Script 5a

Pain sites

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24 January 2020

Contents

Analysis notes

Knee pain was recoded as part of *Leg* pain.

For analysis purposes, missing data in the *site of pain* columns were changed to **'No'** (pain not present in the site). This approach was conservative, but we believed that the approach would have the least effect on the outcome, while still retaining as many participants as possible.

Definitions of missingness

Data were regarded as **missing** when *pain in the last week* data were not present for one or more of weeks 0, 12, 24, 36, 48. Data also were classified as **missing** when there were inconsistencies in the data across the variables collected within a week.

Definition of data inconsistencies

Pain was defined as *pain in the last week* being 'Yes', and *pain at its worst* being > 0. These two measurements were then the "gatekeeper" measurements, such that the two measurements both had to be positive ('Yes' and '> 0', respectively) in order for there to be any entries for *site of pain* and *site of worst pain*. Were the data were inconsistent (e.g., when there was no *pain in the last week* and *pain at its worst* $= 0$, but there were entries for *site of pain* and *site of worst pain*), then the *site of pain* and *site of worst pain* entries were marked as **inconsistent**.

Data also were considered **inconsistent** when *pain in the last week* = 'Yes', but *site of worst pain* = 'None'.

Lastly, data were considered **inconsistent** when *site of worst pain* was not listed as one of the pain locations for a given measurement week.

Import data

```
df <- read_rds('data-cleaned/data-ADVANCE.rds') %>%
    select(ranid, interval_name, pain_in_the_last_week,
           any_missing, ends_with('_pain'))
```

First look

```
head(df)
```

```
## # A tibble: 6 x 17
##   ranid interval_name pain_in_the_las~ any_missing head_pain cervical_pain
##   <chr> <ord>         <chr>            <chr>       <chr>     <chr>
## 1 01-0~ 0 weeks       No               No          No        No
## 2 01-0~ 12 weeks      No               No          No        No
## 3 01-0~ 24 weeks      No               No          No        No
## 4 01-0~ 36 weeks      No               No          No        No
## 5 01-0~ 48 weeks      No               No          No        No
## 6 01-0~ 0 weeks       No               No          No        No
## # ... with 11 more variables: shoulder_pain <chr>, arm_pain <chr>,
## #   hand_pain <chr>, chest_pain <chr>, abdominal_pain <chr>,
## #   low_back_pain <chr>, buttock_pain <chr>, hip_groin_pain <chr>,
## #   leg_pain <chr>, genital_pain <chr>, foot_pain <chr>
```

```
glimpse(df)
```

```
## Observations: 5,265
## Variables: 17
## $ ranid                 <chr> "01-0001", "01-0001", "01-0001", "01-0001", "...
## $ interval_name         <ord> 0 weeks, 12 weeks, 24 weeks, 36 weeks, 48 wee...
## $ pain_in_the_last_week <chr> "No", "No", "No", "No", "No", "No", "Yes", "Y...
## $ any_missing           <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ head_pain             <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ cervical_pain         <chr> "No", "No", "No", "No", "No", "No", "No", "Ye...
## $ shoulder_pain         <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ arm_pain              <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ hand_pain             <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ chest_pain            <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ abdominal_pain        <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ low_back_pain         <chr> "No", "No", "No", "No", "No", "No", "No", "Ye...
## $ buttock_pain          <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ hip_groin_pain        <chr> "No", "No", "No", "No", "No", "No", "Yes", "N...
## $ leg_pain              <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ genital_pain          <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ foot_pain             <chr> "No", "No", "No", "No", "No", "No", "No", "No...
```

Basic clean data

```
# Extract those participants with no missing data and who had pain
df %<>%
  filter(any_missing == 'No') %>%
  select(-any_missing) %>%
  filter(pain_in_the_last_week == 'Yes')
```

Quick tabulation

Analysis data set for the period 0 to 48 weeks

```
# Tabulate data
xtabs(~interval_name, data = df)
```

```
## interval_name
##  0 weeks 12 weeks 24 weeks 36 weeks 48 weeks
##      151      143      127      114       96
```

Tabulate pain sites at each visit

```
df_sites <- df %>%
    # Nest by interval_name
    group_by(interval_name) %>%
    nest() %>%
    arrange(interval_name) %>%
    # Gather pain sites columns
    mutate(data_long = map(.x = data,
                           ~ .x %>%
                             pivot_longer(cols = ends_with('_pain'),
                                          names_to = 'site',
                                          values_to = 'presence'))) %>%
    # Determine pain sites
    mutate(data_prop = map(.x = data_long,
                           ~ .x %>%
                               # Generate counts per site
                               group_by(site, presence) %>%
                               summarise(count = n()) %>%
                               group_by(site) %>%
                               # calculate proportion with a particular pain site
                               mutate(total = sum(count),
                                      prop = round(count / total, 3)) %>%
                               arrange(presence, desc(prop))))


walk2(.x = df_sites$data_prop,
      .y = df_sites$interval_name,
      ~print(kable(.x,
                   caption = .y)))
```

```
##
##
## Table: 0 weeks
```

```
##
## site             presence    count   total    prop
## ---------------  ---------  ------  ------  ------
## genital_pain     No            147     151   0.974
## hip_groin_pain   No            147     151   0.974
## buttock_pain     No            145     151   0.960
## hand_pain        No            144     151   0.954
## arm_pain         No            140     151   0.927
## foot_pain        No            139     151   0.921
## shoulder_pain    No            139     151   0.921
## cervical_pain    No            136     151   0.901
## leg_pain         No            131     151   0.868
## chest_pain       No            125     151   0.828
## low_back_pain    No            124     151   0.821
## head_pain        No            120     151   0.795
## abdominal_pain   No            118     151   0.781
## abdominal_pain   Yes            33     151   0.219
## head_pain        Yes            31     151   0.205
## low_back_pain    Yes            27     151   0.179
## chest_pain       Yes            26     151   0.172
## leg_pain         Yes            20     151   0.132
## cervical_pain    Yes            15     151   0.099
## foot_pain        Yes            12     151   0.079
## shoulder_pain    Yes            12     151   0.079
## arm_pain         Yes            11     151   0.073
## hand_pain        Yes             7     151   0.046
## buttock_pain     Yes             6     151   0.040
## genital_pain     Yes             4     151   0.026
## hip_groin_pain   Yes             4     151   0.026
##
##
## Table: 12 weeks
##
## site             presence    count   total    prop
## ---------------  ---------  ------  ------  ------
## buttock_pain     No            139     143   0.972
## genital_pain     No            138     143   0.965
## hip_groin_pain   No            137     143   0.958
## shoulder_pain    No            135     143   0.944
## hand_pain        No            134     143   0.937
## arm_pain         No            133     143   0.930
## foot_pain        No            133     143   0.930
## cervical_pain    No            132     143   0.923
## leg_pain         No            130     143   0.909
## head_pain        No            120     143   0.839
## low_back_pain    No            119     143   0.832
## chest_pain       No            116     143   0.811
## abdominal_pain   No            114     143   0.797
## abdominal_pain   Yes            29     143   0.203
## chest_pain       Yes            27     143   0.189
## low_back_pain    Yes            24     143   0.168
## head_pain        Yes            23     143   0.161
## leg_pain         Yes            13     143   0.091
## cervical_pain    Yes            11     143   0.077
## arm_pain         Yes            10     143   0.070
## foot_pain        Yes            10     143   0.070
## hand_pain        Yes             9     143   0.063
## shoulder_pain    Yes             8     143   0.056
## hip_groin_pain   Yes             6     143   0.042
```

```
## genital_pain     Yes             5     143   0.035
## buttock_pain     Yes             4     143   0.028
##
##
## Table: 24 weeks
##
## site             presence    count   total    prop
## ---------------  ---------  ------  ------  ------
## buttock_pain     No            126     127   0.992
## genital_pain     No            125     127   0.984
## cervical_pain    No            124     127   0.976
## hip_groin_pain   No            124     127   0.976
## shoulder_pain    No            121     127   0.953
## hand_pain        No            120     127   0.945
## arm_pain         No            118     127   0.929
## leg_pain         No            111     127   0.874
## foot_pain        No            107     127   0.843
## chest_pain       No            105     127   0.827
## abdominal_pain   No            103     127   0.811
## low_back_pain    No            102     127   0.803
## head_pain        No             94     127   0.740
## head_pain        Yes            33     127   0.260
## low_back_pain    Yes            25     127   0.197
## abdominal_pain   Yes            24     127   0.189
## chest_pain       Yes            22     127   0.173
## foot_pain        Yes            20     127   0.157
## leg_pain         Yes            16     127   0.126
## arm_pain         Yes             9     127   0.071
## hand_pain        Yes             7     127   0.055
## shoulder_pain    Yes             6     127   0.047
## cervical_pain    Yes             3     127   0.024
## hip_groin_pain   Yes             3     127   0.024
## genital_pain     Yes             2     127   0.016
## buttock_pain     Yes             1     127   0.008
##
##
## Table: 36 weeks
##
## site             presence    count   total    prop
## ---------------  ---------  ------  ------  ------
## hip_groin_pain   No            113     114   0.991
## buttock_pain     No            111     114   0.974
## cervical_pain    No            111     114   0.974
## genital_pain     No            109     114   0.956
## arm_pain         No            108     114   0.947
## hand_pain        No            108     114   0.947
## shoulder_pain    No            106     114   0.930
## leg_pain         No            103     114   0.904
## low_back_pain    No            101     114   0.886
## chest_pain       No             99     114   0.868
## foot_pain        No             95     114   0.833
## abdominal_pain   No             91     114   0.798
## head_pain        No             86     114   0.754
## head_pain        Yes            28     114   0.246
## abdominal_pain   Yes            23     114   0.202
## foot_pain        Yes            19     114   0.167
## chest_pain       Yes            15     114   0.132
## low_back_pain    Yes            13     114   0.114
## leg_pain         Yes            11     114   0.096
```

```
## shoulder_pain    Yes             8     114   0.070
## arm_pain         Yes             6     114   0.053
## hand_pain        Yes             6     114   0.053
## genital_pain     Yes             5     114   0.044
## buttock_pain     Yes             3     114   0.026
## cervical_pain    Yes             3     114   0.026
## hip_groin_pain   Yes             1     114   0.009
##
##
## Table: 48 weeks
##
## site             presence    count   total    prop
## ---------------  ---------  ------  ------  ------
## buttock_pain     No             96      96   1.000
## hip_groin_pain   No             96      96   1.000
## hand_pain        No             94      96   0.979
## genital_pain     No             93      96   0.969
## arm_pain         No             91      96   0.948
## cervical_pain    No             90      96   0.938
## shoulder_pain    No             90      96   0.938
## chest_pain       No             87      96   0.906
## foot_pain        No             84      96   0.875
## leg_pain         No             80      96   0.833
## low_back_pain    No             77      96   0.802
## head_pain        No             73      96   0.760
## abdominal_pain   No             72      96   0.750
## abdominal_pain   Yes            24      96   0.250
## head_pain        Yes            23      96   0.240
## low_back_pain    Yes            19      96   0.198
## leg_pain         Yes            16      96   0.167
## foot_pain        Yes            12      96   0.125
## chest_pain       Yes             9      96   0.094
## cervical_pain    Yes             6      96   0.062
## shoulder_pain    Yes             6      96   0.062
## arm_pain         Yes             5      96   0.052
## genital_pain     Yes             3      96   0.031
## hand_pain        Yes             2      96   0.021
```

Number of pain sites

`missing` refers to the number of participants who indicated that they had pain (and had a worst pain > 0) but had with no *'Yes'* for any of the pain sites.

```
df_number <- df_sites %>%
  mutate(data_number = map(.x = data_long,
                           ~ .x %>%
                             filter(presence == 'Yes') %>%
                             group_by(ranid) %>%
                             summarise(count = n()))) %>%
  mutate(data_summarised = map2(.x = data_number,
                                .y = data,
                                ~ .x %>%
                                  summarise(n = nrow(.y),
                                            mean = round(mean(count), 2),
                                            sd = round(sd(count), 2),
                                            median = median(count),
```

```
                                          Q25 = quantile(count, probs = 0.25),
                                          Q75 = quantile(count, probs = 0.75),
                                          min = min(count),
                                          max = max(count))))

walk2(.x = df_number$data_summarised,
      .y = df_number$interval_name,
      ~print(kable(.x,
                   caption = .y)))
```

```
##
##
## Table: 0 weeks
##
##    n   mean     sd   median   Q25   Q75   min   max
## ----  -----  -----  -------  ----  ----  ----  ----
##  151   1.38   0.88        1     1     2     1     9
##
##
## Table: 12 weeks
##
##    n   mean     sd   median   Q25   Q75   min   max
## ----  -----  -----  -------  ----  ----  ----  ----
##  143   1.25   0.67        1     1     1     1     5
##
##
## Table: 24 weeks
##
##    n   mean     sd   median   Q25   Q75   min   max
## ----  -----  -----  -------  ----  ----  ----  ----
##  127   1.35   0.99        1     1     1     1    10
##
##
## Table: 36 weeks
##
##    n   mean     sd   median   Q25   Q75   min   max
## ----  -----  -----  -------  ----  ----  ----  ----
##  114   1.24   0.64        1     1     1     1     6
##
##
## Table: 48 weeks
##
##   n   mean     sd   median   Q25   Q75   min   max
## ---  -----  -----  -------  ----  ----  ----  ----
##  96    1.3   0.68        1     1     1     1     4
```

Session information

```
sessionInfo()
```

```
## R version 3.6.1 (2019-07-05)
## Platform: x86_64-apple-darwin15.6.0 (64-bit)
## Running under: macOS Mojave 10.14.6
##
## Matrix products: default
```

```
## BLAS:   /Library/Frameworks/R.framework/Versions/3.6/Resources/lib/libRblas.0.dylib
## LAPACK: /Library/Frameworks/R.framework/Versions/3.6/Resources/lib/libRlapack.dylib
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
##  [1] knitr_1.27      magrittr_1.5    forcats_0.4.0   stringr_1.4.0
##  [5] dplyr_0.8.3     purrr_0.3.3     readr_1.3.1     tidyr_1.0.0
##  [9] tibble_2.1.3    ggplot2_3.2.1   tidyverse_1.3.0
##
## loaded via a namespace (and not attached):
##  [1] tidyselect_0.2.5 xfun_0.12        haven_2.2.0      lattice_0.20-38
##  [5] colorspace_1.4-1 vctrs_0.2.1      generics_0.0.2   htmltools_0.4.0
##  [9] yaml_2.2.0       utf8_1.1.4       rlang_0.4.2      pillar_1.4.3
## [13] withr_2.1.2      glue_1.3.1       DBI_1.1.0        dbplyr_1.4.2
## [17] modelr_0.1.5     readxl_1.3.1     lifecycle_0.1.0  munsell_0.5.0
## [21] gtable_0.3.0     cellranger_1.1.0 rvest_0.3.5      evaluate_0.14
## [25] fansi_0.4.1      highr_0.8        broom_0.5.3      Rcpp_1.0.3
## [29] scales_1.1.0     backports_1.1.5  jsonlite_1.6     fs_1.3.1
## [33] hms_0.5.3        digest_0.6.23    stringi_1.4.5    grid_3.6.1
## [37] cli_2.0.1        tools_3.6.1      lazyeval_0.2.2   crayon_1.3.4
## [41] pkgconfig_2.0.3  zeallot_0.1.0    xml2_1.2.2       reprex_0.3.0
## [45] lubridate_1.7.4  assertthat_0.2.1 rmarkdown_2.1    httr_1.4.1
## [49] rstudioapi_0.10  R6_2.4.1         nlme_3.1-143     compiler_3.6.1
```