

```

1  **Tidy and load
2
3  clear
4
5  cd "...\\Statistical Analysis"
6
7
8  import delimited ".csv"
9
10 ** Summary statistics for patient characteristics
11 summarize ageatsurgery bmi delta_inc_fpp delta_ver_fpp delta_total_offset delta_total_lld ns_inc
   ns_ver ns_offset ns_lld image_inc_fpp image_ver_fpp image_total_offset image_total_lld
12
13 *Fill missing BMI
14 summarize bmi
15
16 egen meanbmi = mean(bmi)
17
18 replace bmi = meanbmi if bmi ==.
19
20 ****Part A - Calculate Agreement****
21
22 **Rock out with the bootstrap out - calculate median of delta
23 bootstrap r(p50), reps(1000) seed(1234) nodots: summarize delta_inc_app, detail
24 bootstrap r(p50), reps(1000) seed(1234) nodots: summarize delta_inc_fpp, detail
25 bootstrap r(p50), reps(1000) seed(1234) nodots: summarize delta_ver_app, detail
26 bootstrap r(p50), reps(1000) seed(1234) nodots: summarize delta_ver_fpp, detail
27 bootstrap r(p50) if !missing(delta_total_offset), reps(1000) seed(1234) nodots: summarize
   delta_total_offset, detail
28 bootstrap r(p50) if !missing(delta_total_lld), reps(1000) seed(1234) nodots: summarize
   delta_total_lld, detail
29
30 **Rock out with the bootstrap out - calculate mean of delta
31 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_inc_app, detail
32 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_inc_fpp, detail
33 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_ver_app, detail
34 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_ver_fpp, detail
35 bootstrap r(mean) if !missing(delta_total_offset), reps(1000) seed(1234) nodots: summarize
   delta_total_offset, detail
36 bootstrap r(mean) if !missing(delta_total_lld), reps(1000) seed(1234) nodots: summarize
   delta_total_lld, detail
37
38 **Rerun with absolute deviations (all declarations included)****
39
40 generate abs_delta_inc_app = abs(delta_inc_app)
41 generate abs_delta_inc_fpp = abs(delta_inc_fpp)
42 generate abs_delta_ver_app = abs(delta_ver_app)
43 generate abs_delta_ver_fpp = abs(delta_ver_fpp)
44 generate abs_delta_offset = abs(delta_total_offset)
45 generate abs_delta_lld = abs(delta_total_lld)
46
47 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_inc_app, detail
48 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_inc_fpp, detail
49 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_ver_app, detail
50 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_ver_fpp, detail
51 bootstrap r(mean) if !missing(abs_delta_offset), reps(1000) seed(1234) nodots: summarize
   abs_delta_offset, detail
52 bootstrap r(mean) if !missing(abs_delta_lld), reps(1000) seed(1234) nodots: summarize abs_delta_lld,
   detail
53
54
55 **Are the differences significantly different to Zero?
56 signrank delta_inc_app = 0

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57 signrank delta_inc_fpp = 0
58 signrank delta_ver_app = 0
59 signrank delta_ver_fpp = 0
60 signrank delta_total_offset = 0
61 signrank delta_total_lld = 0
62
63 **Work out if ave is associated with delta_inc_app
64
65 bootstrap, reps(100) seed(123): regress delta_inc_fpp ave_inc_fpp
66 bootstrap, reps(100) seed(123): regress delta_inc_app ave_inc_app
67 bootstrap, reps(100) seed(123): regress delta_ver_fpp ave_ver_fpp
68 bootstrap, reps(100) seed(123): regress delta_ver_app ave_ver_app
69 bootstrap if !missing(delta_total_offset), reps(100) seed(123): regress delta_total_offset
ave_total_offset
70 bootstrap if !missing(delta_total_lld), reps(100) seed(123): regress delta_total_lld ave_total_lld
71
72 cd "... \Statistical Analysis\ThirdPass\Original"
73
74 *Plot what would be Bland-Altman plots
75 *95%CI is prediction interval for individual datapoint (not the mean)
76 * line coordinates specified are retrieved from LOA calculations listed in [AnalysisTables] in NS
Dashboard gsheet
https://docs.google.com/spreadsheets/d/1InYb70d4dV-uehWHgJPTmLLKyltjMeRf8r\_SzdXagFU/edit#gid=1365526240
77
78 twoway (lfitci delta_inc_fpp ave_inc_fpp, stdf acolor(gs6%50)) (scatter delta_inc_fpp ave_inc_fpp),
ylines(-10.7 6.9, lwidth(1pt) lcolor(blue) lpattern(dash))
79 graph export BlandAltmanInc.png, replace
80 graph close Graph
81 twoway (lfitci delta_ver_fpp ave_ver_fpp, stdf acolor(gs6%50)) (scatter delta_ver_fpp ave_ver_fpp),
ylines(-10.8 3.6, lwidth(1pt) lcolor(blue) lpattern(dash))
82 graph export BlandAltmanVer.png, replace
83 graph close Graph
84 twoway (lfitci delta_total_offset ave_total_offset, stdf acolor(gs6%50)) (scatter delta_total_offset
ave_total_offset), ylines(-8.2 11.2, lwidth(1pt) lcolor(blue) lpattern(dash))
85 graph export BlandAltmanOffset.png, replace
86 graph close Graph
87 twoway (lfitci delta_total_lld ave_total_lld, stdf acolor(gs6%50)) (scatter delta_total_lld
ave_total_lld), ylines(-6.6 10.8, lwidth(1pt) lcolor(blue) lpattern(dash))
88
89 graph export BlandAltmanLLD.png, replace
90 graph close Graph
91
92 cd "... \Statistical Analysis"
93
94 save "NS_JI Accuracy Analysis - Third Pass.dta", replace
95
96 ***Part B factors associated with agreement: *No declarations omitted
97
98 * encode categorical variables
99
100 *rename gender sex
101 encode sex, gen(sexcode)
102
103 cd "... \Statistical Analysis\ThirdPass\Original\Regression"
104
105 *Inclination
106 bootstrap, reps(100) seed(1234) nodots: regress delta_inc_fpp ns_inc c.bmi c.ageatsurgery i.sexcode,
vce(robust)
107
108 *margins sexcode
109
110 predict delta_inc_predict, xb

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111
112
113 generate new_ns_inc = ns_inc - delta_inc_predict
114 generate delta_inc_biase = new_ns_inc - image_inc_fpp
115
116 generate abs_delta_inc_biase = abs(delta_inc_biase)
117
118 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_inc_biase, detail
119 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_inc_biase, detail
120
121 twoway (lfitci delta_inc_biase ave_inc_fpp, stdf acolor(gs6%50)) (scatter delta_inc_biase ave_inc_fpp
122 ),yline(-7.2 7.2, lwidth(1pt) lcolor(blue) lpattern(dash))
123 graph export BlandAltmanIncBC.png, replace
124 graph close Graph
125
126 *Version
127 bootstrap, reps(100) seed(1234) nodots: regress delta_ver_fpp ns_ver c.bmi c.ageatsurgery i.sexcode,
128 vce(robust)
129
130 predict delta_ver_predict, xb
131
132 generate new_ns_ver = ns_ver - delta_ver_predict
133 generate delta_ver_biase = new_ns_ver - image_ver_fpp
134
135 generate abs_delta_ver_biase = abs(delta_ver_biase)
136
137 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_ver_biase, detail
138 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_ver_biase, detail
139
140 twoway (lfitci delta_ver_biase ave_inc_fpp, stdf acolor(gs6%50)) (scatter delta_ver_biase ave_inc_fpp
141 ),yline(-6.7 6.7, lwidth(1pt) lcolor(blue) lpattern(dash))
142 graph export BlandAltmanVerBC.png, replace
143 graph close Graph
144
145 *Offset
146 bootstrap if !missing(delta_total_offset), reps(100) seed(1234) dots: regress delta_total_offset
147 ns_offset c.bmi c.ageatsurgery i.sexcode, vce(robust)
148
149 predict delta_offset_predict, xb
150
151 *regress delta_offset_predict image_total_offset
152
153 generate new_ns_offset = ns_offset - delta_offset_predict
154 generate delta_offset_biase = new_ns_offset - image_total_offset
155
156 generate abs_delta_offset_biase = abs(delta_offset_biase)
157
158 bootstrap r(mean) if !missing(delta_offset_biase), reps(1000) seed(1234) nodots: summarize
159 delta_offset_biase, detail
160 bootstrap r(mean) if !missing(abs_delta_offset_biase), reps(1000) seed(1234) nodots: summarize
161 abs_delta_offset_biase, detail
162
163 twoway (lfitci delta_offset_biase ave_total_offset, stdf acolor(gs6%50)) (scatter delta_offset_biase
164 ave_total_offset),yline(-7.8 7.8, lwidth(1pt) lcolor(blue) lpattern(dash))
165 graph export BlandAltmanOffsetBC.png, replace
166 graph close Graph
167
168 *LLD
169 bootstrap if !missing(delta_total_lll), reps(100) seed(1234) dots: regress delta_total_lll ns_lll c.
170 bmi c.ageatsurgery i.sexcode, vce(robust)
171
172 predict delta_lll_predict, xb
173

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166 generate new_ns_lld = ns_lld - delta_lld_predict
167 generate delta_lld_biase = new_ns_lld - image_total_lld
168
169 generate abs_delta_lld_biase = abs(delta_lld_biase)
170
171 bootstrap r(mean) if !missing(delta_lld_biase), reps(1000) seed(1234) nodots: summarize
delta_lld_biase, detail
172 bootstrap r(mean) if !missing(abs_delta_lld_biase), reps(1000) seed(1234) nodots: summarize
abs_delta_lld_biase, detail
173
174 twoway (lfitci delta_lld_biase ave_total_lld, stdf acolor(gs6%50)) (scatter delta_lld_biase
ave_total_lld), yline(-8.6 8.6, lwidth(1pt) lcolor(blue) lpattern(dash)) ysc(r(-15 15))
175 graph export BlandAltmanlldBC.png, replace
176 graph close Graph
177
178 ** Summary statistics for absolute deviations
179 summarize abs_delta_inc_app abs_delta_inc_fpp abs_delta_ver_app abs_delta_ver_fpp abs_delta_offset
abs_delta_lld
180
181 **Rerun with absolute deviations (all declarations included)****
182
183 **Rock out with the bootstrap out - calculate mean of delta
184 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_inc_biase, detail
185 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_ver_biase, detail
186 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_offset_biase, detail
187 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize delta_lld_biase, detail
188
189 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_inc_biase, detail
190 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_ver_biase, detail
191 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_offset_biase, detail
192 bootstrap r(mean), reps(1000) seed(1234) nodots: summarize abs_delta_lld_biase, detail
193
194 *Declarations omitted
195 cd "...\\Statistical Analysis\\ThirdPass\\DecOmit"
196
197 * encode intraop declarations
198
199
200 generate str3 intraopdec2 = ""
201 replace intraopdec2 = "No" if intraopdec == "Nothing to declare"
202 replace intraopdec2 = "Yes" if !(intraopdec == "Nothing to declare")
203 encode intraopdec2, gen(decode)
204
205 **Run analysis with declarations removed
206
207 generate delta_offset_decomit = .
208 generate delta_lld_decomit = .
209 generate ageatsurgery_decomit = .
210 generate sexcode_decomit = .
211 generate bmi_decomit = .
212 generate ave_offset_decomit = .
213 generate ave_lld_decomit = .
214 generate ns_offset_decomit = .
215 generate ns_lld_decomit = .
216
217 replace delta_offset_decomit = delta_total_offset if decode ==1
218 replace delta_lld_decomit = delta_total_lld if decode ==1
219 replace ageatsurgery_decomit = ageatsurgery if decode ==1
220 replace sexcode_decomit = sexcode if decode ==1
221 replace bmi_decomit = bmi if decode ==1
222 replace ave_offset_decomit = ave_total_offset if decode ==1
223 replace ave_lld_decomit = ave_total_lld if decode ==1
224 replace ns_offset_decomit = ns_offset if decode ==1

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225  replace ns_lld_decomit = ns_lld if deccode ==1
226
227  **Rock out with the bootstrap out - calculate mean of delta
228  bootstrap r(mean) if !missing(delta_offset_decomit), reps(1000) seed(1234) nodots: summarize
    delta_offset_decomit, detail
229  bootstrap r(mean) if !missing(delta_lld_decomit), reps(1000) seed(1234) nodots: summarize
    delta_lld_decomit, detail
230
231  **Rerun with absolute deviations
232
233  generate abs_delta_offset_decomit = abs(delta_offset_decomit)
234  generate abs_delta_lld_decomit = abs(delta_lld_decomit)
235
236
237  *Plot Bland-Altman
238  twoway (lfitci delta_offset_decomit ave_offset_decomit, stdf acolor(gs6%50)) (scatter
    delta_offset_decomit ave_offset_decomit),yline(-8.8 11.4, lwidth(1pt) lcolor(blue) lpattern(dash))
239  graph export BlandAltmanOffsetDecOmit.png, replace
240  graph close Graph
241  twoway (lfitci delta_lld_decomit ave_lld_decomit, stdf acolor(gs6%50)) (scatter delta_lld_decomit
    ave_lld_decomit),yline(-6.5 11.3, lwidth(1pt) lcolor(blue) lpattern(dash))
242  graph export BlandAltmanLLDDecOmit.png, replace
243  graph close Graph
244
245  **Rock out with the bootstrap out - calculate mean of delta
246  bootstrap r(mean) if !missing(delta_offset_decomit), reps(1000) seed(1234) nodots: summarize
    delta_offset_decomit, detail
247  bootstrap r(mean) if !missing(delta_lld_decomit), reps(1000) seed(1234) nodots: summarize
    delta_lld_decomit, detail
248
249  bootstrap r(mean) if !missing(delta_offset_decomit), reps(1000) seed(1234) nodots: summarize
    abs_delta_offset_decomit, detail
250  bootstrap r(mean) if !missing(delta_lld_decomit), reps(1000) seed(1234) nodots: summarize
    abs_delta_lld_decomit, detail
251
252  *Maybe only need up to here for now 12-Nov-2022
253
254
255  cd "...Statistical Analysis"
256
257
258  **Clean up and close
259
260
261  save "...Analysis - Third Pass.dta", replace
262
263  export delimited "... - Output"
264
265  clear
266
267
268

```