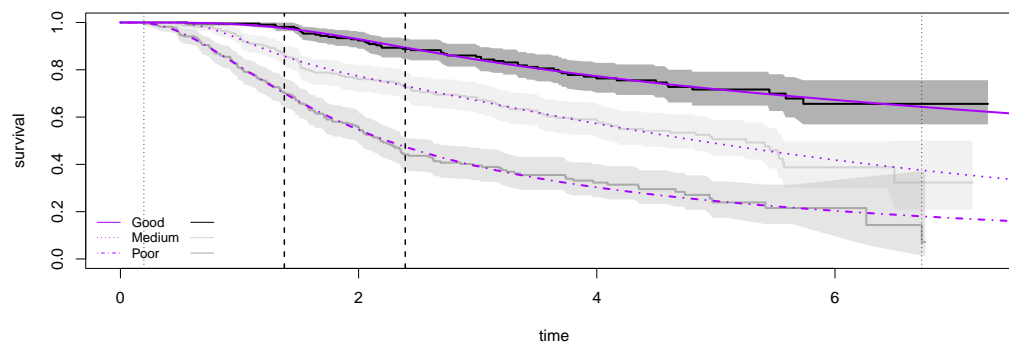


**C: Annual transition probability (Normal 1 knots)**

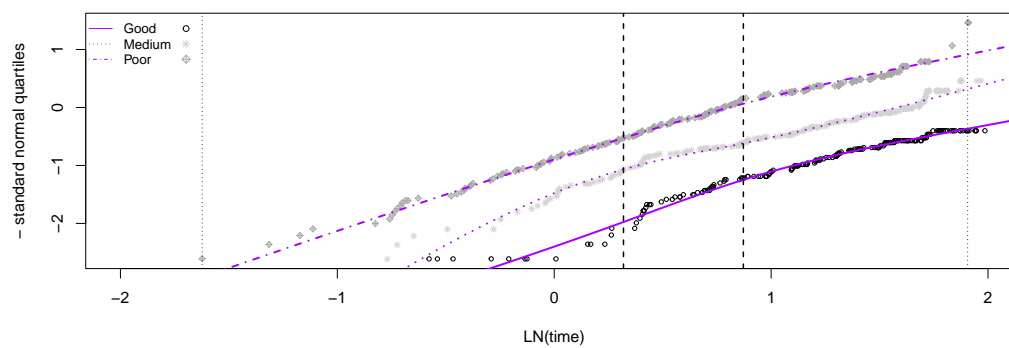


## Normal 2 knots

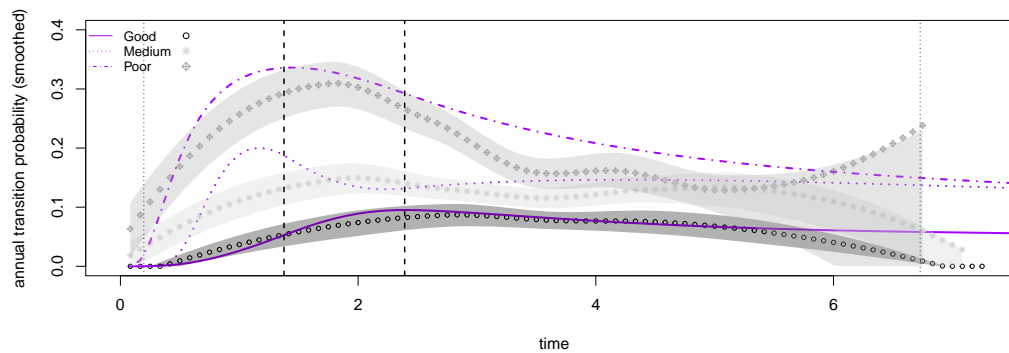
**A: Kaplan–Meier (Normal 2 knots)**



**B: Diagnostic plot (Normal 2 knots)**



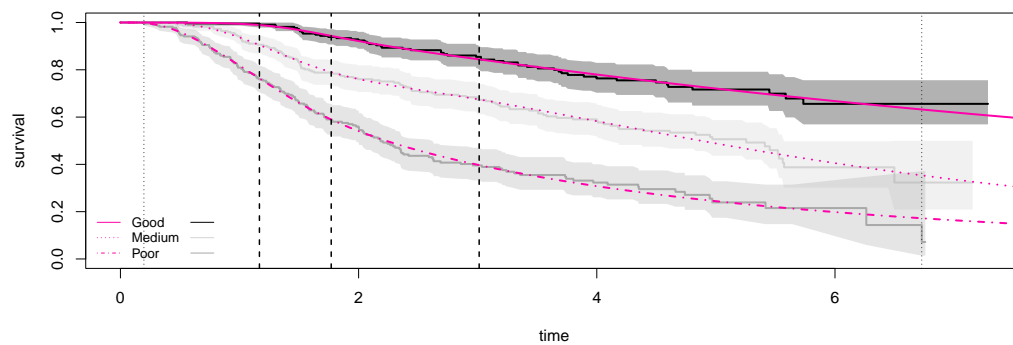
**C: Annual transition probability (Normal 2 knots)**



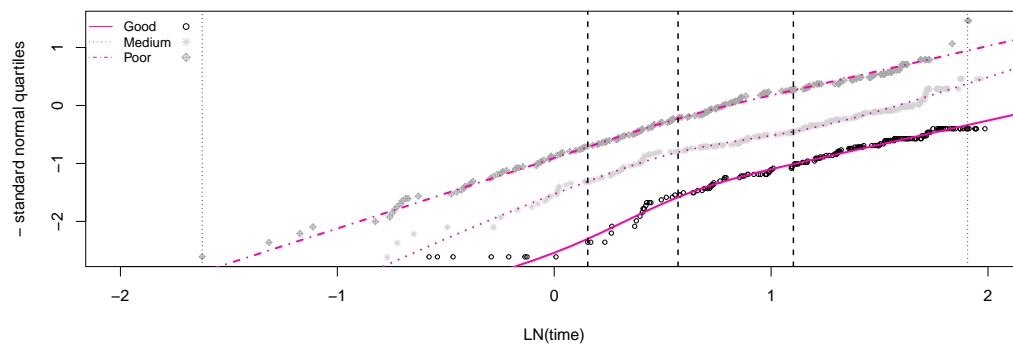


## Normal 3 knots

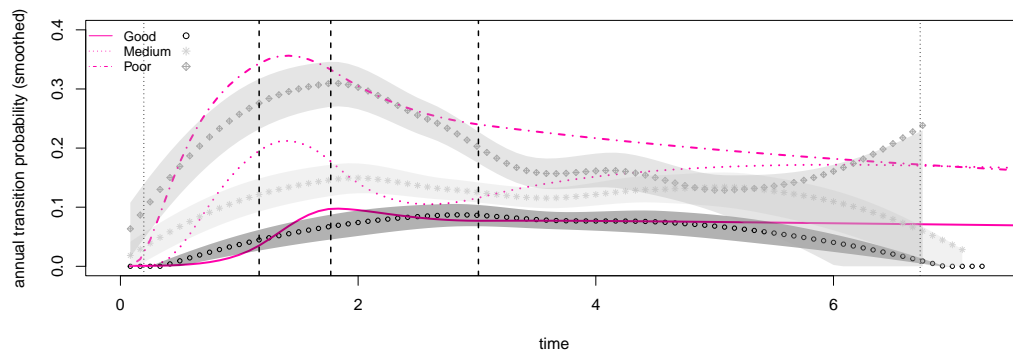
**A: Kaplan–Meier (Normal 3 knots)**



**B: Diagnostic plot (Normal 3 knots)**



**C: Annual transition probability (Normal 3 knots)**



### 4.3 Parametric (non-)mixture cure models

Table 4: Goodness of fit statistics (including standard parametric and cure models)

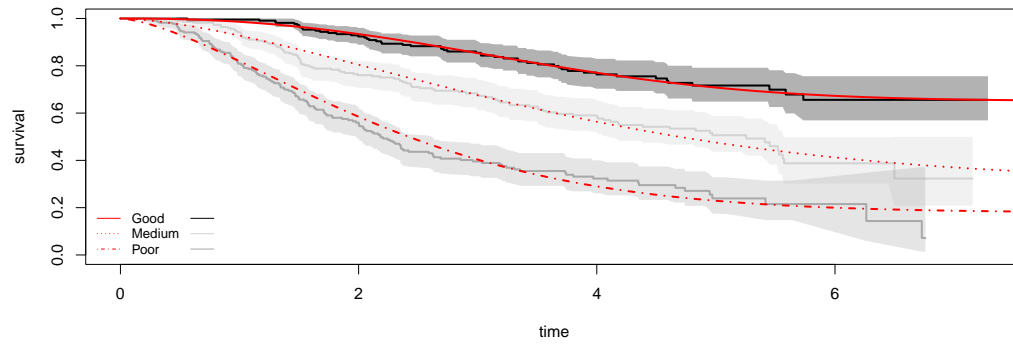
Model	AIC
Generalised Gamma	1589
Log-normal	1593
Mixture cure Log-normal	1594
Non-mixture cure Log-normal	1594
Mixture cure Log-logistic	1604
Non-mixture cure Log-logistic	1606
Log-logistic	1609
Non-mixture cure Weibull	1615
Gamma	1622
Mixture cure Weibull	1623
Weibull	1633
Gompertz	1661
Exponential	1668

Table 5: Cure proportions per group (lower and upper 95CI)

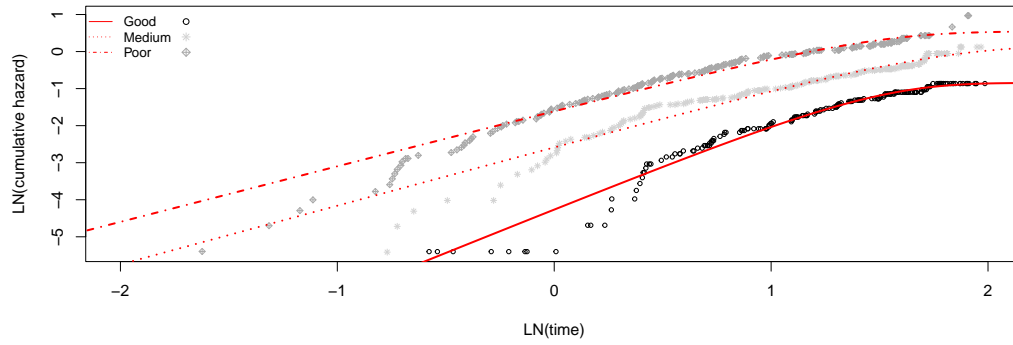
Model	Good	Medium	Poor
Mixture cure Weibull	65% (54%–75%)	31% (15%–53%)	18% (10%–29%)
Non-mixture cure Weibull	65% (53%–75%)	30% (13%–55%)	17% (9%–29%)
Mixture cure Log-normal	57% (35%–77%)	19% (3%–66%)	11% (3%–35%)
Non-mixture cure Log-normal	56% (33%–77%)	20% (5%–57%)	10% (3%–30%)
Mixture cure Log-logistic	60% (45%–74%)	23% (7%–54%)	14% (6%–30%)
Non-mixture cure Log-logistic	60% (45%–74%)	25% (10%–51%)	15% (8%–28%)

## Mixture cure Weibull

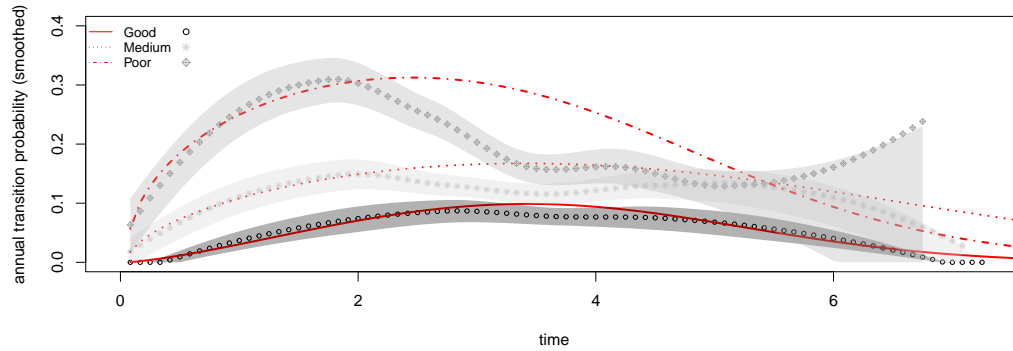
A: Kaplan–Meier (Mixture cure Weibull)



B: Diagnostic plot (Mixture cure Weibull)

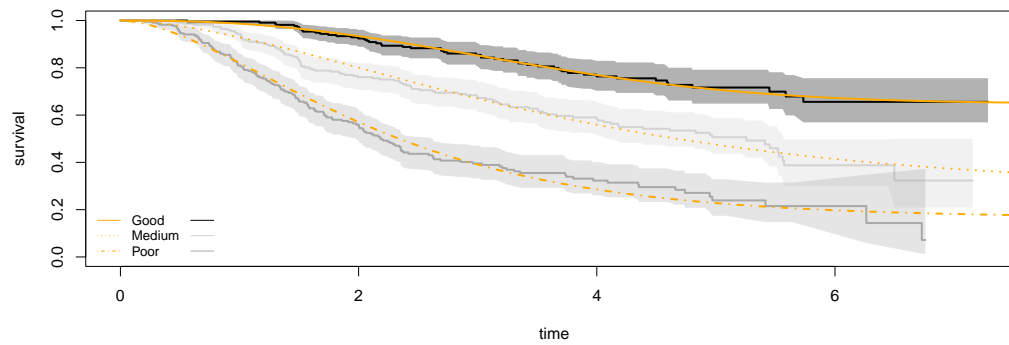


C: Annual transition probability (Mixture cure Weibull)

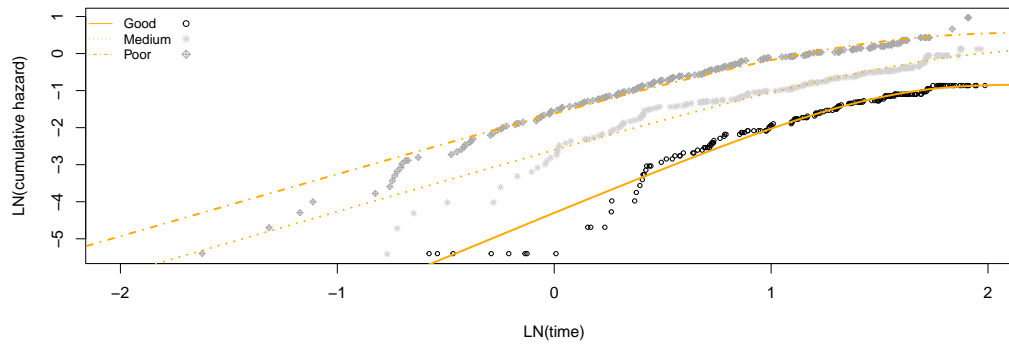


## Non-mixture cure Weibull

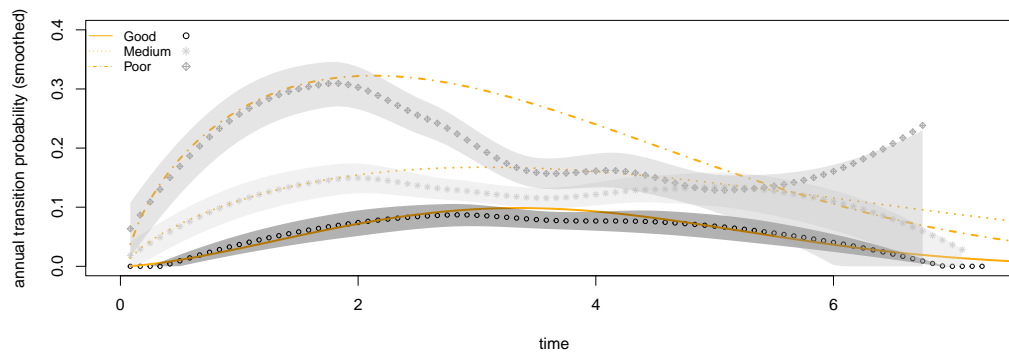
A: Kaplan-Meier (Non-mixture cure Weibull)



B: Diagnostic plot (Non-mixture cure Weibull)

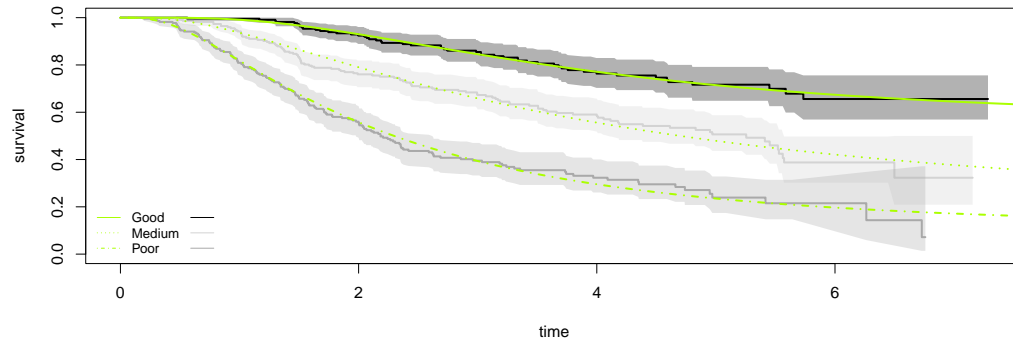


C: Annual transition probability (Non-mixture cure Weibull)

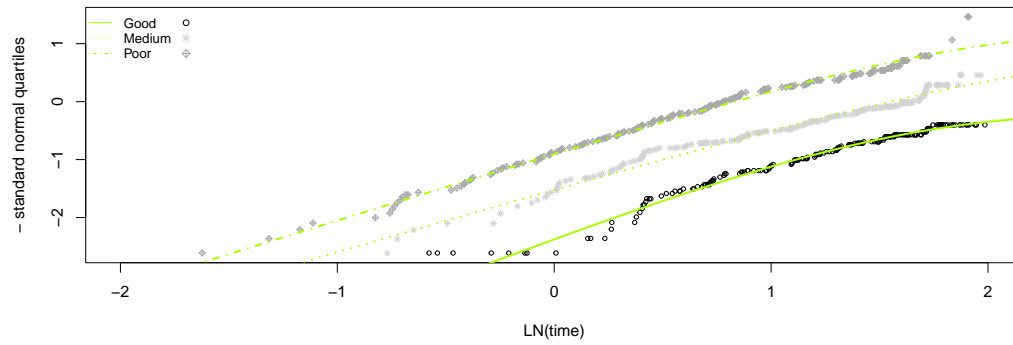


## Mixture cure Log-normal

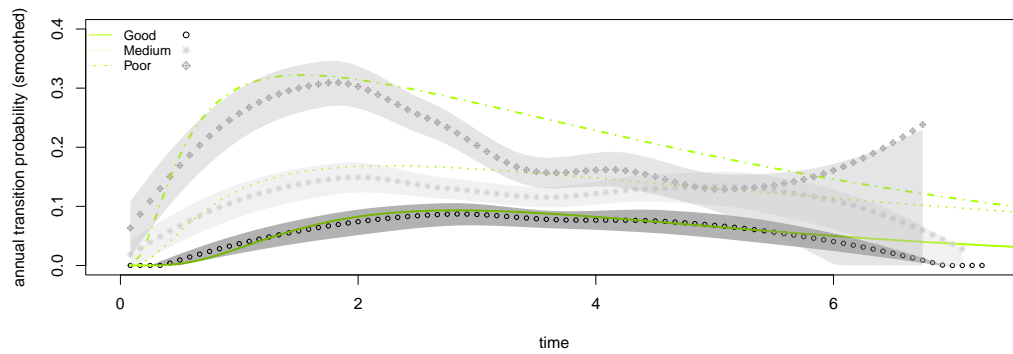
A: Kaplan-Meier (Mixture cure Log-normal)



B: Diagnostic plot (Mixture cure Log-normal)

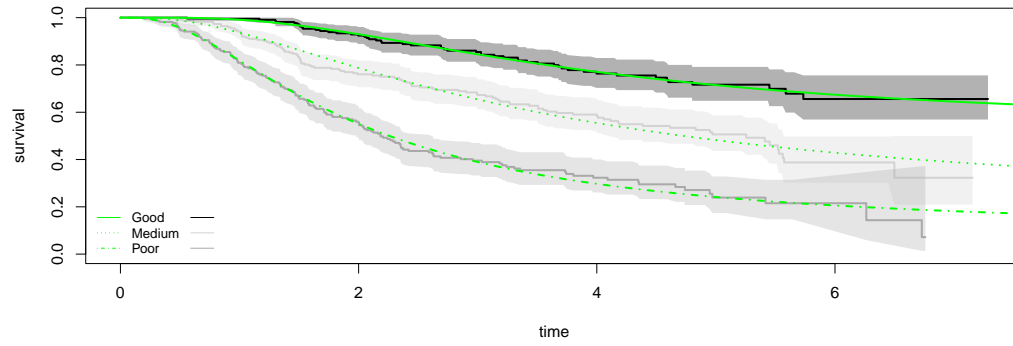


C: Annual transition probability (Mixture cure Log-normal)

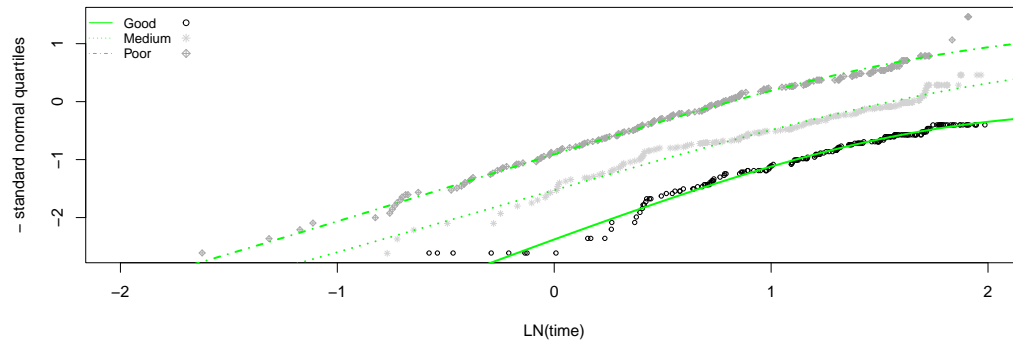


## Non-mixture cure Log-normal

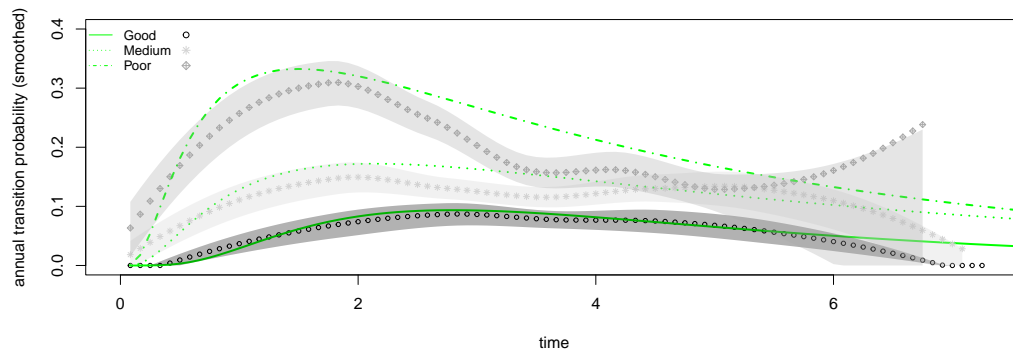
A: Kaplan-Meier (Non-mixture cure Log-normal)



B: Diagnostic plot (Non-mixture cure Log-normal)

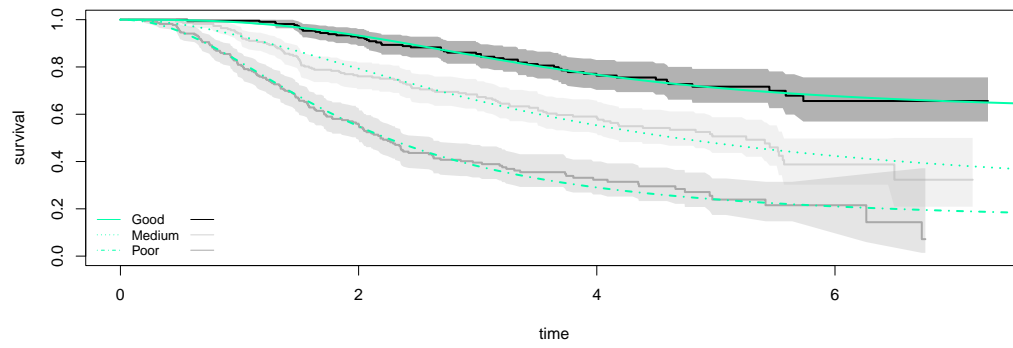


C: Annual transition probability (Non-mixture cure Log-normal)

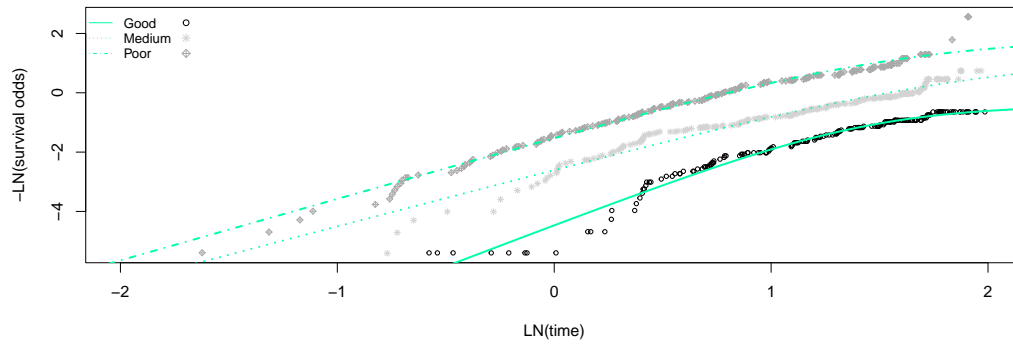


## Mixture cure Log-logistic

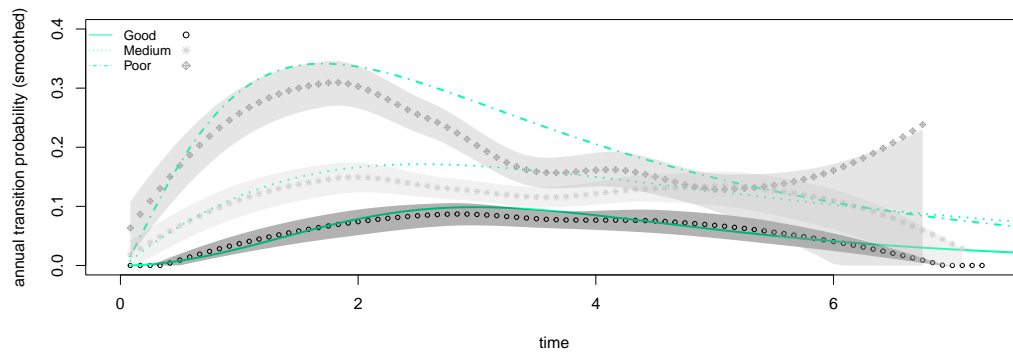
A: Kaplan-Meier (Mixture cure Log-logistic)



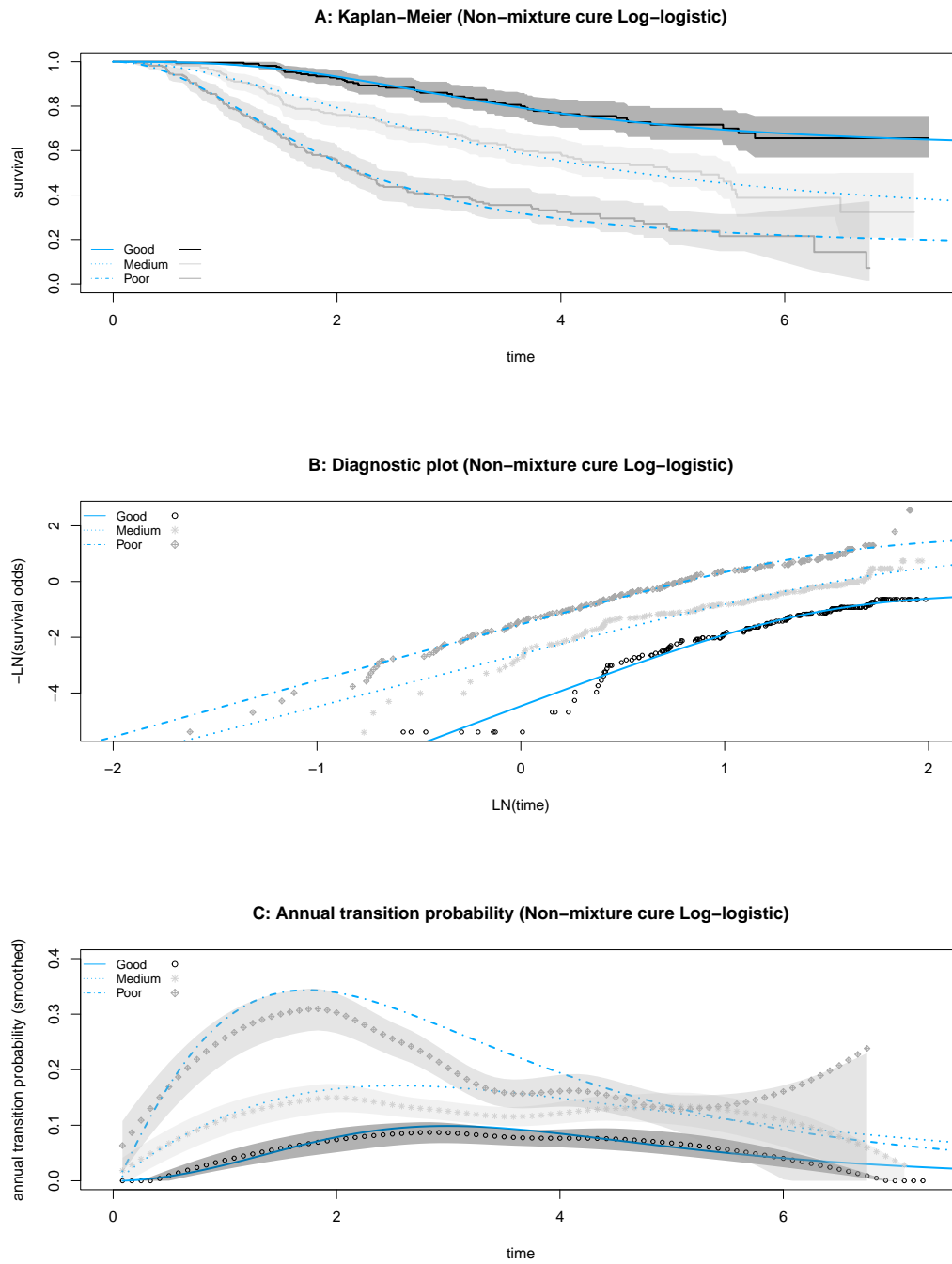
B: Diagnostic plot (Mixture cure Log-logistic)



C: Annual transition probability (Mixture cure Log-logistic)



## Non-mixture cure Log-logistic

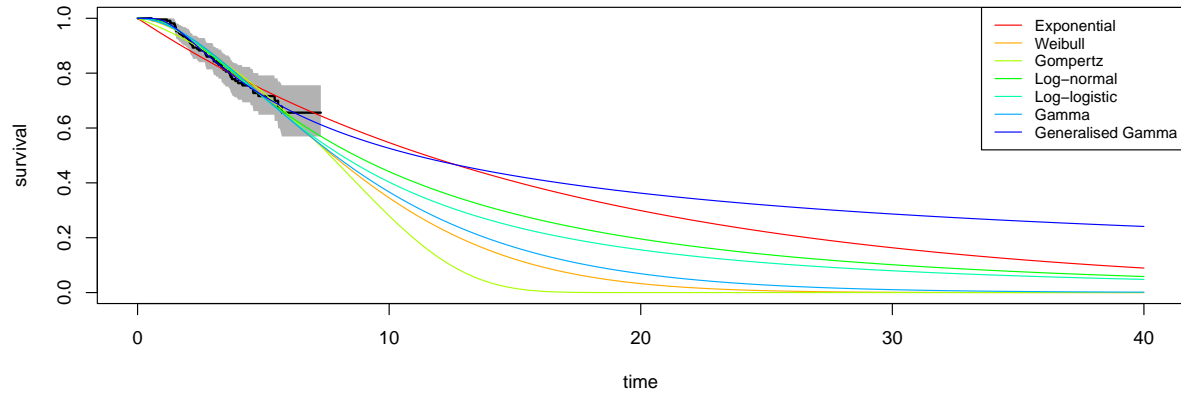




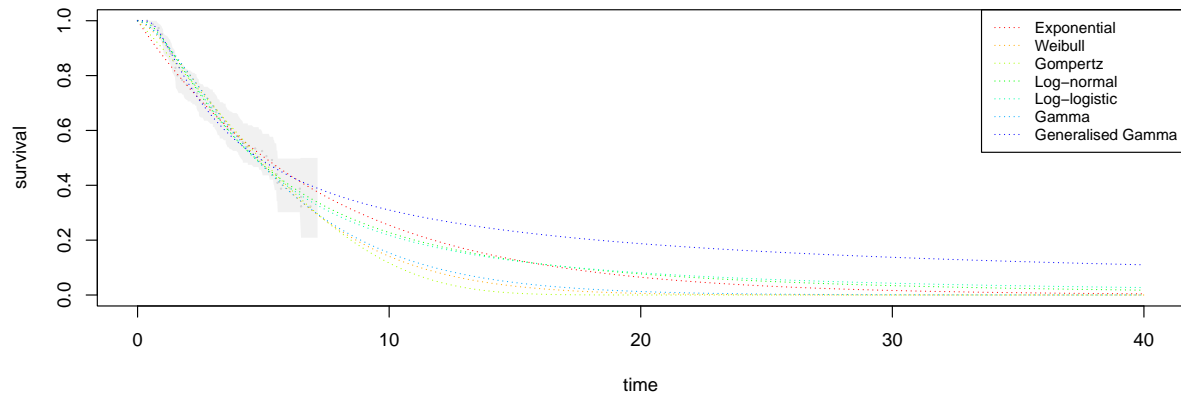
## 5 Extrapolation

### 5.1 Extrapolated survival

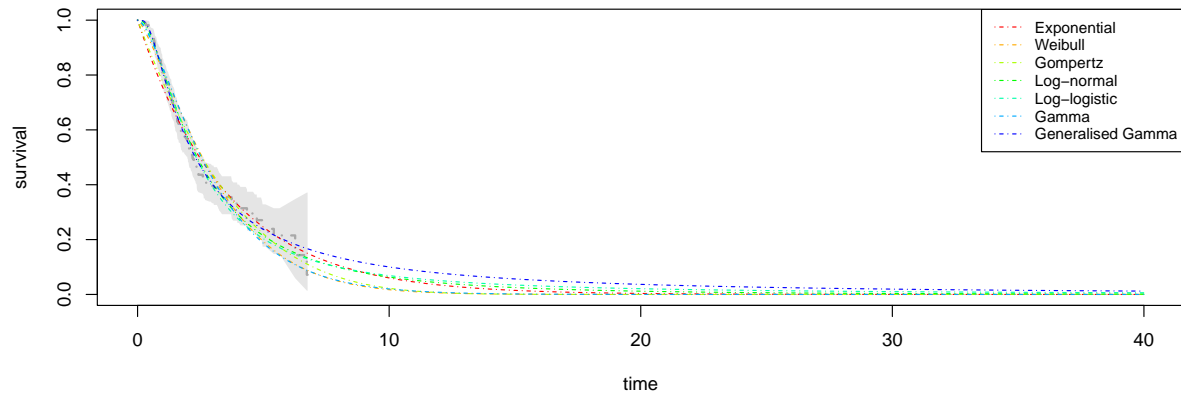
A: Kaplan–Meier (parametric curves), Group: Good



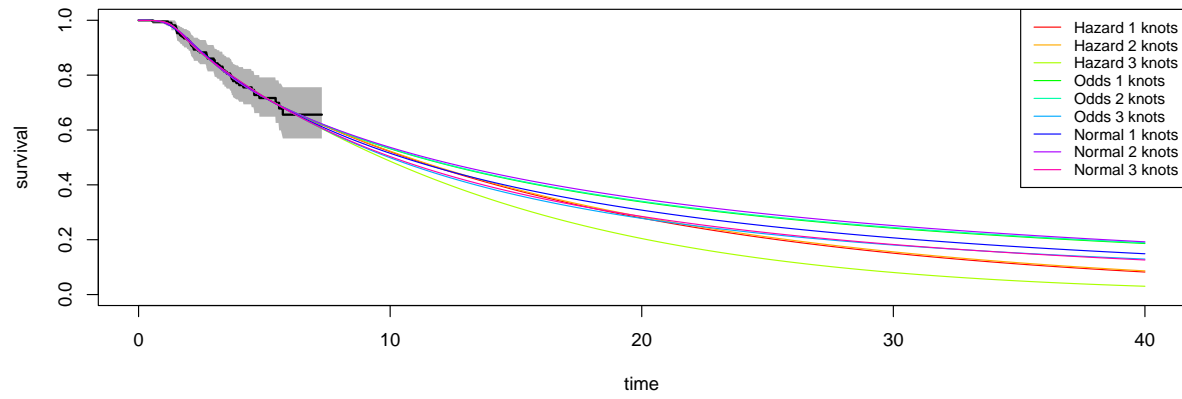
A: Kaplan–Meier (parametric curves), Group: Medium



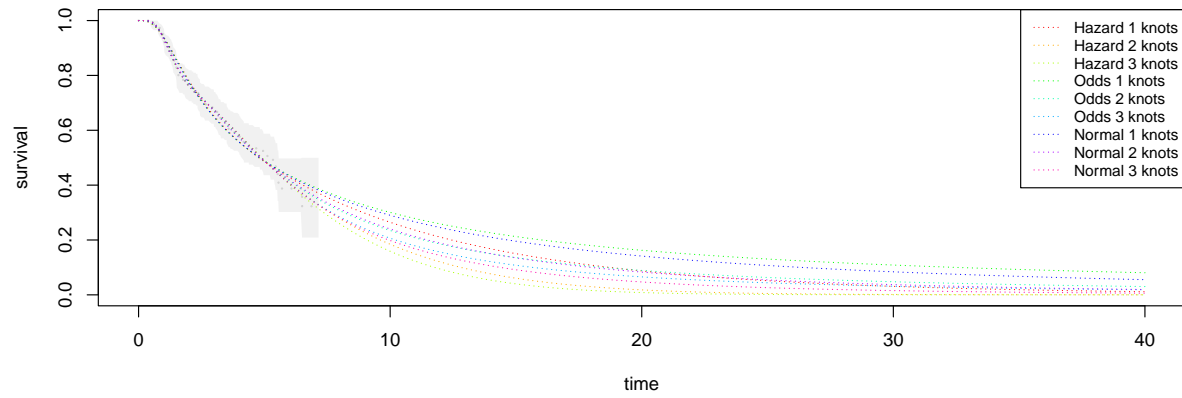
A: Kaplan–Meier (parametric curves), Group: Poor



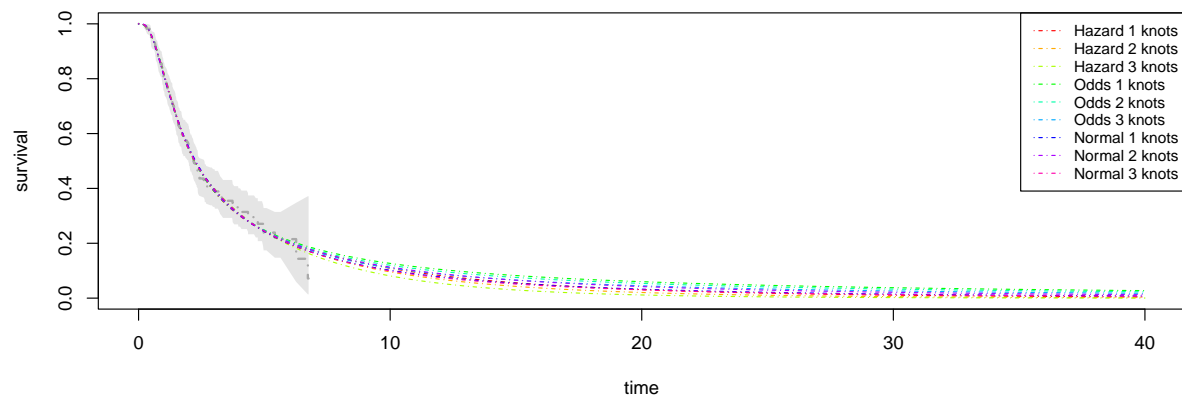
**A: Kaplan–Meier (spline curves), Group: Good**



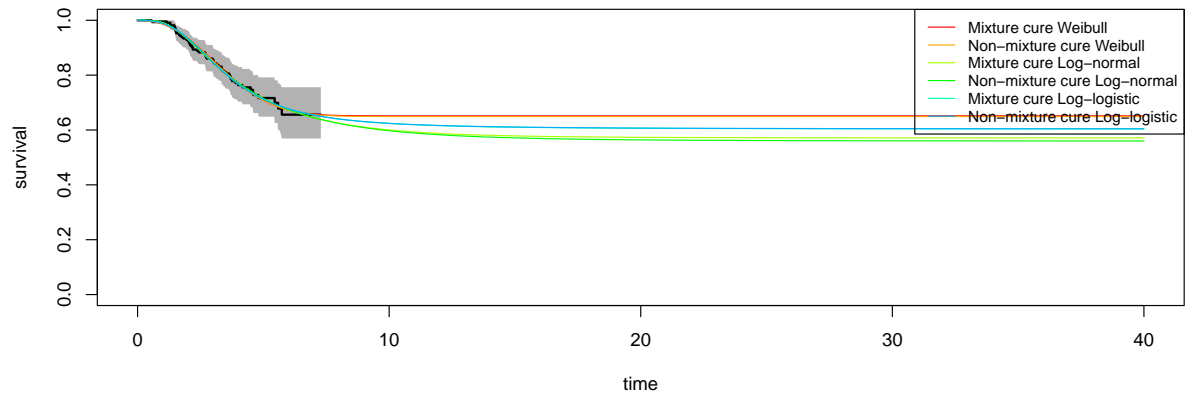
**A: Kaplan–Meier (spline curves), Group: Medium**



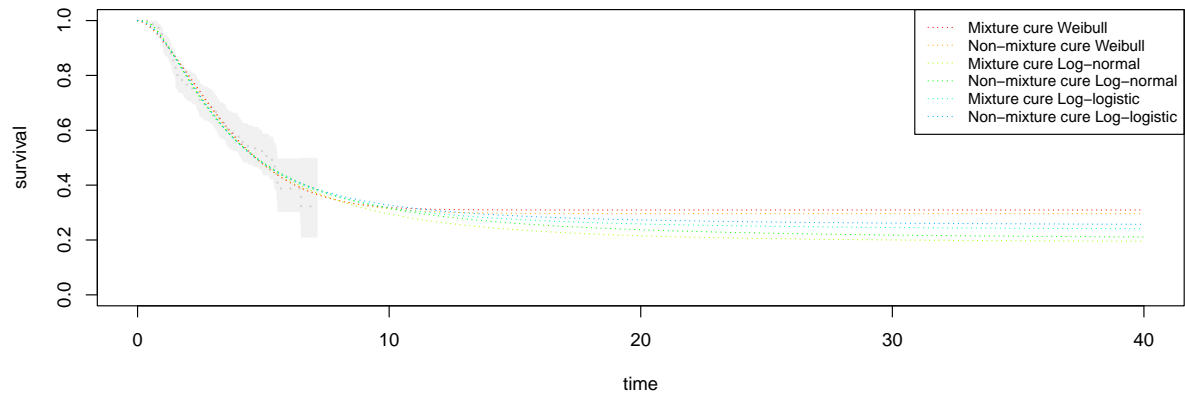
**A: Kaplan–Meier (spline curves), Group: Poor**



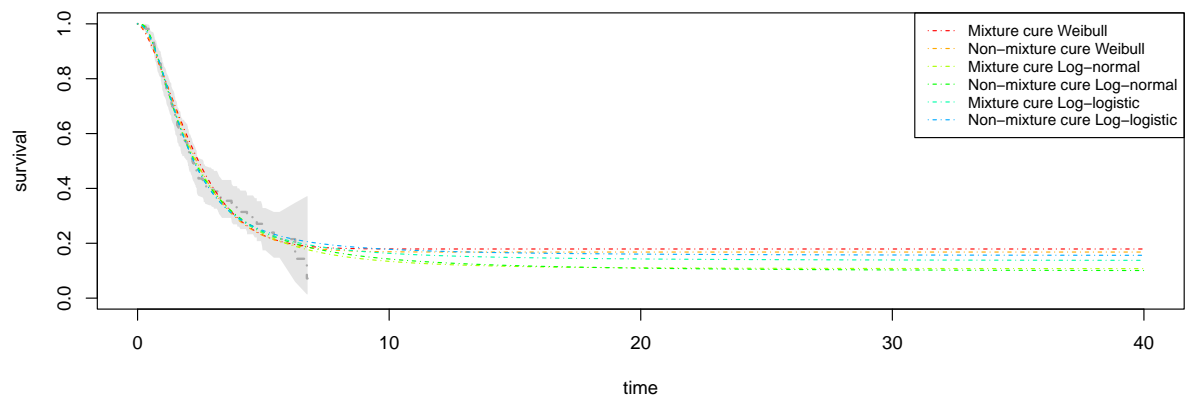
**A: Kaplan–Meier (cure curves), Group: Good**



**A: Kaplan–Meier (cure curves), Group: Medium**

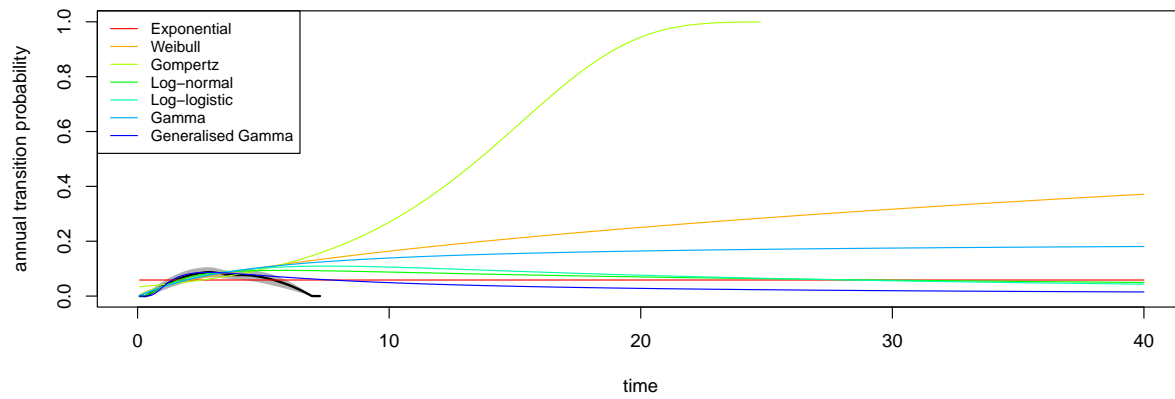


**A: Kaplan–Meier (cure curves), Group: Poor**

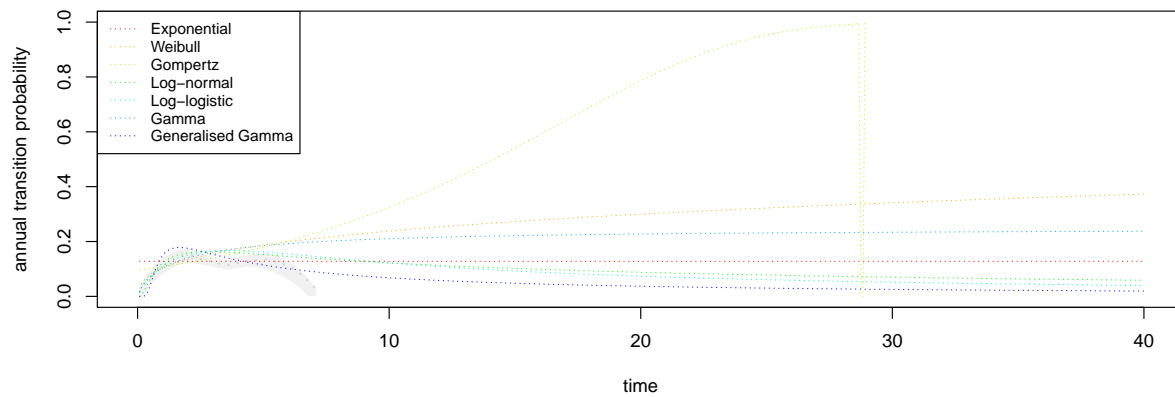


## 5.2 Extrapolated transition probabilities

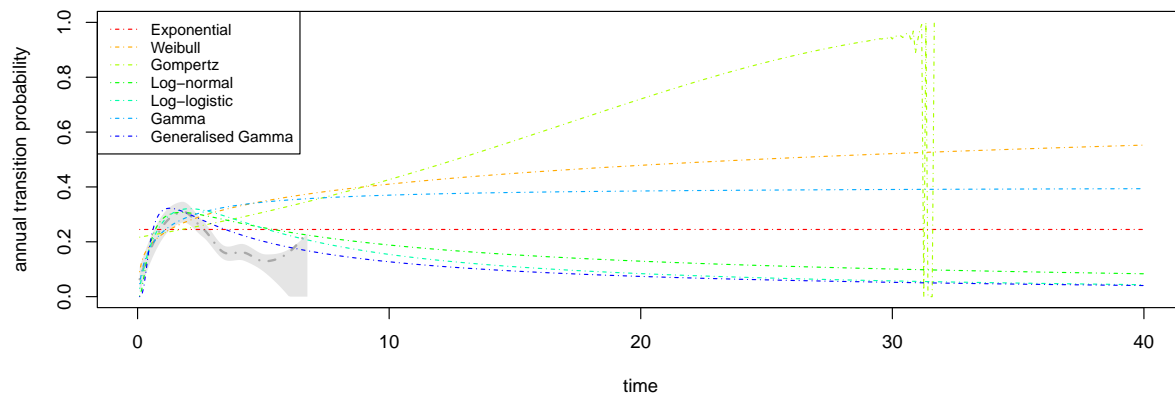
**B: Annual transition probability (parametric curves), Group: Good**



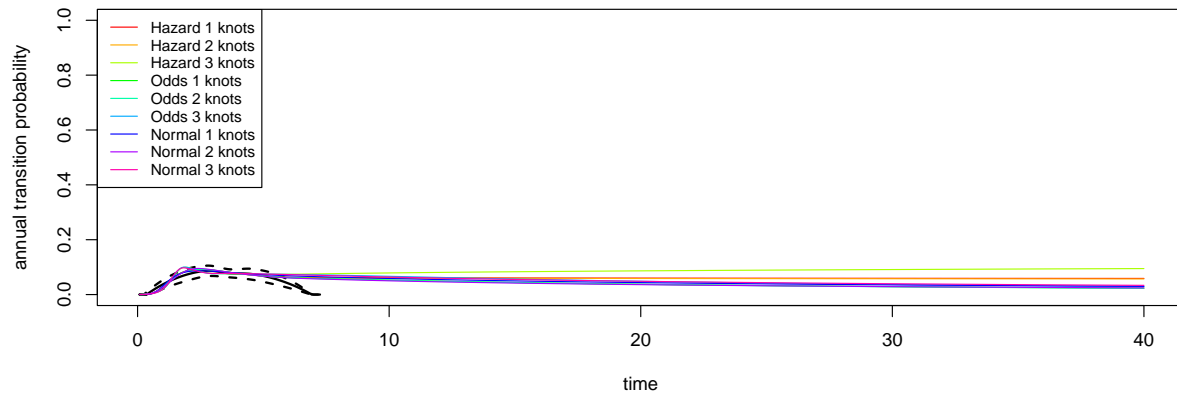
**B: Annual transition probability (parametric curves), Group: Medium**



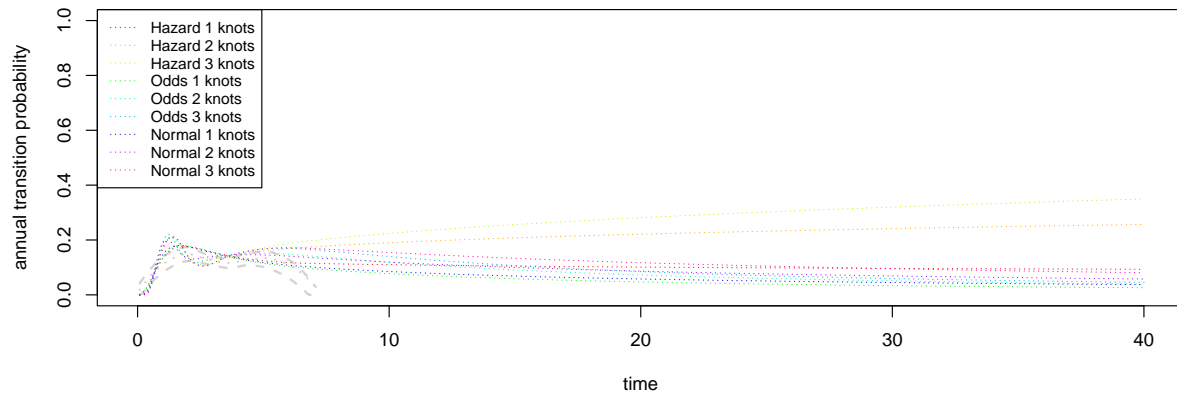
**B: Annual transition probability (parametric curves), Group: Poor**



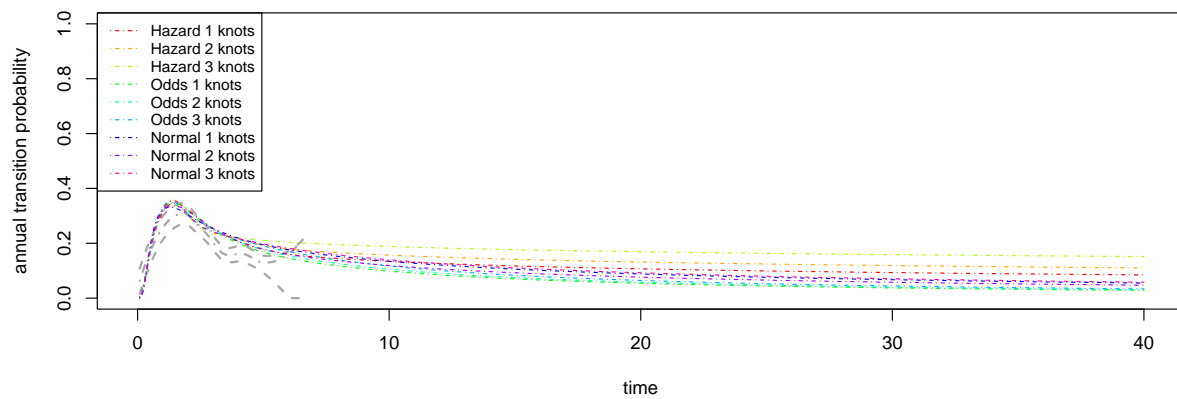
**B: Annual transition probability (spline curves), Group: Good**



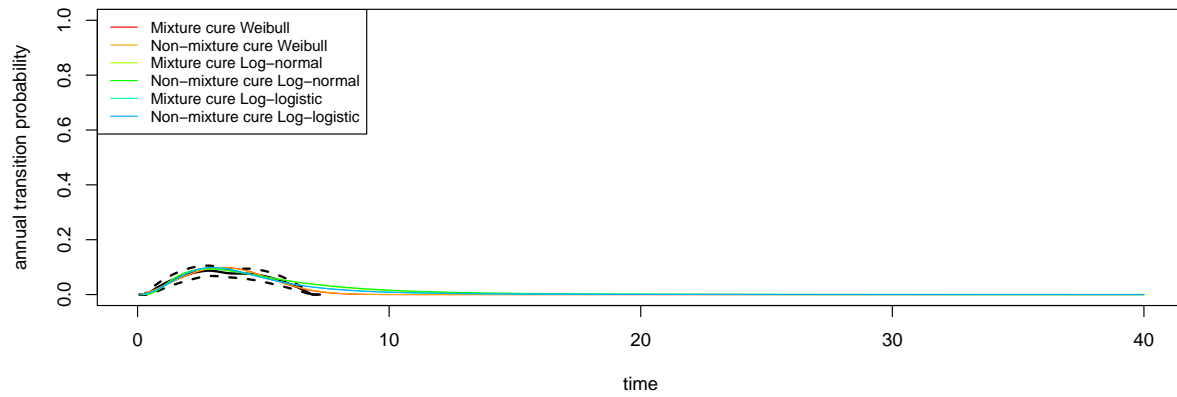
**B: Annual transition probability (spline curves), Group: Medium**



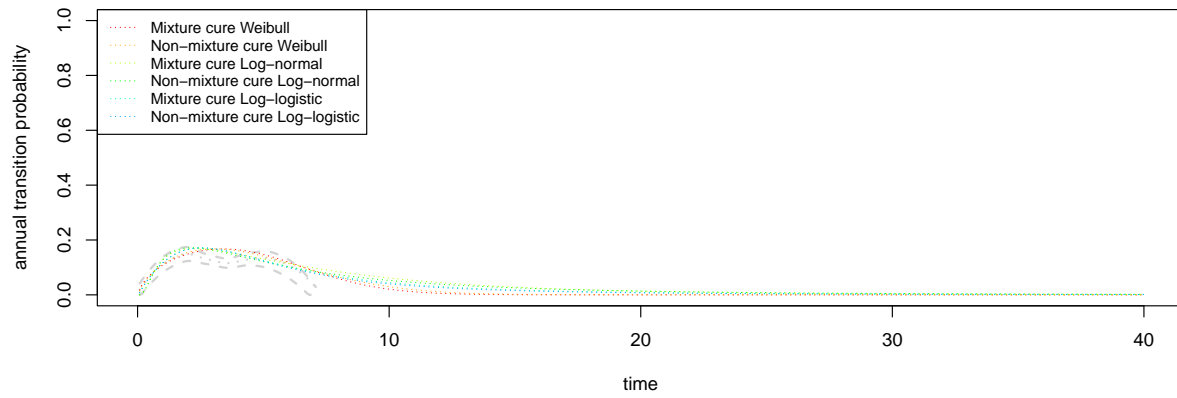
**B: Annual transition probability (spline curves), Group: Poor**



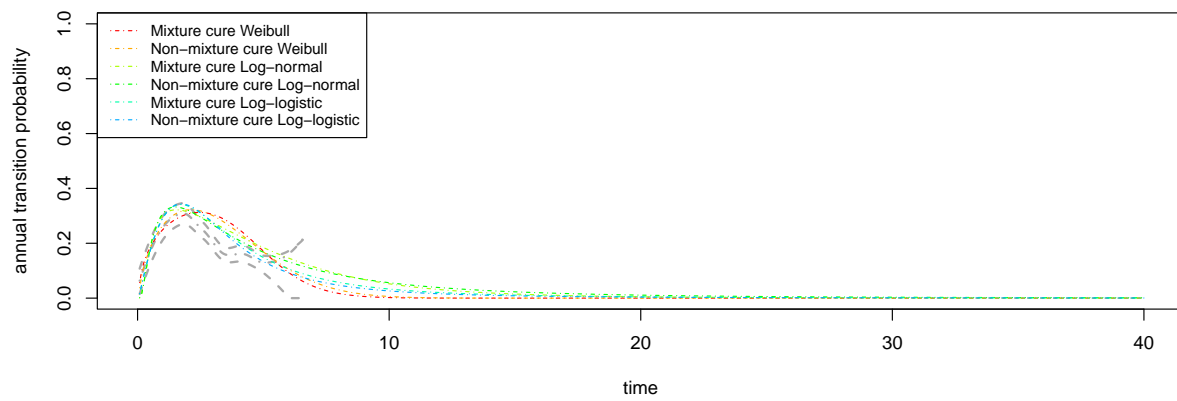
**B: Annual transition probability (cure curves), Group: Good**



**B: Annual transition probability (cure curves), Group: Medium**

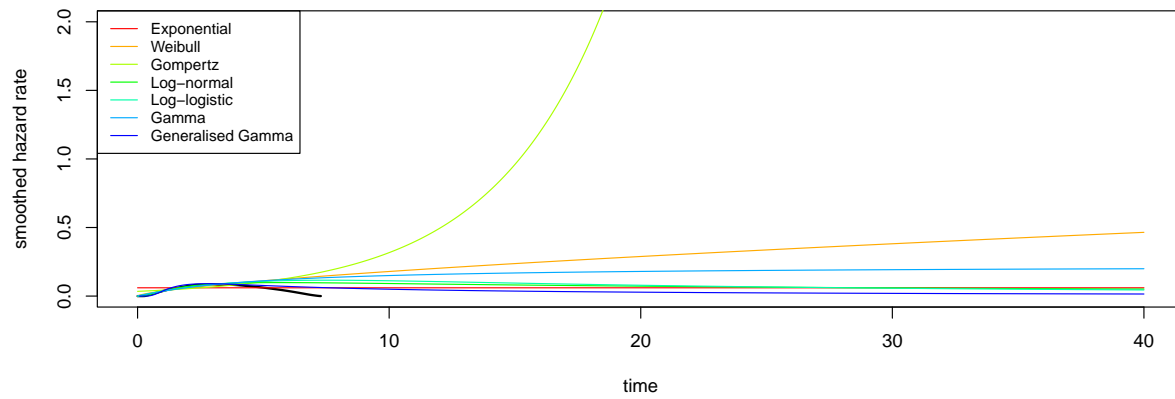


**B: Annual transition probability (cure curves), Group: Poor**

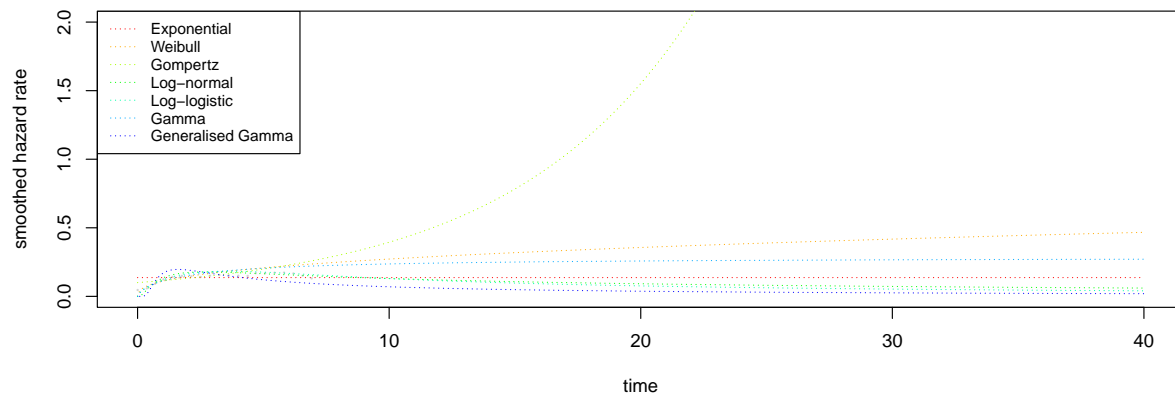


### 5.3 Extrapolated hazard function

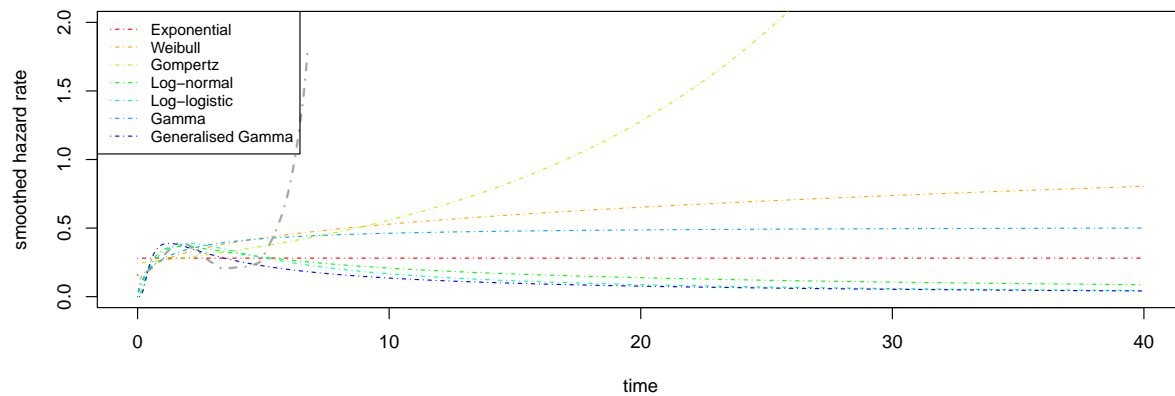
**C: Hazard function (parametric curves), Group: Good**



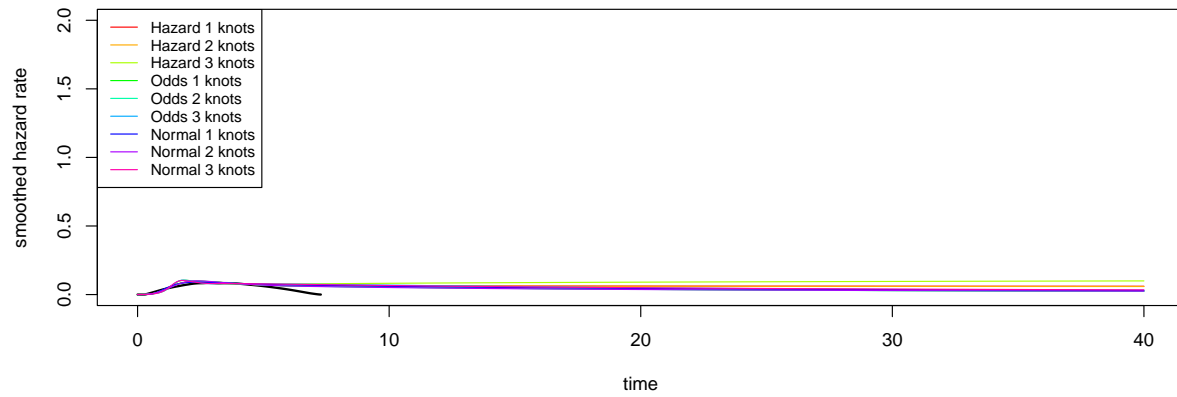
**C: Hazard function (parametric curves), Group: Medium**



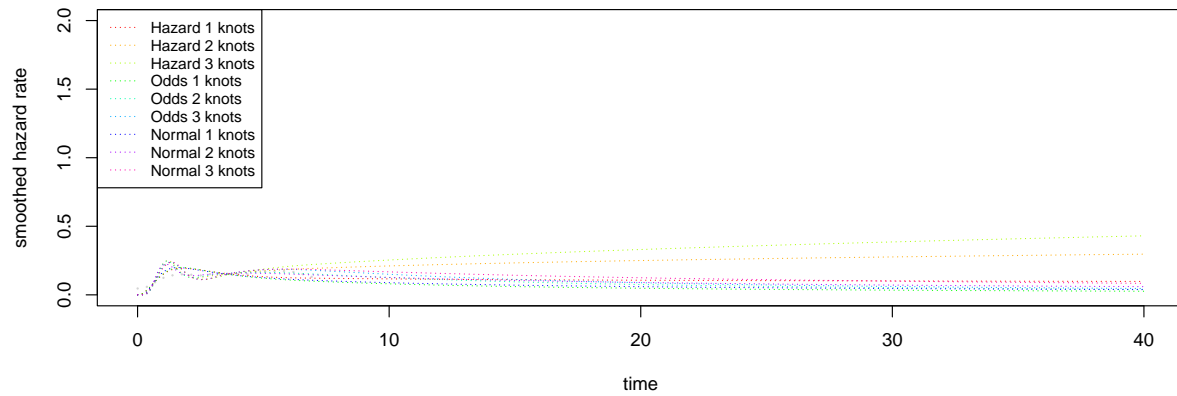
**C: Hazard function (parametric curves), Group: Poor**



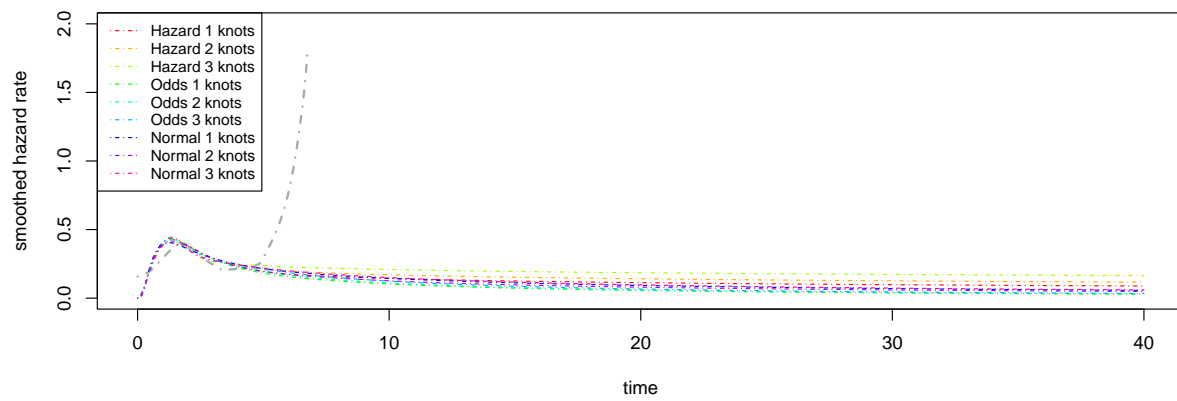
**C: Hazard function (spline curves), Group: Good**



**C: Hazard function (spline curves), Group: Medium**

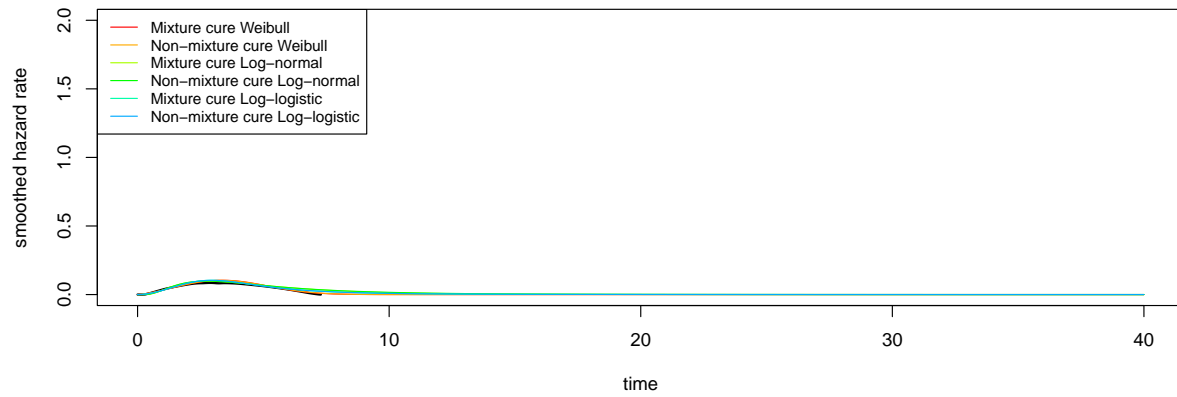


**C: Hazard function (spline curves), Group: Poor**

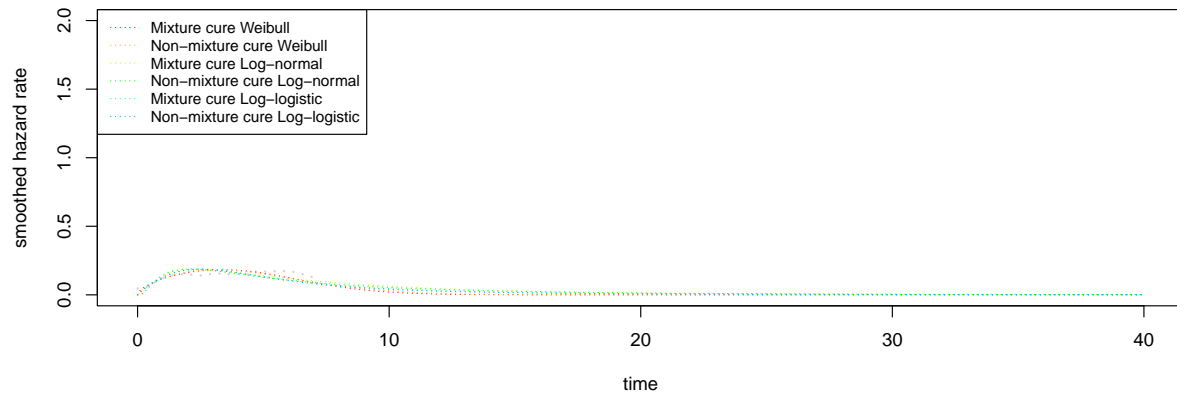




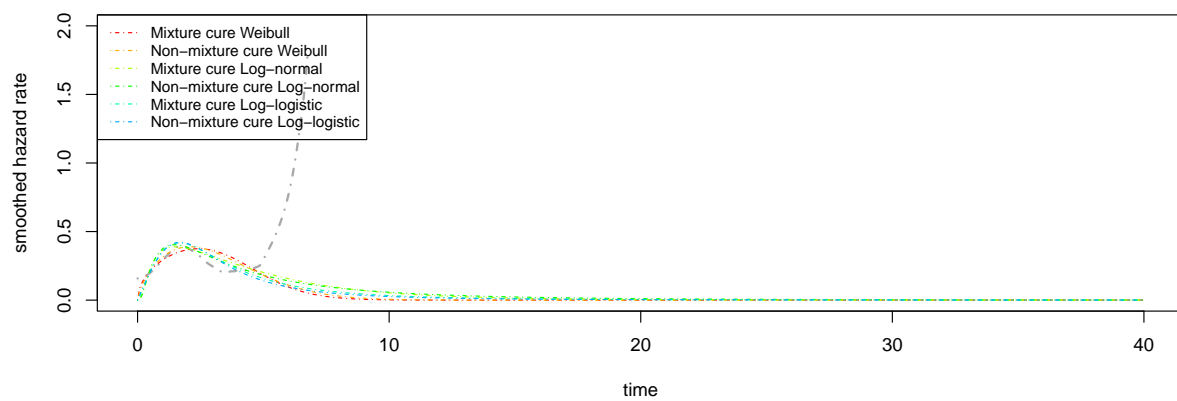
**C: Hazard function (cure curves), Group: Good**



**C: Hazard function (cure curves), Group: Medium**



**C: Hazard function (cure curves), Group: Poor**



## 5.4 Tabulated results

### Group Good

Table 6: Survival probability at different time points

	T= 0	T= 1	T= 2	T= 3	T= 4	T= 5	T= 10	T= 15	T= 20	T= 25	T= 30	T= 35
Exponential	1	0.941	0.886	0.834	0.785	0.739	0.547	0.404	0.299	0.221	0.163	0.121
Weibull	1	0.978	0.932	0.870	0.797	0.719	0.345	0.122	0.033	0.007	0.001	0.000
Gompertz	1	0.962	0.917	0.863	0.801	0.729	0.280	0.015	0.000	0.000	0.000	0.000
Log-normal	1	0.986	0.933	0.861	0.785	0.713	0.441	0.287	0.196	0.139	0.102	0.076
Log-logistic	1	0.980	0.932	0.865	0.789	0.712	0.403	0.240	0.156	0.108	0.080	0.061
Gamma	1	0.982	0.935	0.869	0.793	0.714	0.367	0.165	0.069	0.027	0.011	0.004
Generalised Gamma	1	0.991	0.928	0.849	0.778	0.717	0.526	0.425	0.362	0.319	0.286	0.261
Hazard 1 knots	1	0.992	0.927	0.843	0.774	0.719	0.521	0.381	0.279	0.205	0.151	0.111
Hazard 2 knots	1	0.992	0.928	0.843	0.774	0.719	0.523	0.384	0.284	0.210	0.156	0.116
Hazard 3 knots	1	0.994	0.922	0.843	0.779	0.721	0.486	0.318	0.204	0.129	0.080	0.050
Odds 1 knots	1	0.992	0.927	0.843	0.774	0.718	0.532	0.415	0.338	0.283	0.242	0.211
Odds 2 knots	1	0.992	0.928	0.843	0.774	0.718	0.533	0.418	0.340	0.285	0.245	0.213
Odds 3 knots	1	0.994	0.922	0.844	0.780	0.721	0.499	0.363	0.278	0.221	0.181	0.151
Normal 1 knots	1	0.992	0.926	0.847	0.778	0.719	0.515	0.391	0.308	0.250	0.207	0.174
Normal 2 knots	1	0.992	0.929	0.843	0.773	0.718	0.537	0.425	0.349	0.293	0.251	0.219
Normal 3 knots	1	0.994	0.921	0.845	0.780	0.721	0.503	0.371	0.285	0.225	0.182	0.151
Mixture cure Weibull	1	0.986	0.934	0.853	0.770	0.708	0.652	0.652	0.652	0.652	0.652	0.652
Non-mixture cure Weibull	1	0.987	0.934	0.852	0.770	0.708	0.649	0.649	0.649	0.649	0.649	0.649
Mixture cure Log-normal	1	0.991	0.930	0.845	0.771	0.715	0.600	0.578	0.573	0.572	0.571	0.571
Non-mixture cure Log-normal	1	0.991	0.930	0.845	0.771	0.715	0.597	0.571	0.564	0.561	0.561	0.560
Mixture cure Log-logistic	1	0.989	0.933	0.846	0.767	0.712	0.624	0.610	0.606	0.605	0.604	0.604
Non-mixture cure Log-logistic	1	0.989	0.933	0.846	0.767	0.712	0.624	0.611	0.607	0.606	0.605	0.605

Table 7: Summary statistics of annual transition probabilities

	Mean	Std.Dev	Min	Q1	Median	Q3	Max	IQR
Exponential	0.059	0.000	0.059	0.059	0.059	0.059	0.059	0.000
Weibull	0.235	0.096	0.004	0.164	0.251	0.317	0.371	0.153
Gompertz	0.485	0.361	0.034	0.128	0.415	0.878	1.000	0.750
Log-normal	0.068	0.017	0.000	0.056	0.067	0.082	0.094	0.025
Log-logistic	0.073	0.023	0.002	0.053	0.070	0.094	0.109	0.040
Gamma	0.149	0.038	0.001	0.139	0.164	0.175	0.181	0.036
Generalised Gamma	0.035	0.021	0.000	0.019	0.027	0.045	0.086	0.026
Hazard 1 knots	0.061	0.011	0.000	0.059	0.060	0.061	0.092	0.002
Hazard 2 knots	0.059	0.011	0.000	0.058	0.058	0.060	0.092	0.002
Hazard 3 knots	0.084	0.015	0.000	0.080	0.087	0.091	0.100	0.011
Odds 1 knots	0.041	0.017	0.000	0.028	0.036	0.050	0.092	0.022
Odds 2 knots	0.041	0.017	0.000	0.028	0.036	0.050	0.092	0.022
Odds 3 knots	0.050	0.018	0.000	0.036	0.047	0.064	0.100	0.028
Normal 1 knots	0.046	0.016	0.000	0.035	0.042	0.056	0.087	0.021
Normal 2 knots	0.040	0.017	0.000	0.028	0.035	0.048	0.095	0.019
Normal 3 knots	0.050	0.016	0.001	0.039	0.047	0.061	0.098	0.023
Mixture cure Weibull	0.010	0.025	0.000	0.000	0.000	0.000	0.099	0.000
Non-mixture cure Weibull	0.010	0.025	0.000	0.000	0.000	0.000	0.099	0.000
Mixture cure Log-normal	0.014	0.025	0.000	0.000	0.001	0.012	0.093	0.011
Non-mixture cure Log-normal	0.014	0.025	0.000	0.000	0.001	0.013	0.093	0.013
Mixture cure Log-logistic	0.012	0.025	0.000	0.000	0.001	0.007	0.099	0.007
Non-mixture cure Log-logistic	0.012	0.025	0.000	0.000	0.001	0.007	0.099	0.007

## Group Medium

Table 8: Survival probability at different time points

	T= 0	T= 1	T= 2	T= 3	T= 4	T= 5	T= 10	T= 15	T= 20	T= 25	T= 30	T= 35
Exponential	1	0.872	0.761	0.663	0.578	0.505	0.255	0.128	0.065	0.033	0.016	0.008
Weibull	1	0.923	0.811	0.693	0.578	0.474	0.141	0.032	0.006	0.001	0.000	0.000
Gompertz	1	0.898	0.794	0.689	0.586	0.486	0.117	0.007	0.000	0.000	0.000	0.000
Log-normal	1	0.935	0.797	0.668	0.560	0.473	0.228	0.126	0.077	0.050	0.034	0.024
Log-logistic	1	0.927	0.801	0.673	0.561	0.468	0.218	0.124	0.081	0.057	0.043	0.034
Gamma	1	0.930	0.813	0.689	0.572	0.469	0.154	0.045	0.013	0.003	0.001	0.000
Generalised Gamma	1	0.937	0.774	0.648	0.556	0.488	0.310	0.232	0.187	0.158	0.138	0.122
Hazard 1 knots	1	0.939	0.782	0.652	0.558	0.486	0.265	0.150	0.087	0.052	0.031	0.019
Hazard 2 knots	1	0.935	0.766	0.673	0.579	0.490	0.184	0.061	0.018	0.005	0.001	0.000
Hazard 3 knots	1	0.936	0.761	0.674	0.585	0.491	0.159	0.040	0.008	0.001	0.000	0.000
Odds 1 knots	1	0.939	0.778	0.648	0.556	0.489	0.301	0.213	0.162	0.131	0.109	0.093
Odds 2 knots	1	0.935	0.769	0.673	0.576	0.489	0.235	0.136	0.089	0.063	0.048	0.037
Odds 3 knots	1	0.937	0.761	0.675	0.583	0.489	0.206	0.108	0.065	0.044	0.032	0.024
Normal 1 knots	1	0.938	0.775	0.648	0.557	0.488	0.290	0.195	0.141	0.107	0.084	0.067
Normal 2 knots	1	0.930	0.773	0.669	0.572	0.489	0.240	0.135	0.083	0.054	0.037	0.027
Normal 3 knots	1	0.937	0.761	0.675	0.583	0.489	0.198	0.091	0.047	0.026	0.015	0.010
Mixture cure Weibull	1	0.928	0.804	0.676	0.563	0.475	0.319	0.310	0.309	0.309	0.309	0.309
Non-mixture cure Weibull	1	0.929	0.801	0.670	0.559	0.475	0.314	0.297	0.296	0.296	0.296	0.296
Mixture cure Log-normal	1	0.936	0.790	0.658	0.556	0.479	0.295	0.238	0.215	0.205	0.200	0.197
Non-mixture cure Log-normal	1	0.937	0.787	0.654	0.555	0.482	0.315	0.261	0.237	0.225	0.218	0.214
Mixture cure Log-logistic	1	0.931	0.793	0.658	0.553	0.477	0.318	0.275	0.258	0.250	0.246	0.243
Non-mixture cure Log-logistic	1	0.931	0.793	0.659	0.554	0.479	0.327	0.288	0.273	0.266	0.262	0.259

Table 9: Summary statistics of annual transition probabilities

	Mean	Std.Dev	Min	Q1	Median	Q3	Max	IQR
Exponential	0.128	0.000	0.128	0.128	0.128	0.128	0.128	0.000
Weibull	0.282	0.073	0.030	0.238	0.300	0.341	0.373	0.103
Gompertz	0.535	0.313	0.000	0.233	0.509	0.851	1.000	0.619
Log-normal	0.095	0.032	0.000	0.069	0.086	0.117	0.163	0.048
Log-logistic	0.085	0.040	0.015	0.051	0.072	0.115	0.167	0.063
Gamma	0.214	0.034	0.016	0.211	0.227	0.234	0.237	0.023
Generalised Gamma	0.053	0.040	0.000	0.025	0.036	0.064	0.178	0.039
Hazard 1 knots	0.106	0.020	0.001	0.096	0.101	0.109	0.177	0.013
Hazard 2 knots	0.211	0.042	0.000	0.192	0.221	0.241	0.257	0.049
Hazard 3 knots	0.265	0.070	0.000	0.224	0.282	0.320	0.350	0.096
Odds 1 knots	0.060	0.038	0.000	0.033	0.046	0.074	0.181	0.041
Odds 2 knots	0.083	0.040	0.000	0.050	0.071	0.113	0.219	0.063
Odds 3 knots	0.094	0.042	0.000	0.058	0.082	0.126	0.212	0.067
Normal 1 knots	0.069	0.035	0.000	0.045	0.057	0.082	0.180	0.038
Normal 2 knots	0.093	0.032	0.000	0.068	0.085	0.116	0.201	0.048
Normal 3 knots	0.119	0.032	0.000	0.094	0.113	0.143	0.212	0.049
Mixture cure Weibull	0.027	0.052	0.000	0.000	0.000	0.019	0.167	0.019
Non-mixture cure Weibull	0.028	0.052	0.000	0.000	0.000	0.028	0.168	0.028
Mixture cure Log-normal	0.039	0.050	0.000	0.004	0.013	0.057	0.168	0.053
Non-mixture cure Log-normal	0.037	0.048	0.000	0.005	0.013	0.049	0.172	0.044
Mixture cure Log-logistic	0.034	0.049	0.001	0.003	0.009	0.042	0.171	0.039
Non-mixture cure Log-logistic	0.032	0.048	0.001	0.002	0.007	0.037	0.171	0.035

## Group Poor

Table 10: Survival probability at different time points

	T= 0	T= 1	T= 2	T= 3	T= 4	T= 5	T= 10	T= 15	T= 20	T= 25	T= 30	T= 35
Exponential	1	0.755	0.570	0.430	0.325	0.245	0.060	0.015	0.004	0.001	0.000	0.000
Weibull	1	0.817	0.608	0.430	0.292	0.193	0.017	0.001	0.000	0.000	0.000	0.000
Gompertz	1	0.776	0.588	0.436	0.315	0.221	0.022	0.001	0.000	0.000	0.000	0.000
Log-normal	1	0.820	0.572	0.401	0.289	0.214	0.063	0.025	0.012	0.006	0.004	0.002
Log-logistic	1	0.819	0.568	0.389	0.275	0.203	0.069	0.034	0.021	0.014	0.010	0.008
Gamma	1	0.829	0.605	0.420	0.283	0.187	0.020	0.002	0.000	0.000	0.000	0.000
Generalised Gamma	1	0.810	0.555	0.399	0.302	0.237	0.100	0.057	0.037	0.026	0.019	0.015
Hazard 1 knots	1	0.822	0.545	0.390	0.301	0.244	0.109	0.056	0.031	0.018	0.011	0.007
Hazard 2 knots	1	0.817	0.545	0.396	0.305	0.243	0.096	0.043	0.021	0.010	0.005	0.003
Hazard 3 knots	1	0.819	0.539	0.400	0.310	0.243	0.081	0.030	0.012	0.005	0.002	0.001
Odds 1 knots	1	0.820	0.542	0.390	0.303	0.248	0.127	0.082	0.060	0.047	0.038	0.032
Odds 2 knots	1	0.817	0.544	0.393	0.304	0.246	0.120	0.075	0.054	0.041	0.033	0.027
Odds 3 knots	1	0.818	0.542	0.398	0.308	0.246	0.110	0.066	0.045	0.033	0.026	0.021
Normal 1 knots	1	0.811	0.549	0.398	0.305	0.242	0.102	0.054	0.033	0.021	0.015	0.011
Normal 2 knots	1	0.815	0.546	0.392	0.303	0.245	0.113	0.065	0.042	0.029	0.021	0.016
Normal 3 knots	1	0.818	0.541	0.398	0.308	0.244	0.099	0.051	0.030	0.019	0.013	0.009
Mixture cure Weibull	1	0.819	0.585	0.403	0.290	0.229	0.179	0.179	0.179	0.179	0.179	0.179
Non-mixture cure Weibull	1	0.820	0.570	0.391	0.285	0.228	0.169	0.168	0.168	0.168	0.168	0.168
Mixture cure Log-normal	1	0.818	0.558	0.394	0.295	0.235	0.134	0.116	0.111	0.109	0.108	0.108
Non-mixture cure Log-normal	1	0.818	0.551	0.390	0.297	0.241	0.143	0.118	0.109	0.105	0.103	0.101
Mixture cure Log-logistic	1	0.822	0.549	0.381	0.290	0.240	0.163	0.148	0.143	0.140	0.139	0.138
Non-mixture cure Log-logistic	1	0.823	0.549	0.380	0.293	0.246	0.178	0.165	0.161	0.158	0.157	0.157

Table 11: Summary statistics of annual transition probabilities

	Mean	Std.Dev	Min	Q1	Median	Q3	Max	IQR
Exponential	0.245	0.000	0.245	0.245	0.245	0.245	0.245	0.000
Weibull	0.454	0.087	0.091	0.411	0.479	0.522	0.553	0.111
Gompertz	0.588	0.244	0.000	0.367	0.586	0.816	1.000	0.449
Log-normal	0.150	0.063	0.002	0.100	0.128	0.184	0.307	0.084
Log-logistic	0.116	0.078	0.031	0.057	0.083	0.149	0.321	0.092
Gamma	0.370	0.042	0.047	0.370	0.385	0.391	0.394	0.020
Generalised Gamma	0.101	0.071	0.000	0.052	0.073	0.124	0.322	0.072
Hazard 1 knots	0.125	0.056	0.005	0.093	0.106	0.132	0.346	0.039
Hazard 2 knots	0.147	0.049	0.003	0.118	0.131	0.155	0.347	0.037
Hazard 3 knots	0.179	0.039	0.003	0.158	0.168	0.187	0.359	0.028
Odds 1 knots	0.083	0.072	0.004	0.037	0.053	0.095	0.349	0.058
Odds 2 knots	0.087	0.072	0.003	0.040	0.057	0.102	0.347	0.063
Odds 3 knots	0.093	0.072	0.003	0.044	0.064	0.113	0.354	0.069
Normal 1 knots	0.111	0.065	0.000	0.067	0.087	0.131	0.333	0.065
Normal 2 knots	0.101	0.067	0.000	0.058	0.076	0.116	0.336	0.059
Normal 3 knots	0.115	0.064	0.001	0.070	0.091	0.136	0.356	0.066
Mixture cure Weibull	0.037	0.087	0.000	0.000	0.000	0.002	0.312	0.002
Non-mixture cure Weibull	0.039	0.088	0.000	0.000	0.000	0.006	0.322	0.006
Mixture cure Log-normal	0.050	0.087	0.000	0.001	0.005	0.049	0.322	0.048
Non-mixture cure Log-normal	0.051	0.084	0.001	0.003	0.011	0.054	0.332	0.050
Mixture cure Log-logistic	0.044	0.085	0.001	0.001	0.005	0.032	0.341	0.031
Non-mixture cure Log-logistic	0.041	0.084	0.000	0.001	0.004	0.025	0.343	0.024

## 6. PERSUADE object information

```
## List of 7
## $ name          : chr "BC_OS"
## $ input          :List of 11
## ..$ years       : num [1:686] 3.68 4.32 4.82 3.16 2.65 ...
## ..$ status      : num [1:686] 0 0 0 0 0 0 0 1 0 0 ...
## ..$ group       : Factor w/ 3 levels "Good","Medium",...: 1 1 1 1 1 1 1 1 1 1 ...
## ..$ strata      : logi TRUE
## ..$ spline_mod  : logi TRUE
## ..$ cure_mod    : logi TRUE
## ..$ cure_link   : chr "logistic"
## ..$ time_unit   : num 0.0833
## ..$ time_horizon : num 40
## ..$ time_pred_surv_table: num [1:12] 0 12 24 36 48 60 120 180 240 300 ...
## ..$ time_pred   : num [1:481] 0 0.0833 0.1667 0.25 0.3333 ...
## $ surv_obs      :List of 6
## ..$ km          :List of 24
## .. ..- attr(*, "class")= chr [1:2] "npsurv" "survfit"
## ..$ km_names: int [1:646] 1 1 1 1 1 1 1 1 1 1 ...
## ..$ cum_haz : 'data.frame': 256 obs. of  9 variables:
## ..$ haz      :List of 3
## ..$ tp       :List of 4
## ..$ cox_reg  :List of 21
## .. ..- attr(*, "class")= chr "coxph"
## $ surv_model   :List of 6
## ..$ param_models :List of 7
## ..$ param_ic     : 'data.frame': 7 obs. of  3 variables:
## ..$ spline_models :List of 9
## ..$ spline_ic    : 'data.frame': 9 obs. of  3 variables:
## ..$ cure_models  :List of 6
## ..$ cure_ic      : 'data.frame': 6 obs. of  5 variables:
## $ surv_pred    :List of 3
## ..$ model:List of 9
## ..$ gr      :List of 3
## ..$ tp_gr   :List of 3
## $ surv_model_excel: 'data.frame': 24 obs. of 150 variables:
## ..$ rate      : chr [1:24] "expo" "rate" "-2.80703426596042" "-3.08148411925748" ...
## ..$ groupMedium : chr [1:24] "expo" "groupMedium" "0.818021897705403" "0.482435189564671" ...
## ..$ groupPoor   : chr [1:24] "expo" "groupPoor" "1.53752320421143" "1.21843772753164" ...
## ..$ shape       : chr [1:24] "weib" "shape" "0.522842941227738" "0.285099322690929" ...
## ..$ scale       : chr [1:24] "weib" "scale" "2.26626166011077" "2.02632949004802" ...
## ..$ groupMedium : chr [1:24] "weib" "groupMedium" "-0.447145140906987" "-0.732231654626038" ...
## ..$ groupPoor   : chr [1:24] "weib" "groupPoor" "-1.0384947611494" "-1.30926136509352" ...
## ..$ shape(groupMedium) : chr [1:24] "weib" "shape(groupMedium)" "-0.193739409990849" "-0.484038444" ...
## ..$ shape(groupPoor)  : chr [1:24] "weib" "shape(groupPoor)" "-0.258211641329158" "-0.53041017496" ...
## ..$ shape           : chr [1:24] "gom" "shape" "0.221650478494696" "0.0571597766378877" ...
## ..$ rate            : chr [1:24] "gom" "rate" "-3.36564422440594" "-3.90407851702435" ...
## ..$ groupMedium     : chr [1:24] "gom" "groupMedium" "1.06685398302701" "0.423029806773669" ...
## ..$ groupPoor       : chr [1:24] "gom" "groupPoor" "1.9540432716812" "1.35352047967122" ...
## ..$ shape(groupMedium) : chr [1:24] "gom" "shape(groupMedium)" "-0.0847240786449626" "-0.289307606" ...
## ..$ shape(groupPoor)  : chr [1:24] "gom" "shape(groupPoor)" "-0.138758583249691" "-0.340847146615" ...
## ..$ meanlog          : chr [1:24] "lnorm" "meanlog" "2.15766237442877" "1.89389741374292" ...
## ..$ sdlog            : chr [1:24] "lnorm" "sdlog" "-0.0231614685999281" "-0.240079127188789" ...
```

```

## ..$ groupMedium      : chr [1:24] "lnorm" "groupMedium" "-0.616405276964592" "-0.931509869641886"
## ..$ groupPoor        : chr [1:24] "lnorm" "groupPoor" "-1.29461457120387" "-1.59148086932483" ..
## ..$ sdlog(groupMedium) : chr [1:24] "lnorm" "sdlog(groupMedium)" "0.0430707930704261" "-0.22024713"
## ..$ sdlog(groupPoor)  : chr [1:24] "lnorm" "sdlog(groupPoor)" "-0.035860060637656" "-0.2847543784"
## ..$ shape            : chr [1:24] "llog" "shape" "0.626215586614288" "0.391807869444117" ...
## ..$ scale            : chr [1:24] "llog" "scale" "2.09213155981541" "1.85991061112256" ...
## ..$ groupMedium      : chr [1:24] "llog" "groupMedium" "-0.559250078304111" "-0.843377495291217"
## ..$ groupPoor        : chr [1:24] "llog" "groupPoor" "-1.24675818981847" "-1.51563436942317" ...
## ..$ shape(groupMedium) : chr [1:24] "llog" "shape(groupMedium)" "-0.119014027328347" "-0.404025558"
## ..$ shape(groupPoor)  : chr [1:24] "llog" "shape(groupPoor)" "-0.0445926446637765" "-0.3150356240"
## ..$ shape            : chr [1:24] "gam" "shape" "0.730152742986698" "0.405934219745528" ...
## ..$ rate             : chr [1:24] "gam" "rate" "-1.49809910454757" "-2.03166884973234" ...
## ..$ groupMedium      : chr [1:24] "gam" "groupMedium" "0.24690520822162" "-0.392738296363486" ..
## ..$ groupPoor        : chr [1:24] "gam" "groupPoor" "0.834663901724156" "0.234149853810018" ...
## ..$ shape(groupMedium) : chr [1:24] "gam" "shape(groupMedium)" "-0.22379661876854" "-0.62506526205"
## ..$ shape(groupPoor)  : chr [1:24] "gam" "shape(groupPoor)" "-0.245015909581633" "-0.628451036394"
## ..$ mu               : chr [1:24] "ggam" "mu" "1.81202668453465" "1.21730209478661" ...
## ..$ sigma            : chr [1:24] "ggam" "sigma" "0.232571933902732" "-0.016741543388701" ...
## ..$ Q               : chr [1:24] "ggam" "Q" "-1.22829849620357" "-2.75400037606476" ...
## ..$ groupMedium      : chr [1:24] "ggam" "groupMedium" "-0.703779456085614" "-1.46345284222943"
## ..$ groupPoor        : chr [1:24] "ggam" "groupPoor" "-1.15639058358082" "-1.81090501002432" ...
## ..$ sigma(groupMedium) : chr [1:24] "ggam" "sigma(groupMedium)" "-0.111742534466758" "-0.400994984"
## ..$ sigma(groupPoor)  : chr [1:24] "ggam" "sigma(groupPoor)" "-0.251806027157588" "-0.52934875428"
## ..$ Q(groupMedium)    : chr [1:24] "ggam" "Q(groupMedium)" "0.130949690012828" "-1.7041062478985"
## ..$ Q(groupPoor)      : chr [1:24] "ggam" "Q(groupPoor)" "0.706102215543455" "-0.924489391519342"
## ..$ gamma0           : chr [1:24] "spl_hazard_1" "gamma0" "-4.00166824461331" "-4.73804895372434"
## ..$ gamma1           : chr [1:24] "spl_hazard_1" "gamma1" "5.68413827144086" "2.64680689857505"
## ..$ gamma2           : chr [1:24] "spl_hazard_1" "gamma2" "0.536346985941307" "0.150091211344567"
## ..$ groupMedium      : chr [1:24] "spl_hazard_1" "groupMedium" "1.64701334654769" "0.82121480514"
## ..$ groupPoor        : chr [1:24] "spl_hazard_1" "groupPoor" "2.73852858210568" "1.9573725458295"
## ..$ gamma1(groupMedium) : chr [1:24] "spl_hazard_1" "gamma1(groupMedium)" "-2.61371799384606" "-5.8"
## ..$ gamma1(groupPoor)  : chr [1:24] "spl_hazard_1" "gamma1(groupPoor)" "-3.04969394511859" "-6.150"
## ..$ gamma2(groupMedium) : chr [1:24] "spl_hazard_1" "gamma2(groupMedium)" "-0.286595121633603" "-0."
## ..$ gamma2(groupPoor)  : chr [1:24] "spl_hazard_1" "gamma2(groupPoor)" "-0.310481705247366" "-0.70"
## ..$ gamma0           : chr [1:24] "spl_odds_1" "gamma0" "-4.0491737654773" "-4.80121937987566" .
## ..$ gamma1           : chr [1:24] "spl_odds_1" "gamma1" "5.58348971192191" "2.4370507805455" ...
## ..$ gamma2           : chr [1:24] "spl_odds_1" "gamma2" "0.503676257390164" "0.0982702028126948"
## ..$ groupMedium      : chr [1:24] "spl_odds_1" "groupMedium" "1.68509095473313" "0.8293319359502"
## ..$ groupPoor        : chr [1:24] "spl_odds_1" "groupPoor" "2.81726297700326" "1.99594335877646"
## ..$ gamma1(groupMedium) : chr [1:24] "spl_odds_1" "gamma1(groupMedium)" "-2.44366892055128" "-5.781"
## ..$ gamma1(groupPoor)  : chr [1:24] "spl_odds_1" "gamma1(groupPoor)" "-2.85991639069175" "-6.08715"
## ..$ gamma2(groupMedium) : chr [1:24] "spl_odds_1" "gamma2(groupMedium)" "-0.27699989500101" "-0.711"
## ..$ gamma2(groupPoor)  : chr [1:24] "spl_odds_1" "gamma2(groupPoor)" "-0.328459513919301" "-0.7506"
## ..$ gamma0           : chr [1:24] "spl_normal_1" "gamma0" "-2.18021330994335" "-2.50676494276407"
## ..$ gamma1           : chr [1:24] "spl_normal_1" "gamma1" "2.00305993955204" "0.754967846287642"
## ..$ gamma2           : chr [1:24] "spl_normal_1" "gamma2" "0.139244131569558" "-0.03107801496562"
## ..$ groupMedium      : chr [1:24] "spl_normal_1" "groupMedium" "0.781203417379839" "0.3858841960"
## ..$ groupPoor        : chr [1:24] "spl_normal_1" "groupPoor" "1.39918475049402" "1.0136686890126"
## ..$ gamma1(groupMedium) : chr [1:24] "spl_normal_1" "gamma1(groupMedium)" "-0.474093975078312" "-1.8"
## ..$ gamma1(groupPoor)  : chr [1:24] "spl_normal_1" "gamma1(groupPoor)" "-0.634060434239667" "-1.92"
## ..$ gamma2(groupMedium) : chr [1:24] "spl_normal_1" "gamma2(groupMedium)" "-0.0508253646904045" "-0"
## ..$ gamma2(groupPoor)  : chr [1:24] "spl_normal_1" "gamma2(groupPoor)" "-0.0772462585348352" "-0.2"
## ..$ gamma0           : chr [1:24] "spl_hazard_2" "gamma0" "-3.98129140079743" "-6.29287630646042"
## ..$ gamma1           : chr [1:24] "spl_hazard_2" "gamma1" "5.57246906818651" "-3.04982227896694"

```

```

## ..$ gamma2          : chr [1:24] "spl_hazard_2" "gamma2" "0.256338265058247" "-3.08497801538128"
## ..$ gamma3          : chr [1:24] "spl_hazard_2" "gamma3" "0.289633438971024" "-2.6933860504839"
## ..$ groupMedium     : chr [1:24] "spl_hazard_2" "groupMedium" "2.91628215953512" "0.447765119203"
## ..$ groupPoor       : chr [1:24] "spl_hazard_2" "groupPoor" "2.88242174914437" "0.52158214984163"
## ..$ gamma1(groupMedium): chr [1:24] "spl_hazard_2" "gamma1(groupMedium)" "0.783631054627367" "-8.21"
## ..$ gamma1(groupPoor) : chr [1:24] "spl_hazard_2" "gamma1(groupPoor)" "-2.64531056845819" "-11.32"
## ..$ gamma2(groupMedium): chr [1:24] "spl_hazard_2" "gamma2(groupMedium)" "1.65006763421488" "-1.89"
## ..$ gamma2(groupPoor) : chr [1:24] "spl_hazard_2" "gamma2(groupPoor)" "0.0774625317935244" "-3.31"
## ..$ gamma3(groupMedium): chr [1:24] "spl_hazard_2" "gamma3(groupMedium)" "-1.90693272459592" "-5.1"
## ..$ gamma3(groupPoor) : chr [1:24] "spl_hazard_2" "gamma3(groupPoor)" "-0.404156251325355" "-3.45"
## ..$ gamma0          : chr [1:24] "spl_odds_2" "gamma0" "-4.02185633708958" "-6.3825076933676" .
## ..$ gamma1          : chr [1:24] "spl_odds_2" "gamma1" "5.51052878336718" "-3.19361337561952" .
## ..$ gamma2          : chr [1:24] "spl_odds_2" "gamma2" "0.253140292086233" "-3.16417940172001"
## ..$ gamma3          : chr [1:24] "spl_odds_2" "gamma3" "0.26119991232863" "-2.81390126847145" .
## ..$ groupMedium     : chr [1:24] "spl_odds_2" "groupMedium" "3.02298542925585" "0.47779400406563"
## ..$ groupPoor       : chr [1:24] "spl_odds_2" "groupPoor" "2.89341134948443" "0.46717570677471"
## ..$ gamma1(groupMedium): chr [1:24] "spl_odds_2" "gamma1(groupMedium)" "1.0315946008094" "-8.13093"
## ..$ gamma1(groupPoor) : chr [1:24] "spl_odds_2" "gamma1(groupPoor)" "-2.61699779061024" "-11.3869"
## ..$ gamma2(groupMedium): chr [1:24] "spl_odds_2" "gamma2(groupMedium)" "1.80086631783035" "-1.8636"
## ..$ gamma2(groupPoor) : chr [1:24] "spl_odds_2" "gamma2(groupPoor)" "-0.0115893063326446" "-3.5063"
## ..$ gamma3(groupMedium): chr [1:24] "spl_odds_2" "gamma3(groupMedium)" "-2.0827061335566" "-5.4192"
## ..$ gamma3(groupPoor) : chr [1:24] "spl_odds_2" "gamma3(groupPoor)" "-0.339047547656046" "-3.5245"
## ..$ gamma0          : chr [1:24] "spl_normal_2" "gamma0" "-2.47954443170845" "-3.33706504973905"
## ..$ gamma1          : chr [1:24] "spl_normal_2" "gamma1" "1.1528048973128" "-1.19034788985897"
## ..$ gamma2          : chr [1:24] "spl_normal_2" "gamma2" "-0.360056185826704" "-1.4568534247492"
## ..$ gamma3          : chr [1:24] "spl_normal_2" "gamma3" "0.489377045312761" "-0.58778806367312"
## ..$ groupMedium     : chr [1:24] "spl_normal_2" "groupMedium" "1.56460781348189" "0.58035562978"
## ..$ groupPoor       : chr [1:24] "spl_normal_2" "groupPoor" "1.63775064239602" "0.7237866888568"
## .. [list output truncated]
## $ misc          :List of 7
## ..$ form        :Class 'formula' language Surv(years, status) ~ group
## .. .. attr(*, ".Environment")=<environment: 0x000001cf18efde18>
## ..$ group_names: chr [1:3] "Good" "Medium" "Poor"
## ..$ ngroups     : int 3
## ..$ lbls        : chr [1:7] "Exponential" "Weibull" "Gompertz" "Log-normal" ...
## ..$ lbls_spline: chr [1:9] "Hazard 1 knots" "Hazard 2 knots" "Hazard 3 knots" "Odds 1 knots" ...
## ..$ lbls_cure   : chr [1:6] "Mixture cure Weibull" "Non-mixture cure Weibull" "Mixture cure Log-norm"
## ..$ cols_tp     : num 23
## - attr(*, "class")= chr "PERSUADE"
## NULL

```

## 7. Session information

```
## R version 4.4.2 (2024-10-31 ucrt)
## Platform: x86_64-w64-mingw32/x64
## Running under: Windows 11 x64 (build 26100)
##
## Matrix products: default
##
##
## Random number generation:
## RNG:      Mersenne-Twister
## Normal:   Inversion
## Sample:   Rejection
##
## attached base packages:
## [1] splines      stats      graphics  grDevices  utils      datasets  methods    base
##
## other attached packages:
## [1] docstring_1.0.0      flexsurvcure_1.3.1  sft_2.2-1          SuppDists_1.1-9.8  fda_6.2.0
## [7] fds_1.8              RCurl_1.98-1.16    rainbow_3.8        pcaPP_2.0-5        MASS_7.3-61
## [13] knitr_1.50           summarytools_1.1.4  data.table_1.16.4  survminer_0.5.0    ggpubr_0.6.0
## [19] muhaz_1.2.6.4        flexsurv_2.3.2      survival_3.7-0     rms_6.8-2          Hmisc_5.2-0
##
## loaded via a namespace (and not attached):
## [1] rstudioapi_0.17.1    jsonlite_1.8.9      magrittr_2.0.3      TH.data_1.1-2      magick_2.8.5
## [7] rmarkdown_2.29      vctr_0.6.5          base64enc_0.1-3     tinytex_0.57       rstatix_0.7.2
## [13] polyspline_1.1.25    broom_1.0.8         Formula_1.2-5       sass_0.4.9         hdrcde_3.4
## [19] KernSmooth_2.23-24  bslib_0.8.0         htmlwidgets_1.6.4   plyr_1.8.9         sandwich_3.1-1
## [25] lubridate_1.9.3      cachem_1.1.0        commonmark_1.9.5    lifecycle_1.0.4    pkgconfig_2.0.3
## [31] R6_2.5.1            fastmap_1.2.0       digest_0.6.37       numDeriv_2016.8-1.1 colorspace_2.1
## [37] km.ci_0.5-6         timechange_0.3.0    abind_1.4-8         compiler_4.4.2     withr_3.0.2
## [43] htmlTable_2.4.3      backports_1.5.0     carData_3.0-5       ggsignif_0.6.4     quantreg_5.99
## [49] foreign_0.8-87       mstate_0.3.3        nnet_7.3-19         glue_1.8.0         quadprog_1.5-8
## [55] gridtext_0.1.5       grid_4.4.2          checkmate_2.3.2     cluster_2.1.6      reshape2_1.4.4
## [61] gtable_0.3.6         KMsurv_0.1-5        tidyr_1.3.1         xml2_1.3.6         car_3.1-3
## [67] pillar_1.10.0        stringr_1.5.1       dplyr_1.1.4         ggtext_0.1.2       pryr_0.1.6
## [73] SparseM_1.84-2       ks_1.14.3           tidyselect_1.2.1    gridExtra_2.3       svglite_2.1.3
## [79] statmod_1.5.0        rapportools_1.1      matrixStats_1.5.0   stringi_1.8.4      yaml_2.3.10
## [85] evaluate_1.0.1       codetools_0.2-20    tcltk_4.4.2        tibble_3.2.1       cli_3.6.3
## [91] xtable_1.8-4         systemfonts_1.1.0   munsell_0.5.1       jquerylib_0.1.4     roxygen2_7.3.2
## [97] Rcpp_1.0.13-1        MatrixModels_0.5-3  mclust_6.1.1        bitops_1.0-9       viridisLite_0.
## [103] scales_1.3.0         purrr_1.0.4         rlang_1.1.6         multcomp_1.4-26
```