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Surgery preference of orthopedic surgeons based on X-rays

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Abstract

Medical researchers at the UCLA Department of Orthopedics have conducted an online survey on surgeons. The survey collected information on the practice, training and what percentage of their practice involves treatment of pediatric patients and asked them whether or not they would recommend surgery based on a series of X-rays. We provided them with a multi-level analysis on whether or not there were significant differences between surgery preference rates based on the variables described above.

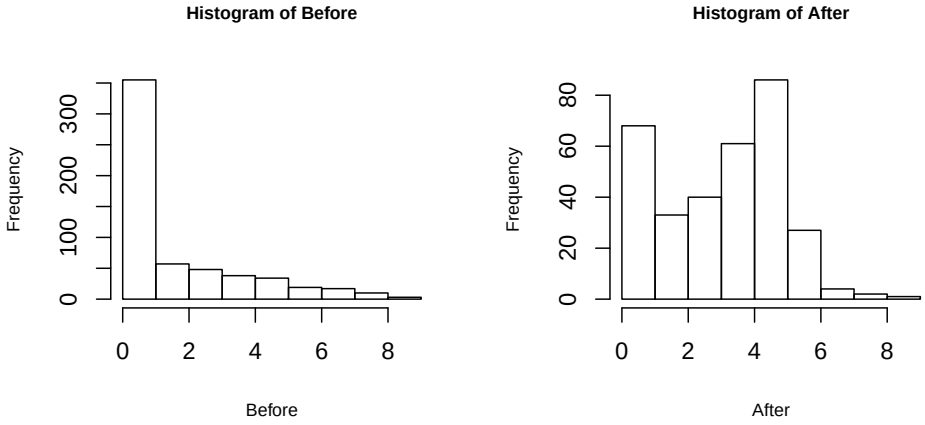
1 Introduction

The data consist of responses from 781 orthopedic surgeons to an online survey. In this survey the surgeons were asked about their training (3 categories), their practice (academic vs. private) and what percentage of their practice involves treatment of pediatric patients (5 categories). They were shown a series of 10 X-ray images both at the time the injury occurred (referred to as "before") and a week after being in the cast (referred to as "after") and asked whether they would choose to operate on the patient based on the X-ray.

Not all questions were answered by every surgeon taking the survey. In our analysis we only focused on those respondents who answered all questions relating to the X-rays.

The two histograms in Figure 1 show the distribution of number of surgeries recommended by the doctors before and after the cast. It appears that many surgeons initially did not recommend surgery however after a week in cast quite a few more surgeons recommended surgery.

Figure 1: Histogram for Before and After



The boxplot in Figure 2 shows the distribution of number of surgeries recommended by type of surgeon, general, hand or pediatric. It appears that there is not much of a difference initially between the number of surgeries recommended by general, hand or pediatric surgeons. However in the second X-ray after being in the cast for a week hand surgeons on average recommended more surgeries than general and pediatric surgeons.

The boxplot in Figure 3 shows the distribution of number of surgeries recommended by practice of surgeon, academic or private. There does not appear to be a large difference between the average number of surgeries recommended by academic or private practitioners. However it should be noted that the averages are higher for surgeons in the private practice both in the first and in the second X-ray.

The boxplot in Figure 4 shows the distribution of number of surgeries recommended depending on the percentage of the surgeon's practice involving the treatment of pediatric patients, 100%, 75%, 50%, 25% or less than 10% . On both X-rays surgeons who treat pediatric patients about 50% of the time recommended the most number of surgeries and those who treat pediatric patients about 100% of the time recommended the least number of surgeries.

Figure 2: Boxplots by type of surgeon

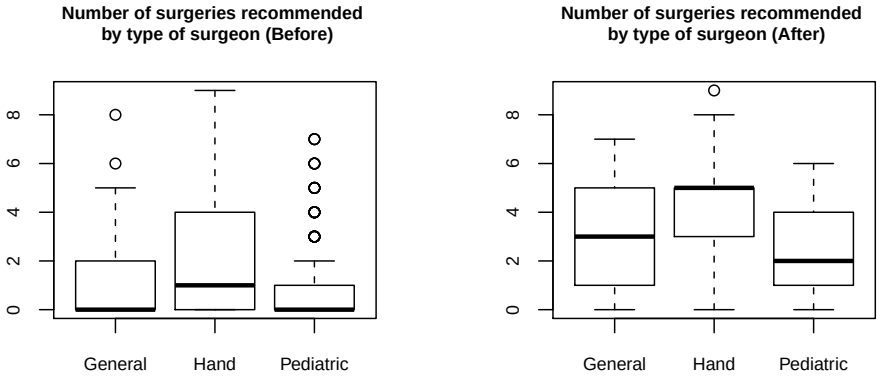


Figure 3: Boxplots by type of surgeon

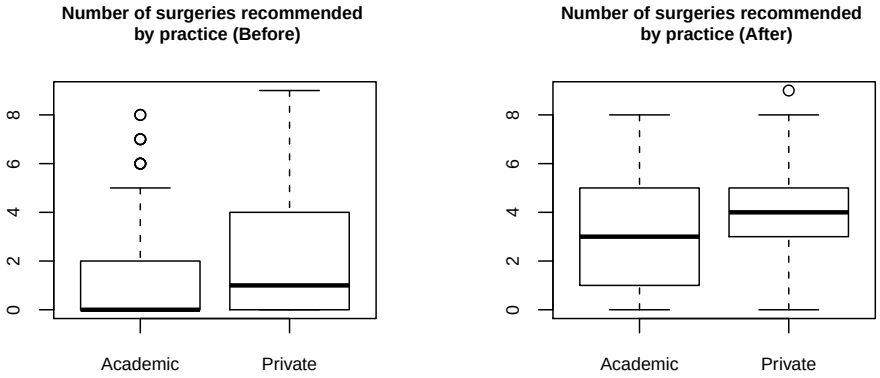
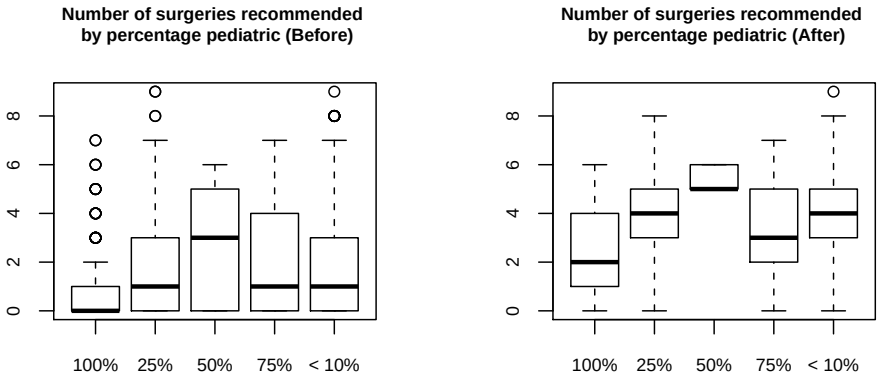


Figure 4: Boxplots by type of surgeon



2 Methodology

Multi-level modeling was used in order to assess if the differences we are seeing in Figures 2, 3 and 4 are statistically significant.

A generalized linear mixed model with a logit link was fit using the `glmer` function in the `lme4` package using `R` statistical software. For more information on the algorithm, see the package vignette (Bates, 2009).

We considered a given surgeon's observations to be non-independent so we nested the 20 X-rays within surgeon, and used "before" or "after" one week in a cast within practice type, percentage of their practice involving treatment of pediatric patients, training of the surgeon as factors. Additionally, a random intercept for each surgeon was fit in order to control for an individual surgeon effect.

The process for model selection started with the fully specified model that included all the given predictors and all second order interaction effects. A backwards model selection approach was then employed to remove one predictor at a time from the model based on their P-values. This process was then continued with model fit being assessed by AIC, and the model resulting in the lowest AIC was selected.

Odds ratios for covariates without interactions were calculated as the exponential of the estimated coefficient for that variable and confidence intervals were calculated using the standard errors of the coefficients. For example, if practice type were a covariate of interest, the odds ratio for private vs. academic would be calculated as $exp(\beta_{private})$ and the confidence interval is calculated as $exp(\beta_{private} \pm 1.96 * se(\beta_{private}))$.

3 Results

3.1 Initial Results

The full model including all variables showed that practice type was not a significant predictor (p-value = 0.1746). This indicates that there is no significant difference between the number of surgeries recommended by academic and private practitioner.

A second model was run excluding the practice type variable and the results of that model can be found in Table 1.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.866	0.320	-2.702	0.007
Before/After - Before	-0.759	0.050	-15.256	0.000
Surgeon Type - Orthopedic	-0.484	0.197	-2.462	0.014
Surgeon Type - Pediatric	-1.058	0.317	-3.341	0.001
Percent Pediatric - 25%	0.108	0.332	0.324	0.746
Percent Pediatric - 50%	0.819	0.423	1.939	0.052
Percent Pediatric - 75%	0.636	0.243	2.621	0.009
Percent Pediatric - <10 %	0.028	0.327	0.085	0.932

Table 1: Model output

Table 2 displays the odds ratios and the confidence intervals associated with those odds ratios.

The reference group for the before and after variable (first X-ray vs. the second X-ray) was the before group. The odds ratio suggests that surgeons are 0.468 times as likely to recommend surgery in the first X-ray vs. the second X-ray. In Figure 1 we had seen that the average number of surgeries recommended was higher for the second X-ray and the modeling analysis has shown that the difference we saw was statistically significant (p-value = 0.000).

Covariates			Odds Ratio	Confidence Interval
Before	vs	After	0.468	(0.425, 0.516)
Surgeon Type - Orthopedic	vs	Surgeon Type - Hand	0.616	(0.419, 0.906)
Surgeon Type - Pediatric	vs	Surgeon Type - Hand	0.347	(0.187, 0.646)
Percent Pediatric - 25%	vs	Percent Pediatric - 100%	1.114	(0.581, 2.136)
Percent Pediatric - 50%	vs	Percent Pediatric - 100%	2.269	(0.991, 5.194)
Percent Pediatric - 75%	vs	Percent Pediatric - 100%	1.89	(1.174, 3.041)
Percent Pediatric - $< 10\%$	vs	Percent Pediatric - 100%	1.028	(0.541, 1.953)

Table 2: Odds ratios and confidence intervals

The reference group for surgeon type is hand surgeons. Therefore, orthopedic surgeons are 0.616 times as likely to recommend surgery while pediatric surgeons are only 0.347 times as likely to recommend surgery as hand surgeons. We had seen in Figure 2 that hand surgeons had the highest average of number of surgeries recommended, and the modeling analysis has shown that the difference we saw was statistically significant (p-values are 0.014 and 0.001 for orthopedic and pediatric surgeons, respectively).

The reference group for the percent pediatric variable indicating what percentage of the surgeon's practice involves treatment of pediatric patients was the 100% group. The odds ratios suggest that surgeons who treat pediatric patients 25% of the time are 1.114 as likely, surgeons who treat pediatric patients 50% of the time are 2.269 times as likely, surgeons who treat pediatric patients 75% of the time are 1.89 times as likely and surgeons who treat pediatric patients less than 10% of the time are 1.028 times as likely as those whose practice involves solely pediatric patients. Only the difference between the 75% and 100% groups was found to be significant (p-value = 0.009).

3.2 Exploring different cutoff points for the Percent Pediatric variable and interaction between Before/After and Percent Pediatric variables

3.2.1 Baseline group: $< 10\%$ group

Table 3 displays the results of the model with with percent pediatric cutoffs at less than 10%, 25%, 50%, 75% and 100%. In this model the baseline group is the less than 10% group, and an interaction factor between the before/after and the percent pediatric variables are included. The interaction variable is not significant except for the 75% group.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.826	0.087	-9.454	0.000
Before/After - Before	-0.485	0.197	-2.465	0.014
Surgeon Type - Orthopedic	-1.051	0.317	-3.318	0.001
Surgeon Type - Pediatric	-0.787	0.075	-10.468	0.000
Percent Pediatric - 25%	0.064	0.135	0.473	0.637
Percent Pediatric - 50%	0.617	0.386	1.597	0.110
Percent Pediatric - 75%	0.345	0.360	0.957	0.339
Percent Pediatric - 100%	0.011	0.332	0.032	0.974
Before/After - Before * Percent Pediatric - 25%	0.039	0.119	0.325	0.745
Before/After - Before * Percent Pediatric - 50%	0.375	0.308	1.219	0.223
Before/After - Before * Percent Pediatric - 75%	0.582	0.224	2.597	0.009
Before/After - Before * Percent Pediatric - 100%	-0.129	0.138	-0.935	0.350

Table 3: Model output - Baseline: 10%

3.2.2 Baseline group: 25% or less group

Table 4 displays the results of the model with with percent pediatric cutoff at 25%. In this model there are two groups: 25% or less and 50% or more. The baseline group is the 25% or less group. An interaction factor between the before/after and the percent pediatric variables is included and it is not significant.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.802	0.069	-11.594	0.000
Before/After - Before	-0.484	0.198	-2.448	0.014
Surgeon Type - Orthopedic	-1.450	0.268	-5.406	0.000
Surgeon Type - Pediatric	-0.772	0.058	-13.253	0.000
Percent Pediatric - 50% or more	0.421	0.264	1.593	0.111
Before/After - Before * Percent Pediatric - 50% or more	0.050	0.112	0.446	0.655

Table 4: Model output - Baseline: 25% or less

3.2.3 Baseline group: 50% or less group

Table 5 displays the results of the model with with percent pediatric cutoff at 50%. In this model there are two groups: 50% or less and 75% or more. The baseline group is the 50% or less group. An interaction factor between the before/after and the percent pediatric variables is included and it is not significant.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.787	0.069	-11.482	0.000
Before/After - Before	-0.482	0.198	-2.429	0.015
Surgeon Type - Orthopedic	-1.077	0.310	-3.472	0.001
Surgeon Type - Pediatric	-0.759	0.057	-13.281	0.000
Percent Pediatric - 75% or more	0.041	0.310	0.131	0.896
Before/After - Before * Percent Pediatric - 75% or more	0.002	0.116	0.018	0.986

Table 5: Model output - Baseline: 50% or less

3.2.4 Baseline group: 75% or less group

Table 6 displays results of the model with with percent pediatric cutoff at 75%. In this model there are two groups: 75% or less and 100%. The baseline group is the 75% or less group. An interaction factor between the before/after and the percent pediatric variables is included and it is not significant.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.792	0.068	-11.729	0.000
Before/After - Before	-0.489	0.197	-2.476	0.013
Surgeon Type - Orthopedic	-0.617	0.211	-2.926	0.003
Surgeon Type - Pediatric	-0.721	0.055	-13.089	0.000
Percent Pediatric - 100%	-0.444	0.225	-1.972	0.049
Before/After - Before * Percent Pediatric - 100%	-0.195	0.129	-1.516	0.130

Table 6: Model output - Baseline: 75% or less

3.2.5 Results summary

Even with trying out different cutoff points for the percent pediatric variable, we have not found a significant interaction between the before/after variable and percent pediatric variables. However it should be noted

that one of the levels of the surgeon type variable is pediatric surgeons. Perhaps we would see more of an effect in either of the variables (surgeon type or percent pediatric) if one of the variables were dropped.

3.3 Exploring different cutoff points for the Percent Pediatric variable and interaction between Before/After and Percent Pediatric variables (excluding Surgeon Type from the model)

3.3.1 Baseline group: < 10% group

Table 7 displays the results of the model with with percent pediatric cutoffs at less than 10%, 25%, 50%, 75% and 100%. In this model the baseline group is the less than 10% group, and an interaction factor between the before/after and the percent pediatric variables are included and surgeon type is excluded from the model. The interaction variable is once again not significant except for the 75% group.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.895	0.085	-10.511	0.000
Before/After - Before	-0.788	0.075	-10.475	0.000
Percent Pediatric - 25%	0.089	0.136	0.652	0.515
Percent Pediatric - 50%	0.380	0.383	0.992	0.321
Percent Pediatric - 75%	-0.470	0.256	-1.838	0.066
Percent Pediatric - 100%	-0.940	0.138	-6.794	0.000
Before/After - Before * Percent Pediatric - 25%	0.039	0.119	0.326	0.745
Before/After - Before * Percent Pediatric - 50%	0.378	0.307	1.233	0.218
Before/After - Before * Percent Pediatric - 75%	0.585	0.223	2.620	0.009
Before/After - Before * Percent Pediatric - 100%	-0.128	0.138	-0.927	0.354

Table 7: Model output - Baseline: 10%

3.3.2 Baseline group: 25% or less group

Table 8 displays the results of the model with with percent pediatric cutoff at 25%. In this model there are two groups: 25% or less and 50% or more. The baseline group is the 25% or less group. An interaction factor between the before/after and the percent pediatric variables is included and surgeon type is excluded from the model. The interaction variable is once again not significant.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.867	0.068	-12.727	0.000
Before/After - Before	-0.775	0.058	-13.279	0.000
Percent Pediatric - 50% or more	-0.831	0.119	-6.975	0.000
Before/After - Before * Percent Pediatric - 50% or more	0.058	0.111	0.520	0.603

Table 8: Model output - Baseline: 25% or less

3.3.3 Baseline group: 50% or less group

Table 9 displays the results of the model with with percent pediatric cutoff at 50%. In this model there are two groups: 50% or less and 75% or more. The baseline group is the 50% or less group. An interaction factor between the before/after and the percent pediatric variables is included and surgeon type is excluded from the model. The interaction variable is once again not significant.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.853	0.066	-12.879	0.000
Before/After - Before	-0.760	0.057	-13.291	0.000
Percent Pediatric - 75% or more	-0.914	0.120	-7.600	0.000
Before/After - Before * Percent Pediatric - 75% or more	0.005	0.116	0.044	0.965

Table 9: Model output - Baseline: 50% or less

3.3.4 Baseline group: 75% or less group

Table 10 displays results of the model with with percent pediatric cutoff at 75%. In this model there are two groups: 75% or less and 100%. The baseline group is the 75% or less group. An interaction factor between the before/after and the percent pediatric variables is included and surgeon type is excluded from the model. The interaction variable is once again not significant.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.887	0.063	-13.990	0.000
Before/After - Before	-0.721	0.055	-13.091	0.000
Percent Pediatric - 100%	-0.950	0.126	-7.521	0.000
Before/After - Before * Percent Pediatric - 100%	-0.195	0.129	-1.519	0.129

Table 10: Model output - Baseline: 75% or less

3.3.5 Results summary

Even with trying out different cutoff points for the percent pediatric variable and excluding the surgeon type variable, we have not found a significant interaction between the before/after variable and percent pediatric variables. Another approach may be to exclude the percent pediatric variable from the model and instead look for an interaction between surgeon type and the before/after variables.

3.4 Interaction between Before/After and Surgeon Type variables

Table 11 displays results of the model with percent pediatric variable excluded from the model and an interaction between surgeon type and before/after variables included. The interaction variable is once again not significant.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.804	0.068	-11.760	0.000
Before/After - Before	-0.716	0.059	-12.110	0.000
Surgeon Type - Orthopedic	-0.388	0.212	-1.826	0.068
Surgeon Type - Pediatric	-0.994	0.122	-8.155	0.000
Before/After - Before * Surgeon Type - Orthopedic	-0.238	0.202	-1.182	0.237
Before/After - Before * Surgeon Type - Pediatric	-0.114	0.120	-0.945	0.345

Table 11: Model output - Surgeon Type vs. Before/After

Next we try some alternative approaches to look for a model that yields a significant interaction effect between the variables.

3.5 Alternative approaches

Table 12 displays results of the model with practice type, before/after, surgeon type, percent pediatric and an interaction variable between practice type and before/after variables included in the model.

	Estimate	Std. Error	z value	Pr(>|z|)
Intercept	-0.820	0.118	-6.943	0.000
Practice Type - Private	-0.007	0.124	-0.057	0.955
Before/After - Before	-1.059	0.093	-11.410	0.000
Surgeon Type - Orthopedic	-0.477	0.196	-2.434	0.015
Surgeon Type - Pediatric	-1.087	0.316	-3.438	0.001
Percent Pediatric - 50%	0.803	0.355	2.264	0.024
Percent Pediatric - 75%	0.643	0.342	1.876	0.061
Percent Pediatric - 100%	0.044	0.330	0.132	0.895
Practice Type - Private * Before/After - Before	0.430	0.110	3.904	0.000

Table 12: Model output - Practice Type vs. Before/After

Based on this model the effect of practice type is not significant however the interaction effect between practice type and the before/after variables is significant. Table 13 displays the odds ratios and the confidence intervals associated with those odds ratios.

Covariates			Odds Ratio	Confidence Interval
Surgeon Type - Orthopedic	vs	Surgeon Type - Hand	0.621	(0.423, 0.911)
Surgeon Type - Pediatric	vs	Surgeon Type - Hand	0.337	(0.181, 0.627)
Percent Pediatric - 50%	vs	Percent Pediatric - less than 25%	2.233	(1.114, 4.477)
Percent Pediatric - 75%	vs	Percent Pediatric - less than 25%	1.901	(0.972, 3.72)
Percent Pediatric - 100%	vs	Percent Pediatric - less than 25%	1.045	(0.547, 1.994)
Private Practice, Before	vs	Academic Practice, Before	1.526	(0.965, 2.414)
Private Practice, After	vs	Academic Practice, After	0.993	(0.779, 1.266)
Private Practice, Before	vs	Private Practice, After	0.533	(0.358, 0.793)
Academic Practice, Before	vs	Academic Practice, After	0.347	(0.289, 0.416)

Table 13: Odds ratios and confidence intervals

The reference group for surgeon type is hand surgeons. Therefore, orthopedic surgeons are 0.621 times as likely to recommend surgery while pediatric surgeons are only 0.337 times as likely to recommend surgery as hand surgeons. We had seen in Figure 2 that hand surgeons had the highest average of number of surgeries recommended, and the modeling analysis has shown that the difference we saw was statistically significant (p-values are 0.015 and 0.001 for orthopedic and pediatric surgeons, respectively).

The reference group for the percent pediatric variable indicating what percentage of the surgeon's practice involves treatment of pediatric patients was the less than 25% group (this is a combination of the less than 10% and the 25% groups combined). The odds ratios suggest that surgeons who treat pediatric patients 50% of the time are 2.333 as likely, surgeons who treat pediatric patients 75% of the time are 1.901 times as likely, surgeons who treat pediatric patients 100% of the time are 1.045 times as likely as those whose who treat pediatric patients less than 25% of the time. Only the difference between the 50% and less than 25% groups were significant at 0.05 significance level (p-value = 0.024). The difference between the 75% and less than 25% groups were significant at 0.10 significance level (p-value = 0.061) and the difference between the less than 25% and 100% groups was not significant (p-value = 0.895).

The odds ratios for the interaction variable can be interpreted as follows:

- Private practitioners are 1.526 times as likely to recommend surgery than academic practitioners in the first X-ray. This difference is statistically significant (CI: 0.965, 2.414).

- Private practitioners are 0.993 times as likely to recommend surgery than academic practitioners in the second X-ray. This difference is not statistically significant (CI: 0.779, 1.266).
- Private practitioners are 0.553 times as likely to recommend surgery in the first X-ray than in the second X-ray. This difference is statistically significant (CI: 0.358, 0.793). Therefore, private practitioners are more likely to recommend surgery in the second X-ray.
- Academic practitioners are 0.347 times as likely to recommend surgery in the first X-ray than in the second X-ray. This difference is statistically significant (CI: 0.289, 0.416). Therefore, academic practitioners are more likely to recommend surgery in the second X-ray.

4 Summary

Based on the model presented in Section 3.5 showed that there are significant differences in surgery preference rates based on surgeon type, percentage of pediatric patients seen. Furthermore an interaction effect between practice type and whether surgery was recommended in the first or second X-ray was found to be significant.

5 References

Bates, D. (2009). *Package 'lme4'*. CRAN. http://cran.r-project.org/web/packages/lme4/lme4.pdf.

A R output

A.1 Full model

```
Generalized linear mixed model fit by the Laplace approximation
Formula: y ~ prepost + surgtype + practype + pctkids + (1 | id)
   Data: d_long_complete
   AIC   BIC logLik deviance
 10877 10951  -5429    10857
Random effects:
 Groups Name        Variance Std.Dev.
 id     (Intercept) 0.99501  0.9975
Number of obs: 11240, groups: id, 562

Fixed effects:
               Estimate Std. Error z value Pr(>|z|)
(Intercept)   -0.898607   0.319998  -2.808  0.00498 **
prepostpre    -0.758641   0.049735 -15.254  < 2e-16 ***
surgtypeortho -0.467557   0.196346  -2.381  0.01725 *
surgtypepeds  -1.072307   0.315634  -3.397  0.00068 ***
practypepriv   0.158550   0.116789   1.358  0.17460
pctkids25%     0.009916   0.338423   0.029  0.97662
pctkids50%     0.756707   0.423160   1.788  0.07374 .
pctkids75%     0.594860   0.243904   2.439  0.01473 *
pctkids< 10%  -0.062194   0.332539  -0.187  0.85164
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
            (Intr) prpstp srgtypr srgtypp prctyp pct25% pct50% pct75%
prepostpre  -0.066
surgtyperth -0.062  0.006
surgtypepds -0.942  0.010  0.058
practypeprv -0.079 -0.005  0.061  -0.034
pctkids25%  -0.912  0.002  0.000   0.893  -0.211
pctkids50%  -0.568 -0.004 -0.019   0.537  -0.107  0.566
pctkids75%  -0.291 -0.006 -0.026   0.188  -0.124  0.310  0.209
pctkids<10% -0.929  0.003 -0.029   0.907  -0.198  0.931  0.575  0.315
```

A.2 Second model

```
Generalized linear mixed model fit by the Laplace approximation
Formula: y ~ prepost + surgtype + pctkids + (1 | id)
   Data: d_long_complete
   AIC   BIC logLik deviance
 10877 10943  -5430    10859
Random effects:
 Groups Name        Variance Std.Dev.
 id     (Intercept) 1.0037   1.0019
Number of obs: 11240, groups: id, 562

Fixed effects:
              Estimate Std. Error z value Pr(>|z|)
```

```
(Intercept)   -0.86567    0.32034  -2.702 0.006885 **
prepostpre    -0.75874    0.04973 -15.256  < 2e-16 ***
surgtypeortho -0.48427    0.19666  -2.462 0.013798 *
surgtypepeds  -1.05827    0.31675  -3.341 0.000835 ***
pctkids25%     0.10777    0.33216   0.324 0.745598
pctkids50%     0.81932    0.42251   1.939 0.052483 .
pctkids75%     0.63636    0.24277   2.621 0.008760 **
pctkids< 10%   0.02782    0.32732   0.085 0.932278
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
            (Intr) prpstp srgtypr srgtypp pct25% pct50% pct75%
prepostpre  -0.066
surgtyperth -0.058  0.007
surgtypepds -0.949  0.010  0.060
pctkids25%  -0.953  0.001  0.014   0.907
pctkids50%  -0.582 -0.005 -0.012   0.537   0.559
pctkids75%  -0.304 -0.007 -0.019   0.186   0.293  0.198
pctkids<10% -0.966  0.002 -0.018   0.919   0.928  0.569  0.298
```

A.3 Alternative model

```
Generalized linear mixed model fit by the Laplace approximation
Formula: y ~ practype * prepost + surgtype + as.factor(pctkids_base25less2) +      (1 | id)
   Data: d_long_complete
   AIC   BIC logLik deviance
 10863 10936  -5421    10843
Random effects:
 Groups Name        Variance Std.Dev.
 id     (Intercept) 0.99722  0.99861
Number of obs: 11240, groups: id, 562

Fixed effects:
                                 Estimate Std. Error z value Pr(>|z|)
(Intercept)                     -0.820463   0.118170  -6.943 3.84e-12 ***
practypepriv                    -0.007021   0.123961  -0.057 0.954832
prepostpre                      -1.058744   0.092794 -11.410  < 2e-16 ***
surgtypeortho                   -0.476827   0.195905  -2.434 0.014935 *
surgtypepeds                    -1.087405   0.316269  -3.438 0.000586 ***
as.factor(pctkids_base25less2)1  0.803395   0.354873   2.264 0.023581 *
as.factor(pctkids_base25less2)2  0.642541   0.342429   1.876 0.060597 .
as.factor(pctkids_base25less2)3  0.043547   0.329851   0.132 0.894968
practypepriv:prepostpre          0.429661   0.110065   3.904 9.47e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
            (Intr) prctyp prpstp srgtypr srgtypp a.(_252)1 a.(_252)2 a.(_252)3
practypeprv -0.821
prepostpre  -0.281  0.265
surgtyperth -0.221  0.061  0.004
surgtypepds -0.001 -0.027  0.019  0.058
```

```
as.f(_252)1 -0.130  0.056 -0.014 -0.005  -0.212
as.f(_252)2 -0.164  0.100 -0.015 -0.002  -0.749   0.194
as.f(_252)3 -0.245  0.192 -0.009  0.018  -0.917   0.236     0.737
prctypprv:p  0.234 -0.332 -0.843 -0.001  -0.015   0.011     0.012     0.008
```