

Appendix: Notes on Statistical Analysis

Mixed effect modelling of trends in blood Co

summary(cobalt_no1_nov1.lme)

Linear mixed-effects model fit by REML

Data: cob2

AIC BIC logLik

1166.737 1203.8 -574.3685

Random effects:

Formula: ~1 | Patient

(Intercept) Residual

StdDev: 1.140969 0.4096451

Correlation Structure: AR(1)

Formula: ~1 | Patient

Parameter estimate(s):

Phi

-0.3386792

Fixed effects: log(Cobalt) ~ Timeop + Sex + Device + Age + Femoral.size

	Value	Std error	DF	t value	P value
Intercept	1.44306	0.95370	255	1.51311	0.1315
Time since op	0.00042	0.00129	255	0.32911	0.7423
Sex (male)	-0.31868	0.16199	255	-1.96718	0.0502
Device (BHR)	-0.35208	0.28740	199	-1.22503	0.2220
Age	0.001157	0.00856	255	0.135179	0.8926
Femoral size	-0.00549	0.01781	255	-0.30848	0.7580

Correlation:

(Intr) Timeop SexM DvcBHR Age

Timeop -0.028

SexM 0.143 -0.008

DeviceBHR -0.084 -0.110 -0.129

Age -0.449 -0.019 -0.085 0.140

Femoral.size -0.860 -0.023 -0.208 0.006 -0.050

Standardized Within-Group Residuals:

Minimum	Quartile 1	Median	Quartile 3	Maximum
-3.8746	-0.4086	-0.0188	0.40499	3.2818

Number of Observations: 460

Number of Groups: 201

Event analysis of hip replacement failure analysis

Cox hazards model was performed using each patient's initial blood result.

	Coefficient	Exp (coef)	Se (coef)	z	Significance
Sex (male)	-0.7761	0.4602	0.3383	-2.294	0.0218
Log (Co)	0.8623	2.3687	0.1022	8.441	< 2e-16
Device (BHR)	-2.2215	0.1084	0.6430	-3.455	0.000551