Subject index

A

accelerated failure-time model 16, 112, 113
advanced prostate cancer data 311
age as the time scale 18, 32, 44, 211
age-specific reference interval 290
AIC (Akaike information criterion) . . 18, 76, 105, 110, 131, 252, 283, 287
Andersen–Gill (AG) model 296
Aranda-Ordaz link function . . 119, 130, 178

B

baseline hazard . . 2, 3, 6, 47, 61, 64, 67, 71, 86, 106, 127, 298, 302
Bayesian models 304
BIC (Bayes information criterion) . . . 18, 76, 105, 110, 131, 252
bladder cancer data 298
bootstrap 19

C

calibration 160
cause-specific hazard rate 310, 313
cause-specific survival 228
CD4 lymphocyte data 285
choice of scale 130
collapsing the data 57
competing risks 310, 322
conditional event probability 54
confidence interval 224
continuous variable, ... 267
    time-dependent effects of 205
Cox model 2, 12, 47
Cox, Sir David 1
crude probability of death 311, 323
cumulative distribution function 18
cumulative hazard function . . 17, 92, 99
cumulative incidence function 310, 312, 322

D

dataset, large 56, 111
delayed entry 18, 44
delta method 19, 224
density function 284, 288
discrimination 149, 152, 160

E

England and Wales breast cancer data 15, 39, 231, 248, 323
estimation 16, 120
excess mortality rate 228, 253
excess mortality-rate ratio 242, 270
explained variation 149, 296
exponential distribution 48, 92

F

`fracpoly` 127
fractional polynomials, ... 81, 127, 287
    multivariable 294
frailty models 296

G

gamma distribution 15
generalized linear modeling (GLM) . . 47
goodness of fit 147, 293

H

Harrell's C index 152
hazard difference 197
hazard function, . . . 3, 17, 38, 40, 44, 78
    estimation of 100
    piecewise 65

hazard function, *continued*
Weibull 95
wiggly 5, 39
hazard rate 73, 196
hazard ratio, ... 2, 3, 12, 177, 197
time-dependent 13

K
Kaplan–Meier curve 8, 38
kernel, Epanechnikov 39
kidney cancer data 274
knots 67
boundary 70
number of 74, 110
position 78, 108
sensitivity analysis 122, 260

L
left-truncation 31
life table 233
likelihood function 18, 49, 120
loglogistic model, ... 112
generalization of 113

M
marginal model 296
martingale residuals 147
median survival time 38
`mfp` 127, 132
model selection, . . 18, 89, 121, 129, 259
spline 108
multiple events 296
multivariable fractional polynomials 220
multivariable model 127

N
net probability of death 311
net survival 230
nomogram 127
nonlinearity 149
nonproportional excess hazards 243
nonproportional hazards 12, 54
number needed to treat 273

O
odds ratio 111
orchiectomy data 42, 211
orthogonalization 98
out-of-sample estimation 104
outcome-dependent model 287
overall survival 230
overfitting 19

P
parameterization
loglogistic and PO(1) models . . . 113
Weibull and PH(1) models 104
parametric model 13, 14
period analysis 31, 317
piecewise exponential model 50, 53
piecewise model 235
Poisson distribution 305
Poisson model 47–49, 54, 235
equivalence to Cox model 61
time-dependent effects in 179
`predict` 19
prediction, ... 17
out of sample 14, 153
`predictnl` 13, 19
Prentice, Williams, and Peterson (PWP) model 296
prior distributions 307
probit function 285
probit model, ... 114, 117, 283, 287
generalization of 115
prognostic index 127
prognostic model, ... 125
developing and reporting 126
proportional cumulative excess hazards 247
proportional hazards 2, 11, 47
proportional-hazards assumption . . . 10, 172

proportional odds model 112
proportionality assumption 224
prostate cancer data 294

R
random effects in Bayesian Royston–Parmar models . . 310
relative survival, ... 13, 320, 322
likelihood for 247
Royston–Parmar models for . . . 246
restricted cubic splines . . . 118, 184, 241
risk difference 273
Rotterdam breast cancer data . . 37, 48, 71, 86, 93, 119, 127, 283, 305
Royston–Parmar model 118, 127
distribution modeling with 283
with time-dependent effects . . . 190

S
scaled Schoenfeld residuals 172
scales,
choice of 13
other 248, 250
scaling (of covariate effects) 176
selection of variables and functional form 131
sensitivity analysis 307
spline,
basis functions 70, 97
calculation of 69
function 66, 67, 71, 97
restricted cubic 70
splitting the time scale . . 18, 47, 50, 59, 66, 173, 183, 297
`stpm2` 3, 16, 97, 284, 298, 313
`str2d` 151
stratification 203, 298
`streg` 14
`strs` 233, 234
`stset` 23, 37, 43, 299, 301, 319
`stsplit` 33
`stsurvimpute` 161
survival analysis, requirements of 9
survival difference 198
survival distribution, centiles of 145
survival function, ... 17, 38, 40, 91
estimation of 79
extrapolation 153, 155
plotting adjusted 142
survival function, plotting adjusted plotting difference 143
survival probabilities at given covariate values 138
survival probabilities for individuals 134
survival probabilities in groups 140
survival times, visualization of 161

T
time intervals, number of 62
time scales, multiple 14, 218
time-dependent effect, ... 33, 47, 57, 167, 168, 214, 225, 253, 287, 298, 302
continuous 193
forward selection of 220
in prognostic models 219
more than one 201
time-fixed covariate 168
time-fixed effect 168
time-varying covariate 34, 168

V
validation, external 153, 157, 160
varying-coefficient model 296

W
Wei, Lin, and Weissfeld (WLW) model 296
Weibull distribution 95
Weibull model, generalization of 96, 101
WinBUGS 304

Z
zeros trick in WinBUGS 305