

Briefing of PRC Project

PRC Team¹

November 6, 2018

¹I thank everyone present at this moment.

Background

knitr, Beamer,
and FragileFrame

PRC Team

First Test

Result

- **Aim 1:** Develop procedures for rapid optimization and validation of "Personalized-Reference Chart" (PRC) algorithms for:
 - Knee function
 - Physical Function, and
 - Patient-reported function
- **Aim 2:** Develop a software application that generates PRCs and integrates with clinical practice
- **Aim 3:** Examine the implementation of PRCs in clinical practice via a feasibility study framework

Method

knitr, Beamer,
and FragileFrame

PRC Team

First Test

Result

Steps	Description	Modeling
1	Splitting of training and testing data	Train-Test Split
2	Fitting of model to predict clinically relevant outcome (e.g. 90 day post-operative TUG)	Linear Mixed Model w/ b-spline
3	Fitting of model based on variables that contribute significantly to the previously predicted outcome	General Linear Model
4	Matching of patients based on the fitted/predicted value generated from the general linear model	Nearest N Matching
5	Leave one out cross validation to obtain measures of bias, coverage, and precision	LOOCV
6	Based on optimal number of matches, predict on test set	Generalized Additive Model for Location Scale, and Shape

Table 1

knitr, Beamer,
and FragileFrame

PRC Team

First Test

Result

Table: Table 1. Baseline Characteristics of Training and Testing Set

	Test (N = 202, # TUG Obs = 604)	Train (N = 397, # TUG Obs = 1339)	p
Age (years) (mean (sd))	65.90 (8.84)	64.04 (8.43)	0.012
Gender = Male (%)	84 (41.6)	185 (46.6)	0.280
BMI (kg/m ²) (mean (sd))	31.98 (6.20)	31.33 (5.82)	0.208
Baseline TUG (sec) (mean (sd))	11.00 (5.04)	9.98 (4.95)	0.018

Figure 2

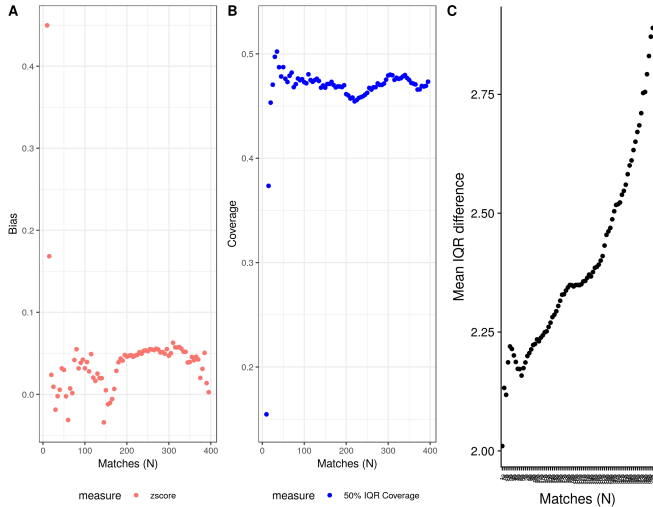


Figure: Bias, Precision, and Coverage plot using Box-Cox-Power-Exponential distribution for location, shape, and scale for `gamlss`

Figure 3

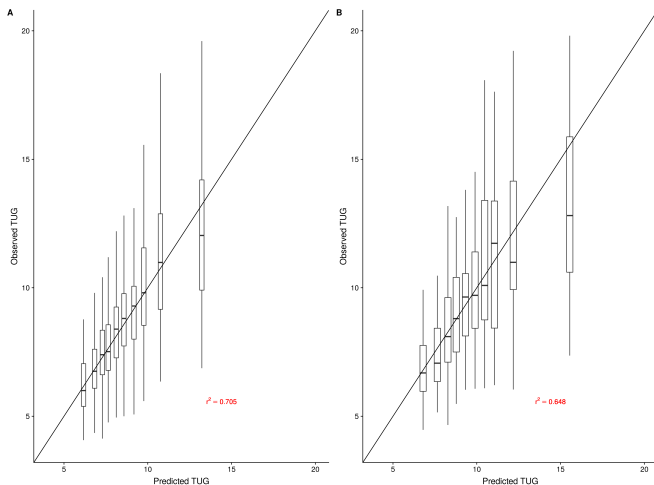


Figure: Calibration plot of $N = 35$ matches using Box-Cox-Cole-Green distribution for location, shape, and scale for gamlss

Figure 4: Zoom In

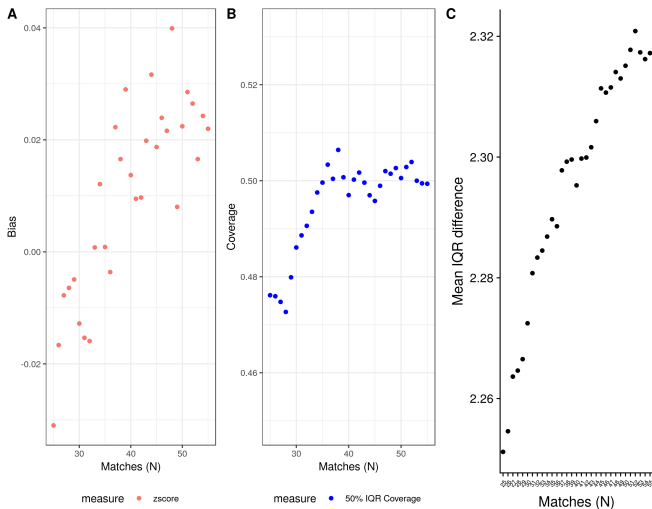


Figure: Bias, Precision, and Coverage plot using Box-Cox-Cole-Green distribution for location, shape, and scale for gamlss; Zoomed In