Results Section: Public Metadata

```
library(staphopia)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(ggplot2)
library(reshape2)
USE_DEV = TRUE
```

Aggregating Data For Public Samples

First we'll get all publicly available *S. aureus* samples.

```
ps <- get_public_samples()
```

We now have 42949 samples to work with. Next we will acquire metadata associated with each sample.

We will also get information pertaining to submissions by year and how any publication links were made.

```
submissions <- get_submission_by_year()
publication_links <- get_publication_links()
```

Next we are going to pull down any metadata associated with the public samples.

```
metrics <- merge(
    ps,
    get_metadata(ps$sample_id),
    by='sample_id'
)
```

We are now going to add two columns `rank_name` and `year`.

```
metrics$year <- sapply(
    metrics$first_public,
    function(x) {
        strsplit(x, "-")[[1]][1]
    }
)

metrics$rank_name <- ifelse(
    metrics$rank.x == 3,
    'Gold',
    ifelse(
        metrics$rank.x == 2,
        'Silver',
```

```
        'Bronze'
    )
)
```

Publication Information

Summary

Here are details looking at total submissions and their publication status.

```
t(submissions[submissions$year == max(submissions$year),])
```

```
##                          8
## year                  2017
## published               17
## unpublished           6698
## count                 6715
## overall_published    11921
## overall_unpublished 31028
## overall              42949
```

Here is information on how publication links were made.

```
t(publication_links)
```

```
##                1
## elink       6712
## text        5656
## elink_pmid    48
## text_pmid     30
## total      11921
## total_pmid    78
```

There are 6 rows and their names are as follows:

1. elink: Number samples linked to a PubMed ID identified from eLink
2. text: Number samples linked to a PubMed ID identified from text mining (not through eLink)
3. elink_pmid: Number of PubMed IDs identified from eLink
4. text_pmid: Number of PubMed IDs identified from text mining (not through eLink)
5. total: Total number of samples associated with a PubMed ID
6. total_pmid: Total number of PubMed IDs associated with published samples

Percent of Samples Published

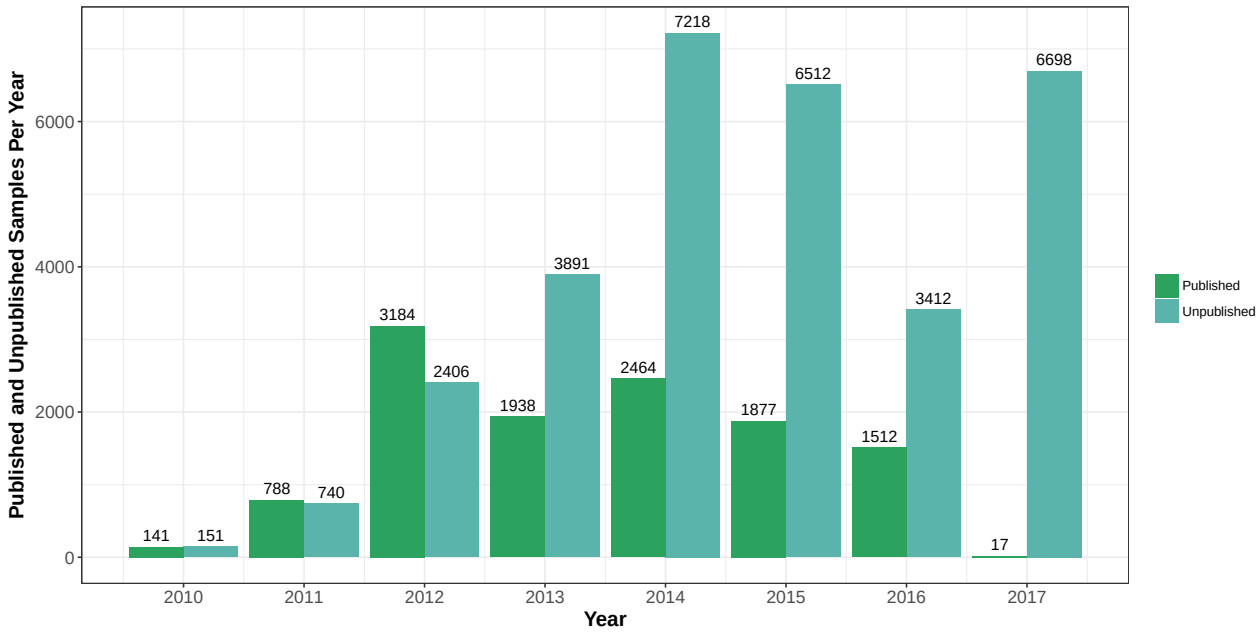
```
stats <- submissions[submissions$year == max(submissions$year),]
stats$overall_published / stats$overall * 100
```

```
## [1] 27.75618
```

Published vs Unpublished Submissions Per Year

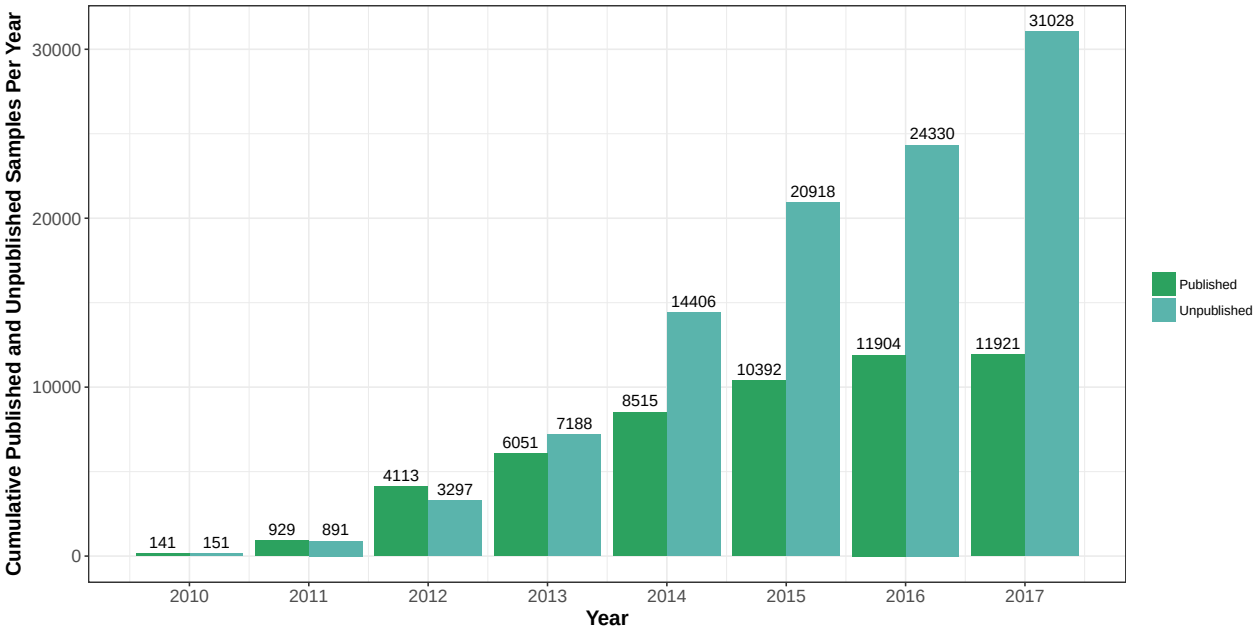
```
melted <- melt(submissions, id=c('year'),
               measure.vars = c('published', 'unpublished'))
melted$title <- ifelse(melted$variable == 'published', 'Published', 'Unpublished')
p <- ggplot(data=melted, aes(x=year, y=value, fill=title)) +
    xlab("Year") +
```

```
    ylab("Published and Unpublished Samples Per Year") +
    geom_bar(stat='identity', position='dodge') +
    geom_text(aes(label=value), vjust = -0.5, position = position_dodge(.9)) +
    scale_fill_manual(values=c("#2ca25f", "#5ab4ac")) +
    scale_x_continuous(breaks = round(seq(min(submissions$year), max(submissions$year), by = 1),1)) +
    theme_bw() +
    theme(axis.text=element_text(size=12),
          axis.title=element_text(size=14,face="bold"),
          legend.title = element_blank())


p
```



Overall Published vs Unpublished Submissions

```
melted <- melt(submissions, id=c('year'),
               measure.vars = c('overall_published', 'overall_unpublished'))
melted$title <- ifelse(melted$variable == 'overall_published', 'Published', 'Unpublished')
p <- ggplot(data=melted, aes(x=year, y=value, fill=title)) +
    xlab("Year") +
    ylab("Cumulative Published and Unpublished Samples Per Year") +
    geom_bar(stat='identity', position='dodge') +
    geom_text(aes(label=value), vjust = -0.5, position = position_dodge(.9)) +
    scale_fill_manual(values=c("#2ca25f", "#5ab4ac")) +
    scale_x_continuous(breaks = round(seq(min(submissions$year), max(submissions$year), by = 1),1)) +
    theme_bw() +
    theme(axis.text=element_text(size=12),
          axis.title=element_text(size=14,face="bold"),
          legend.title = element_blank())


p
```



Metadata Information

Number of Samples With A Collection Date

```
has_collection_date <- nrow(metrics[metrics$collection_date != "",])
paste0(has_collection_date," (", has_collection_date / nrow(metrics) * 100, " %)")
```

```
## [1] "17034 (39.660993271089 %)"
```

Number of Samples With A Location Information

```
has_location <- nrow(metrics[metrics$location != "unknown/missing",])
paste0(has_location," (", has_location / nrow(metrics) * 100, " %)")
```

```
## [1] "14983 (34.8855619455633 %)"
```

Number of Locations

```
nrow(as.data.frame(table(metrics[metrics$location != "unknown/missing",]$location)))
```

```
## [1] 123
```

Countries

```
country_data <- as.data.frame(table(metrics[(metrics$country != "unknown/missing" ) & (metrics$country
colnames(country_data) <- c("Country", "total")
country_data <- arrange(country_data, desc(total))
country_data
```

```
##                          Country total
## 1  United States of America (USA)  5823
## 2             United Kingdom (UK)  5177
## 3                         Germany   966
## 4                         Denmark   480
```

```
## 5                      Thailand   277
## 6                     Singapore   247
## 7                      Tanzania   153
## 8                   Netherlands   138
## 9                     Australia   131
## 10                   Luxembourg   122
## 11                      Ireland   111
## 12                       Gambia    88
## 13                  New Zealand    82
## 14                       Canada    59
## 15                     Colombia    59
## 16                        Gabon    59
## 17                       France    55
## 18                       Taiwan    54
## 19                      Belgium    53
## 20                    Argentina    50
## 21                        Spain    40
## 22                       Sweden    35
## 23                        Italy    29
## 24                     Portugal    28
## 25                       Russia    27
## 26                        Chile    25
## 27                  Switzerland    25
## 28                         Perú    24
## 29                       Poland    21
## 30                   Mozambique    17
## 31                     Malaysia    14
## 32                        Ghana    12
## 33                      Finland    10
## 34                       Norway     7
## 35                       Brazil     6
## 36                        China     6
## 37                       Greece     6
## 38                       Turkey     6
## 39                      Hungary     5
## 40                   Martinique     1
```

Number of Countries

```
paste0(nrow(country_data), " countries, represented by ", sum(country_data$total), " samples")
```

```
## [1] "40 countries, represented by 14528 samples"
```

Number of Samples With Isolation Source

```
has_source <- nrow(metrics[metrics$isolation_source != "",])
paste0(has_source," (", has_source / nrow(metrics) * 100, " %)")
```

```
## [1] "14768 (34.3849682181192 %)"
```

Isolation Sources

```
as.data.frame(table(metrics[metrics$isolation_source != "",]$isolation_source))
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## 14     5
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## 20     1
## 21     2
## 22     1
## 23     1
## 24     1
## 25     1
## 26     3
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## 29     5
## 30     1
## 31     2
## 32     2
## 33    38
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## 36   229
## 37     3
## 38     2
## 39    19
## 40     4
## 41     2
## 42     2
## 43    26
## 44     9
## 45    24
## 46     2
## 47     5
## 48     3
## 49     8
## 50    71
## 51    93
## 52     3
## 53     1
## 54     1
## 55     8
## 56     1
## 57     7
## 58     1
## 59     2
## 60     1
## 61     1
## 62     4
## 63     2
## 64     1
## 65     2
## 66     1
## 67    78
## 68    10
## 69     9
## 70     1
## 71     4
## 72     1
## 73     8
## 74   305
## 75   399
## 76     1
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## 79     1
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## 82    19
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## 84     1
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## 103   10
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## 105   10
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## 110    8
## 111   63
## 112    1
## 113    2
## 114    2
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## 116    3
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## 118   17
## 119   36
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## 138   18
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## 143   24
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## 150    2
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## 155    1
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## 159  118
## 160   52
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## 167   12
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## 184   57
## 185  153
## 186   11
## 187    7
## 188  228
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## 191  641
## 192  595
## 193  141
## 194   14
## 195  225
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## 209    1
## 210    1
## 211  116
## 212  865
## 213  238
## 214   13
## 215    5
## 216   45
## 217  253
## 218    2
## 219    4
## 220    1
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## 225    2
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## 271    3
## 272   17
## 273   10
## 274  205
## 275    3
## 276    1
## 277  363
## 278  266
## 279    1
## 280    7
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## 283    3
## 284    4
## 285    1
## 286    1
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## 288    1
## 289    9
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## 292    2
## 293  127
## 294   26
## 295    1
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## 298   12
## 299    3
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## 303   64
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## 385    1
## 386    1
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## 389  997
## 390    2
## 391   13
## 392    1
## 393    1
## 394   51
## 395   18
## 396    2
```

Number of Isolation Sources

```
nrow(as.data.frame(table(metrics[metrics$isolation_source != "",]$isolation_source)))
```

```
## [1] 396
```