Skills-for-care analysis Draft 1

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Updated with newly derived variables

# environment setup to run ordered logit properly  
options(contrasts = rep("contr.treatment", 2))

This chunk loads all the packages to use

#packages for ordered logit  
library(tidyverse) # package for data cleaning and plotting  
library(readxl) # package for reading excel file  
library(broom) # extracting model summary as data frame  
library(modelsummary) # deriving model tables  
library(scales) # label percent  
library(lubridate) # working with dates  
library(marginaleffects) #to calculate marginal effects  
library(ordinal) # package for ordinal logit regression  
library(here) # specifying directory

## Data Preparation

First, import the sampled and coded data set

#import the raw data file  
cqc\_skills <- read\_rds(here("data","cleaned\_sfc\_ipw.rds"))

cqc\_skills %>%   
 mutate(overall = ifelse(domain == "Overall", 1, 0)) %>%   
 group\_by(form) %>%   
 summarize(count\_rating\_unit = sum(overall),  
 count\_rating = n())

## # A tibble: 6 × 3  
## form count\_rating\_unit count\_rating  
## <fct> <dbl> <int>  
## 1 FPO 5122 30732  
## 2 CIC 51 306  
## 3 GOV 378 2268  
## 4 IND 298 1788  
## 5 NPO 1405 8430  
## 6 <NA> 4 24

nrow(cqc\_skills)

## [1] 43548

summary(cqc\_skills[, c("turnover", "turnover0", "staff\_level", "staff\_level0")])

## turnover turnover0 staff\_level staff\_level0   
## Min. : 0.000 Min. : 0.000 Min. : 0.000 Min. : 0.000   
## 1st Qu.: 7.143 1st Qu.: 6.885 1st Qu.: 0.500 1st Qu.: 0.794   
## Median : 18.868 Median : 18.182 Median : 0.808 Median : 1.273   
## Mean : 31.132 Mean : 29.171 Mean : 1.204 Mean : 1.647   
## 3rd Qu.: 38.298 3rd Qu.: 38.095 3rd Qu.: 1.357 3rd Qu.: 1.917   
## Max. :4500.000 Max. :704.348 Max. :55.333 Max. :67.333   
## NA's :10656 NA's :10644 NA's :5004 NA's :5004

## Modeling on rating with new staffing variables

model\_order\_weighted <- clm(rating ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Overall"),  
 link = "logit",  
 weights = ipw)  
  
model\_staff\_weighted <- lm(staff\_level ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Overall"),  
 weights = ipw)  
  
staff\_direct\_order\_weighted <- clm(rating ~ form + staff\_level + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Overall"),  
 link = "logit",  
 weights = ipw)  
  
model\_turnover\_weighted <- lm(turnover ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Overall"),  
 weights = ipw)  
  
turnover\_direct\_order\_weighted <- clm(rating ~ form + turnover + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Overall"),  
 link = "logit",  
 weights = ipw)

## Modeling on rating with old staffing variables

model\_staff\_weighted0 <- lm(staff\_level0 ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Overall"),  
 weights = ipw)  
  
staff\_direct\_order\_weighted0 <- clm(rating ~ form + staff\_level0 + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Overall"),  
 link = "logit",  
 weights = ipw)  
  
model\_turnover\_weighted0 <- lm(turnover0 ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Overall"),  
 weights = ipw)  
  
turnover\_direct\_order\_weighted0 <- clm(rating ~ form + turnover0 + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Overall"),  
 link = "logit",  
 weights = ipw)

## drive result tables

### results table for new staffing variables

new\_models <- modelsummary(list("full weighted" = model\_order\_weighted,   
 "staffing weighted"= model\_staff\_weighted,  
 "staff direct weighted" = staff\_direct\_order\_weighted,  
 "turnover weighted"= model\_turnover\_weighted,   
 "turnover direct weighted" = turnover\_direct\_order\_weighted),  
 coef\_omit = "region", exponentiate = F,  
 statistic = "({p.value}) {stars}")  
new\_models

|  | full weighted | staffing weighted | staff direct weighted | turnover weighted | turnover direct weighted |
| --- | --- | --- | --- | --- | --- |
| Inadequate|Req improv | -4.704 |  | -4.583 |  | -4.700 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Req improv|Good | -1.847 |  | -1.734 |  | -1.773 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Good|Outstanding | 3.414 |  | 3.531 |  | 3.519 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| formCIC | 0.258 | 0.492 | 0.129 | -12.839 | 0.181 |
|  | (0.392) | (0.049) \* | (0.683) | (0.534) | (0.665) |
| formGOV | 0.145 | 0.707 | 0.041 | -22.042 | 0.132 |
|  | (0.330) | (<0.001) \*\*\* | (0.785) | (0.004) \*\* | (0.382) |
| formIND | -0.274 | -0.222 | -0.210 | -13.983 | -0.276 |
|  | (0.004) \*\* | (0.007) \*\* | (0.040) \* | (0.012) \* | (0.010) \* |
| formNPO | 0.284 | 0.418 | 0.196 | -9.028 | 0.248 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.008) \*\* | (0.027) \* | (0.002) \*\* |
| service\_type\_selectedcare home w/o nursing | 0.130 | 0.316 | 0.142 | -8.583 | 0.121 |
|  | (0.033) \* | (<0.001) \*\*\* | (0.028) \* | (0.019) \* | (0.086) + |
| service\_type\_selectedDomicilary Care | 0.561 | -0.165 | 0.634 | 4.404 | 0.643 |
|  | (<0.001) \*\*\* | (0.005) \*\* | (<0.001) \*\*\* | (0.286) | (<0.001) \*\*\* |
| service\_type\_selectedSupported Living | 0.589 | 1.391 | 0.593 | -9.017 | 0.615 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.209) | (<0.001) \*\*\* |
| age | 0.030 | 0.000 | 0.029 | -0.265 | 0.030 |
|  | (<0.001) \*\*\* | (0.916) | (<0.001) \*\*\* | (0.379) | (<0.001) \*\*\* |
| during\_covidTRUE | -1.764 | -0.119 | -1.741 | 5.650 | -1.720 |
|  | (<0.001) \*\*\* | (0.007) \*\* | (<0.001) \*\*\* | (0.066) + | (<0.001) \*\*\* |
| (Intercept) |  | 1.000 |  | 47.128 |  |
|  |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  |
| staff\_level |  |  | 0.082 |  |  |
|  |  |  | (<0.001) \*\*\* |  |  |
| turnover |  |  |  |  | 0.000 |
|  |  |  |  |  | (0.452) |
| Num.Obs. | 12521 | 5984 | 11143 | 5085 | 9500 |
| R2 |  | 0.075 |  | 0.011 |  |
| R2 Adj. |  | 0.073 |  | 0.008 |  |
| AIC | 14997.6 | 22011.7 | 13247.1 | 61049.5 | 11127.0 |
| BIC | 15146.3 | 22138.9 | 13400.8 | 61173.6 | 11277.3 |
| Log.Lik. |  | -10986.852 |  | -30505.731 |  |
| RMSE | 2.27 | 1.58 | 2.27 | 93.27 | 2.27 |

### results table for oldstaffing variables

old\_models <- modelsummary(list("full weighted" = model\_order\_weighted,   
 "staffing weighted"= model\_staff\_weighted0,  
 "staff direct weighted" = staff\_direct\_order\_weighted0,  
 "turnover weighted"= model\_turnover\_weighted0,   
 "turnover direct weighted" = turnover\_direct\_order\_weighted0),  
 coef\_omit = "region", exponentiate = F,  
 statistic = "({p.value}) {stars}")  
old\_models

|  | full weighted | staffing weighted | staff direct weighted | turnover weighted | turnover direct weighted |
| --- | --- | --- | --- | --- | --- |
| Inadequate|Req improv | -4.704 |  | -4.549 |  | -4.740 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Req improv|Good | -1.847 |  | -1.701 |  | -1.811 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Good|Outstanding | 3.414 |  | 3.563 |  | 3.482 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| formCIC | 0.258 | 0.496 | 0.138 | -7.474 | 0.176 |
|  | (0.392) | (0.097) + | (0.663) | (0.390) | (0.675) |
| formGOV | 0.145 | 0.898 | 0.045 | -19.195 | 0.109 |
|  | (0.330) | (<0.001) \*\*\* | (0.767) | (<0.001) \*\*\* | (0.471) |
| formIND | -0.274 | -0.150 | -0.220 | -11.766 | -0.290 |
|  | (0.004) \*\* | (0.125) | (0.031) \* | (<0.001) \*\*\* | (0.007) \*\* |
| formNPO | 0.284 | 0.519 | 0.198 | -7.709 | 0.241 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.007) \*\* | (<0.001) \*\*\* | (0.003) \*\* |
| service\_type\_selectedcare home w/o nursing | 0.130 | 0.101 | 0.161 | -5.761 | 0.115 |
|  | (0.033) \* | (0.107) | (0.012) \* | (<0.001) \*\*\* | (0.103) |
| service\_type\_selectedDomicilary Care | 0.561 | -0.612 | 0.658 | 4.280 | 0.646 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.014) \* | (<0.001) \*\*\* |
| service\_type\_selectedSupported Living | 0.589 | 1.197 | 0.632 | -2.538 | 0.607 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.400) | (<0.001) \*\*\* |
| age | 0.030 | -0.015 | 0.030 | 0.477 | 0.030 |
|  | (<0.001) \*\*\* | (0.004) \*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* |
| during\_covidTRUE | -1.764 | -0.122 | -1.742 | 2.466 | -1.721 |
|  | (<0.001) \*\*\* | (0.020) \* | (<0.001) \*\*\* | (0.056) + | (<0.001) \*\*\* |
| (Intercept) |  | 1.855 |  | 28.081 |  |
|  |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  |
| staff\_level0 |  |  | 0.063 |  |  |
|  |  |  | (<0.001) \*\*\* |  |  |
| turnover0 |  |  |  |  | -0.001 |
|  |  |  |  |  | (0.099) + |
| Num.Obs. | 12521 | 5984 | 11143 | 5087 | 9503 |
| R2 |  | 0.074 |  | 0.032 |  |
| R2 Adj. |  | 0.072 |  | 0.028 |  |
| AIC | 14997.6 | 24154.6 | 13251.5 | 52263.6 | 11129.7 |
| BIC | 15146.3 | 24281.8 | 13405.1 | 52387.8 | 11280.0 |
| Log.Lik. |  | -12058.289 |  | -26112.814 |  |
| RMSE | 2.27 | 1.87 | 2.27 | 39.59 | 2.27 |

## Models for other domains

“Overall”,“Safe”,“Effective”, “Caring”, “Well-led”, “Responsive”

### “Safe” domain

model\_order\_weighted\_safe <- clm(rating ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Safe"),  
 link = "logit",  
 weights = ipw)  
  
model\_staff\_weighted\_safe <- lm(staff\_level ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Safe"),  
 weights = ipw)  
  
staff\_direct\_order\_weighted\_safe <- clm(rating ~ form + staff\_level + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Safe"),  
 link = "logit",  
 weights = ipw)  
  
model\_turnover\_weighted\_safe <- lm(turnover ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Safe"),  
 weights = ipw)  
  
turnover\_direct\_order\_weighted\_safe <- clm(rating ~ form + turnover + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Safe"),  
 link = "logit",  
 weights = ipw)

safe\_models <- modelsummary(list("full weighted" = model\_order\_weighted\_safe,   
 "staffing weighted"= model\_staff\_weighted\_safe,  
 "staff direct weighted" = staff\_direct\_order\_weighted\_safe,  
 "turnover weighted"= model\_turnover\_weighted\_safe,   
 "turnover direct weighted" = turnover\_direct\_order\_weighted\_safe),  
 coef\_omit = "region", exponentiate = F,  
 statistic = "({p.value}) {stars}")  
safe\_models

|  | full weighted | staffing weighted | staff direct weighted | turnover weighted | turnover direct weighted |
| --- | --- | --- | --- | --- | --- |
| Inadequate|Req improv | -4.171 |  | -4.032 |  | -4.171 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Req improv|Good | -1.356 |  | -1.178 |  | -1.220 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Good|Outstanding | 6.376 |  | 6.633 |  | 6.396 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| formCIC | 0.161 | 0.492 | -0.057 | -12.839 | -0.219 |
|  | (0.638) | (0.049) \* | (0.870) | (0.534) | (0.614) |
| formGOV | 0.325 | 0.707 | 0.196 | -22.042 | 0.287 |
|  | (0.062) + | (<0.001) \*\*\* | (0.269) | (0.004) \*\* | (0.101) |
| formIND | -0.250 | -0.222 | -0.151 | -13.983 | -0.319 |
|  | (0.010) \* | (0.007) \*\* | (0.155) | (0.012) \* | (0.004) \*\* |
| formNPO | 0.502 | 0.418 | 0.411 | -9.028 | 0.409 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.027) \* | (<0.001) \*\*\* |
| service\_type\_selectedcare home w/o nursing | 0.284 | 0.316 | 0.286 | -8.583 | 0.331 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.019) \* | (<0.001) \*\*\* |
| service\_type\_selectedDomicilary Care | 0.673 | -0.165 | 0.737 | 4.404 | 0.718 |
|  | (<0.001) \*\*\* | (0.005) \*\* | (<0.001) \*\*\* | (0.286) | (<0.001) \*\*\* |
| service\_type\_selectedSupported Living | 0.990 | 1.391 | 0.876 | -9.017 | 1.004 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.209) | (<0.001) \*\*\* |
| age | 0.023 | 0.000 | 0.020 | -0.265 | 0.027 |
|  | (<0.001) \*\*\* | (0.916) | (<0.001) \*\*\* | (0.379) | (<0.001) \*\*\* |
| during\_covidTRUE | -1.446 | -0.119 | -1.426 | 5.650 | -1.415 |
|  | (<0.001) \*\*\* | (0.007) \*\* | (<0.001) \*\*\* | (0.066) + | (<0.001) \*\*\* |
| (Intercept) |  | 1.000 |  | 47.128 |  |
|  |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  |
| staff\_level |  |  | 0.161 |  |  |
|  |  |  | (<0.001) \*\*\* |  |  |
| turnover |  |  |  |  | 0.000 |
|  |  |  |  |  | (0.384) |
| Num.Obs. | 12491 | 5984 | 11116 | 5085 | 9474 |
| R2 |  | 0.075 |  | 0.011 |  |
| R2 Adj. |  | 0.073 |  | 0.008 |  |
| AIC | 12241.1 | 22011.7 | 10678.9 | 61049.5 | 9109.1 |
| BIC | 12389.8 | 22138.9 | 10832.5 | 61173.6 | 9259.4 |
| Log.Lik. |  | -10986.852 |  | -30505.731 |  |
| RMSE | 2.11 | 1.58 | 2.11 | 93.27 | 2.11 |

### “Effective domain”

model\_order\_weighted\_effective <- clm(rating ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Effective"),  
 link = "logit",  
 weights = ipw)  
  
model\_staff\_weighted\_effective <- lm(staff\_level ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Effective"),  
 weights = ipw)  
  
staff\_direct\_order\_weighted\_effective <- clm(rating ~ form + staff\_level + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Effective"),  
 link = "logit",  
 weights = ipw)  
  
model\_turnover\_weighted\_effective <- lm(turnover ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Effective"),  
 weights = ipw)  
  
turnover\_direct\_order\_weighted\_effective <- clm(rating ~ form + turnover + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Effective"),  
 link = "logit",  
 weights = ipw)

effective\_models <- modelsummary(list("full weighted" = model\_order\_weighted\_effective,   
 "staffing weighted"= model\_staff\_weighted\_effective,  
 "staff direct weighted" = staff\_direct\_order\_weighted\_effective,  
 "turnover weighted"= model\_turnover\_weighted\_effective,   
 "turnover direct weighted" = turnover\_direct\_order\_weighted\_effective),  
 coef\_omit = "region", exponentiate = F,  
 statistic = "({p.value}) {stars}")  
effective\_models

|  | full weighted | staffing weighted | staff direct weighted | turnover weighted | turnover direct weighted |
| --- | --- | --- | --- | --- | --- |
| Inadequate|Req improv | -5.773 |  | -5.828 |  | -5.931 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Req improv|Good | -1.877 |  | -1.782 |  | -1.895 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Good|Outstanding | 4.884 |  | 4.982 |  | 4.842 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| formCIC | -0.051 | 0.492 | -0.222 | -12.839 | 0.043 |
|  | (0.893) | (0.049) \* | (0.568) | (0.534) | (0.936) |
| formGOV | 0.195 | 0.707 | 0.046 | -22.042 | 0.138 |
|  | (0.338) | (<0.001) \*\*\* | (0.823) | (0.004) \*\* | (0.499) |
| formIND | -0.391 | -0.222 | -0.188 | -13.983 | -0.211 |
|  | (<0.001) \*\*\* | (0.007) \*\* | (0.151) | (0.012) \* | (0.127) |
| formNPO | 0.233 | 0.418 | 0.124 | -9.028 | 0.165 |
|  | (0.011) \* | (<0.001) \*\*\* | (0.204) | (0.027) \* | (0.129) |
| service\_type\_selectedcare home w/o nursing | 0.333 | 0.316 | 0.309 | -8.583 | 0.249 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.019) \* | (0.006) \*\* |
| service\_type\_selectedDomicilary Care | 0.604 | -0.165 | 0.655 | 4.404 | 0.619 |
|  | (<0.001) \*\*\* | (0.005) \*\* | (<0.001) \*\*\* | (0.286) | (<0.001) \*\*\* |
| service\_type\_selectedSupported Living | 0.739 | 1.391 | 0.792 | -9.017 | 0.758 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.209) | (<0.001) \*\*\* |
| age | 0.021 | 0.000 | 0.019 | -0.265 | 0.019 |
|  | (<0.001) \*\*\* | (0.916) | (0.005) \*\* | (0.379) | (0.015) \* |
| during\_covidTRUE | -1.177 | -0.119 | -1.224 | 5.650 | -1.161 |
|  | (<0.001) \*\*\* | (0.007) \*\* | (<0.001) \*\*\* | (0.066) + | (<0.001) \*\*\* |
| (Intercept) |  | 1.000 |  | 47.128 |  |
|  |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  |
| staff\_level |  |  | 0.077 |  |  |
|  |  |  | (<0.001) \*\*\* |  |  |
| turnover |  |  |  |  | -0.001 |
|  |  |  |  |  | (0.002) \*\* |
| Num.Obs. | 12047 | 5984 | 10733 | 5085 | 9135 |
| R2 |  | 0.075 |  | 0.011 |  |
| R2 Adj. |  | 0.073 |  | 0.008 |  |
| AIC | 9023.6 | 22011.7 | 7937.5 | 61049.5 | 6744.8 |
| BIC | 9171.5 | 22138.9 | 8090.4 | 61173.6 | 6894.3 |
| Log.Lik. |  | -10986.852 |  | -30505.731 |  |
| RMSE | 2.13 | 1.58 | 2.14 | 93.27 | 2.14 |

### “Caring” domain

model\_order\_weighted\_caring <- clm(rating ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Caring"),  
 link = "logit",  
 weights = ipw)  
  
model\_staff\_weighted\_caring <- lm(staff\_level ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Caring"),  
 weights = ipw)  
  
staff\_direct\_order\_weighted\_caring <- clm(rating ~ form + staff\_level + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Caring"),  
 link = "logit",  
 weights = ipw)  
  
model\_turnover\_weighted\_caring <- lm(turnover ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Caring"),  
 weights = ipw)  
  
turnover\_direct\_order\_weighted\_caring <- clm(rating ~ form + turnover + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Caring"),  
 link = "logit",  
 weights = ipw)

caring\_models <- modelsummary(list("full weighted" = model\_order\_weighted\_caring,   
 "staffing weighted"= model\_staff\_weighted\_caring,  
 "staff direct weighted" = staff\_direct\_order\_weighted\_caring,  
 "turnover weighted"= model\_turnover\_weighted\_caring,   
 "turnover direct weighted" = turnover\_direct\_order\_weighted\_caring),  
 coef\_omit = "region", exponentiate = F,  
 statistic = "({p.value}) {stars}")  
caring\_models

|  | full weighted | staffing weighted | staff direct weighted | turnover weighted | turnover direct weighted |
| --- | --- | --- | --- | --- | --- |
| Inadequate|Req improv | -7.035 |  | -6.828 |  | -6.739 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Req improv|Good | -2.768 |  | -2.740 |  | -2.894 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Good|Outstanding | 3.925 |  | 3.942 |  | 3.950 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| formCIC | 0.705 | 0.492 | 0.686 | -12.839 | -0.043 |
|  | (0.041) \* | (0.049) \* | (0.052) + | (0.534) | (0.934) |
| formGOV | 0.004 | 0.707 | -0.100 | -22.042 | 0.000 |
|  | (0.984) | (<0.001) \*\*\* | (0.633) | (0.004) \*\* | (0.999) |
| formIND | 0.081 | -0.222 | 0.135 | -13.983 | 0.254 |
|  | (0.547) | (0.007) \*\* | (0.344) | (0.012) \* | (0.092) + |
| formNPO | 0.194 | 0.418 | 0.188 | -9.028 | 0.281 |
|  | (0.035) \* | (<0.001) \*\*\* | (0.055) + | (0.027) \* | (0.011) \* |
| service\_type\_selectedcare home w/o nursing | 0.327 | 0.316 | 0.265 | -8.583 | 0.153 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.007) \*\* | (0.019) \* | (0.162) |
| service\_type\_selectedDomicilary Care | 0.882 | -0.165 | 0.881 | 4.404 | 0.881 |
|  | (<0.001) \*\*\* | (0.005) \*\* | (<0.001) \*\*\* | (0.286) | (<0.001) \*\*\* |
| service\_type\_selectedSupported Living | 0.875 | 1.391 | 0.833 | -9.017 | 0.793 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.209) | (<0.001) \*\*\* |
| age | 0.040 | 0.000 | 0.038 | -0.265 | 0.044 |
|  | (<0.001) \*\*\* | (0.916) | (<0.001) \*\*\* | (0.379) | (<0.001) \*\*\* |
| during\_covidTRUE | -1.071 | -0.119 | -1.047 | 5.650 | -1.112 |
|  | (<0.001) \*\*\* | (0.007) \*\* | (<0.001) \*\*\* | (0.066) + | (<0.001) \*\*\* |
| (Intercept) |  | 1.000 |  | 47.128 |  |
|  |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  |
| staff\_level |  |  | 0.019 |  |  |
|  |  |  | (0.302) |  |  |
| turnover |  |  |  |  | 0.000 |
|  |  |  |  |  | (0.371) |
| Num.Obs. | 11961 | 5984 | 10666 | 5085 | 9084 |
| R2 |  | 0.075 |  | 0.011 |  |
| R2 Adj. |  | 0.073 |  | 0.008 |  |
| AIC | 8060.8 | 22011.7 | 7237.6 | 61049.5 | 5955.4 |
| BIC | 8208.5 | 22138.9 | 7390.4 | 61173.6 | 6104.8 |
| Log.Lik. |  | -10986.852 |  | -30505.731 |  |
| RMSE | 2.24 | 1.58 | 2.25 | 93.27 | 2.24 |

### “Well-led” domain

model\_order\_weighted\_well\_led <- clm(rating ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Well-led"),  
 link = "logit",  
 weights = ipw)  
  
model\_staff\_weighted\_well\_led <- lm(staff\_level ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Well-led"),  
 weights = ipw)  
  
staff\_direct\_order\_weighted\_well\_led <- clm(rating ~ form + staff\_level + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Well-led"),  
 link = "logit",  
 weights = ipw)  
  
model\_turnover\_weighted\_well\_led <- lm(turnover ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Well-led"),  
 weights = ipw)  
  
turnover\_direct\_order\_weighted\_well\_led <- clm(rating ~ form + turnover + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Well-led"),  
 link = "logit",  
 weights = ipw)

well\_led\_models <- modelsummary(list("full weighted" = model\_order\_weighted\_well\_led,   
 "staffing weighted"= model\_staff\_weighted\_well\_led,  
 "staff direct weighted" = staff\_direct\_order\_weighted\_well\_led,  
 "turnover weighted"= model\_turnover\_weighted\_well\_led,   
 "turnover direct weighted" = turnover\_direct\_order\_weighted\_well\_led),  
 coef\_omit = "region", exponentiate = F,  
 statistic = "({p.value}) {stars}")  
well\_led\_models

|  | full weighted | staffing weighted | staff direct weighted | turnover weighted | turnover direct weighted |
| --- | --- | --- | --- | --- | --- |
| Inadequate|Req improv | -4.160 |  | -4.052 |  | -4.110 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Req improv|Good | -1.312 |  | -1.191 |  | -1.269 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Good|Outstanding | 3.496 |  | 3.593 |  | 3.578 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| formCIC | 0.525 | 0.492 | 0.391 | -12.839 | 0.148 |
|  | (0.070) + | (0.049) \* | (0.198) | (0.534) | (0.711) |
| formGOV | 0.124 | 0.707 | 0.015 | -22.042 | 0.093 |
|  | (0.369) | (<0.001) \*\*\* | (0.916) | (0.004) \*\* | (0.509) |
| formIND | -0.341 | -0.222 | -0.292 | -13.983 | -0.369 |
|  | (<0.001) \*\*\* | (0.007) \*\* | (0.002) \*\* | (0.012) \* | (<0.001) \*\*\* |
| formNPO | 0.324 | 0.418 | 0.235 | -9.028 | 0.299 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.027) \* | (<0.001) \*\*\* |
| service\_type\_selectedcare home w/o nursing | 0.168 | 0.316 | 0.160 | -8.583 | 0.156 |
|  | (0.003) \*\* | (<0.001) \*\*\* | (0.008) \*\* | (0.019) \* | (0.016) \* |
| service\_type\_selectedDomicilary Care | 0.565 | -0.165 | 0.613 | 4.404 | 0.658 |
|  | (<0.001) \*\*\* | (0.005) \*\* | (<0.001) \*\*\* | (0.286) | (<0.001) \*\*\* |
| service\_type\_selectedSupported Living | 0.508 | 1.391 | 0.542 | -9.017 | 0.531 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.209) | (<0.001) \*\*\* |
| age | 0.032 | 0.000 | 0.031 | -0.265 | 0.030 |
|  | (<0.001) \*\*\* | (0.916) | (<0.001) \*\*\* | (0.379) | (<0.001) \*\*\* |
| during\_covidTRUE | -1.482 | -0.119 | -1.445 | 5.650 | -1.452 |
|  | (<0.001) \*\*\* | (0.007) \*\* | (<0.001) \*\*\* | (0.066) + | (<0.001) \*\*\* |
| (Intercept) |  | 1.000 |  | 47.128 |  |
|  |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  |
| staff\_level |  |  | 0.083 |  |  |
|  |  |  | (<0.001) \*\*\* |  |  |
| turnover |  |  |  |  | 0.000 |
|  |  |  |  |  | (0.075) + |
| Num.Obs. | 12500 | 5984 | 11124 | 5085 | 9483 |
| R2 |  | 0.075 |  | 0.011 |  |
| R2 Adj. |  | 0.073 |  | 0.008 |  |
| AIC | 17172.3 | 22011.7 | 15256.7 | 61049.5 | 12788.4 |
| BIC | 17321.0 | 22138.9 | 15410.4 | 61173.6 | 12938.7 |
| Log.Lik. |  | -10986.852 |  | -30505.731 |  |
| RMSE | 2.27 | 1.58 | 2.28 | 93.27 | 2.28 |

### “Responsive” domain

model\_order\_weighted\_responsive <- clm(rating ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Responsive"),  
 link = "logit",  
 weights = ipw)  
  
model\_staff\_weighted\_responsive <- lm(staff\_level ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Responsive"),  
 weights = ipw)  
  
staff\_direct\_order\_weighted\_responsive <- clm(rating ~ form + staff\_level + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Responsive"),  
 link = "logit",  
 weights = ipw)  
  
model\_turnover\_weighted\_responsive <- lm(turnover ~ form + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Responsive"),  
 weights = ipw)  
  
turnover\_direct\_order\_weighted\_responsive <- clm(rating ~ form + turnover + service\_type\_selected + age + region + during\_covid,  
 data = filter(cqc\_skills, domain == "Responsive"),  
 link = "logit",  
 weights = ipw)

responsive\_models <- modelsummary(list("full weighted" = model\_order\_weighted\_responsive,   
 "staffing weighted"= model\_staff\_weighted\_responsive,  
 "staff direct weighted" = staff\_direct\_order\_weighted\_responsive,  
 "turnover weighted"= model\_turnover\_weighted\_responsive,   
 "turnover direct weighted" = turnover\_direct\_order\_weighted\_responsive),  
 coef\_omit = "region", exponentiate = F,  
 statistic = "({p.value}) {stars}")  
responsive\_models

|  | full weighted | staffing weighted | staff direct weighted | turnover weighted | turnover direct weighted |
| --- | --- | --- | --- | --- | --- |
| Inadequate|Req improv | -6.380 |  | -6.098 |  | -5.961 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Req improv|Good | -1.822 |  | -1.705 |  | -1.785 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| Good|Outstanding | 3.679 |  | 3.805 |  | 3.783 |
|  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |
| formCIC | -0.281 | 0.492 | -0.420 | -12.839 | -0.327 |
|  | (0.386) | (0.049) \* | (0.216) | (0.534) | (0.467) |
| formGOV | 0.088 | 0.707 | -0.031 | -22.042 | 0.088 |
|  | (0.597) | (<0.001) \*\*\* | (0.857) | (0.004) \*\* | (0.609) |
| formIND | 0.069 | -0.222 | 0.124 | -13.983 | 0.108 |
|  | (0.536) | (0.007) \*\* | (0.298) | (0.012) \* | (0.400) |
| formNPO | 0.271 | 0.418 | 0.237 | -9.028 | 0.241 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.004) \*\* | (0.027) \* | (0.010) \*\* |
| service\_type\_selectedcare home w/o nursing | 0.598 | 0.316 | 0.610 | -8.583 | 0.526 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.019) \* | (<0.001) \*\*\* |
| service\_type\_selectedDomicilary Care | 0.643 | -0.165 | 0.742 | 4.404 | 0.749 |
|  | (<0.001) \*\*\* | (0.005) \*\* | (<0.001) \*\*\* | (0.286) | (<0.001) \*\*\* |
| service\_type\_selectedSupported Living | 1.036 | 1.391 | 1.071 | -9.017 | 0.989 |
|  | (<0.001) \*\*\* | (<0.001) \*\*\* | (<0.001) \*\*\* | (0.209) | (<0.001) \*\*\* |
| age | 0.039 | 0.000 | 0.040 | -0.265 | 0.041 |
|  | (<0.001) \*\*\* | (0.916) | (<0.001) \*\*\* | (0.379) | (<0.001) \*\*\* |
| during\_covidTRUE | -0.773 | -0.119 | -0.724 | 5.650 | -0.656 |
|  | (<0.001) \*\*\* | (0.007) \*\* | (<0.001) \*\*\* | (0.066) + | (<0.001) \*\*\* |
| (Intercept) |  | 1.000 |  | 47.128 |  |
|  |  | (<0.001) \*\*\* |  | (<0.001) \*\*\* |  |
| staff\_level |  |  | 0.062 |  |  |
|  |  |  | (<0.001) \*\*\* |  |  |
| turnover |  |  |  |  | 0.000 |
|  |  |  |  |  | (0.952) |
| Num.Obs. | 12026 | 5984 | 10718 | 5085 | 9123 |
| R2 |  | 0.075 |  | 0.011 |  |
| R2 Adj. |  | 0.073 |  | 0.008 |  |
| AIC | 11517.2 | 22011.7 | 10240.4 | 61049.5 | 8527.0 |
| BIC | 11665.1 | 22138.9 | 10393.3 | 61173.6 | 8676.5 |
| Log.Lik. |  | -10986.852 |  | -30505.731 |  |
| RMSE | 2.30 | 1.58 | 2.30 | 93.27 | 2.29 |