lab17

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Import

```
url = "covid19vaccinesbyzipcode_test.csv" # data fulled from 2023-02-28

vax <- read.csv(url)
tail(vax[order(vax$as_of_date),])
```

```
       as_of_date zip_code_tabulation_area local_health_jurisdiction
197563 2023-02-21                   95076                Santa Cruz
197564 2023-02-21                   93280                      Kern
197565 2023-02-21                   93301                      Kern
197566 2023-02-21                   95046               Santa Clara
197567 2023-02-21                   93437             Santa Barbara
197568 2023-02-21                   95010                Santa Cruz
              county vaccine_equity_metric_quartile                vem_source
197563    Santa Cruz                             2 Healthy Places Index Score
197564          Kern                             1 Healthy Places Index Score
197565          Kern                             1 Healthy Places Index Score
197566   Santa Clara                             4 Healthy Places Index Score
197567 Santa Barbara                            NA            No VEM Assigned
197568    Santa Cruz                             3 Healthy Places Index Score
       age12_plus_population age5_plus_population tot_population
197563               70940.9                80312          86905
197564               23052.1                26032          28138
197565                9731.2                11151          12325
197566                5087.5                 5696           5918
197567                2494.5                 2871           3387
197568                7602.0                 8436           8856
       persons_fully_vaccinated persons_partially_vaccinated
197563                    68622                         6516
```

```
197564                    13439                          1829
197565                     7578                          1148
197566                     5291                           336
197567                      457                           988
197568                     7752                           695
       percent_of_population_fully_vaccinated
197563                                0.789621
197564                                0.477610
197565                                0.614848
197566                                0.894052
197567                                0.134928
197568                                0.875339
       percent_of_population_partially_vaccinated
197563                                    0.074978
197564                                    0.065001
197565                                    0.093144
197566                                    0.056776
197567                                    0.291704
197568                                    0.078478
       percent_of_population_with_1_plus_dose booster_recip_count
197563                                0.864599               40293
197564                                0.542611                5768
197565                                0.707992                3714
197566                                0.950828                3391
197567                                0.426632                 103
197568                                0.953817                5600
       bivalent_dose_recip_count eligible_recipient_count redacted
197563                     15013                    68362       No
197564                      1132                    13418       No
197565                      1168                     7563       No
197566                      1267                     5276       No
197567                        31                      456       No
197568                      2831                     7741       No
```

Q1 persons_fully_vaccinated

Q2 zip_code_tabulation_area

Q3 2021-01-05

Q4 2023-02-21 (this report is done on 2023-02-28, the data will update throughout time)

```
skimr::skim(vax)
```

Table 1: Data summary

Name	vax
Number of rows	197568
Number of columns	18
_____	
Column type frequency:	
character	5
numeric	13
_____	
Group variables	None

Variable type: character

skim_variable	n_missing	complete_rate	min	max	empty	n_unique	whitespace
as_of_date	0	1	10	10	0	112	0
local_health_jurisdiction	0	1	0	15	560	62	0
county	0	1	0	15	560	59	0
vem_source	0	1	15	26	0	3	0
redacted	0	1	2	69	0	2	0

Variable type: numeric

skim_variable	n_missing	complete_rate	mean	sd	p0	p25	p50	p75	p100	hist
zip_code_tabulation_area	0	1.00	93665.11	1817.38	90001	92257.75	93658.50	95380.50	97635.0	
vaccine_equity_metric_quartile	9744	0.95	2.44	1.11	1	1.00	2.00	3.00	4.0	
age12_plus_population	0	1.00	18895.01	18993.87	0	1346.95	13685.50	31756.25	88556.7	
age5_plus_population	0	1.00	20875.24	21105.97	0	1460.50	15364.00	34877.00	101902.0	
tot_population	9632	0.95	23372.72	22628.51	12	2126.00	18714.00	38168.00	111165.0	
persons_fully_vaccinated	16424	0.92	13933.28	15034.25	11	927.75	8548.00	23255.00	67533.0	
persons_partially_vaccinated	16424	0.92	1701.03	2026.98	11	165.00	1196.00	2534.00	39832.0	
percent_of_population_fully_vaccinated	20688	0.90	0.57	0.25	0	0.42	0.60	0.74	1.0	
percent_of_population_partially_vaccinated	20688	0.90	0.08	0.09	0	0.05	0.06	0.08	1.0	
percent_of_population_with_1_plus_dose	21712	0.89	0.63	0.24	0	0.48	0.67	0.81	1.0	
booster_recip_count	72754	0.63	5791.60	7111.11	11	295.00	2724.00	9372.75	59493.0	
bivalent_dose_recip_count	158541	0.20	2867.36	3529.71	11	186.00	1374.00	4513.50	27175.0	
eligible_recipient_count	0	1.00	12772.28	13887.79	0	501.00	6309.50	21926.50	67215.0	

Q5 13

Q6 16424

```
1 - 0.9168691
```

```
[1] 0.0831309
```

Q7 8.31%

Q8 Some population might not be fully registed in the medical system.

Working with dates

```
library(lubridate)
```

```
Attaching package: 'lubridate'

The following objects are masked from 'package:base':

    date, intersect, setdiff, union
```

```
today()
```

```
[1] "2023-03-07"
```

```
# Specify that we are using the year-month-day format
vax$as_of_date <- ymd(vax$as_of_date)
```

How many days have passed since the first vaccination reported in this dataset?

```
today() - vax$as_of_date[1]
```

```
Time difference of 791 days
```

How many days the dataset span?

```
vax$as_of_date[nrow(vax)] - vax$as_of_date[1]
```

```
Time difference of 777 days
```

How many days have passed since the last update of the dataset?

```
today()  - tail(vax$as_of_date,1)
```

```
Time difference of 14 days
```

Q9 7

```
length(unique(vax$as_of_date))
```

```
[1] 112
```

Q10 112

Working with ZIP codes

```
library(zipcodeR)
geocode_zip('92037')
```

```
# A tibble: 1 x 3
  zipcode   lat   lng
  <chr>   <dbl> <dbl>
1 92037    32.8 -117.
```

```
# distance between two zip code
zip_distance('92037','92109')
```

```
  zipcode_a zipcode_b distance
1     92037     92109     2.33
```

```
  # get information from zip code
  reverse_zipcode(c('92037', "92109") )
```

```
# A tibble: 2 x 24
  zipcode zipcode_~1 major~2 post_~3 common_c~4 county state   lat   lng timez~5
  <chr>   <chr>      <chr>   <chr>       <blob> <chr>  <chr> <dbl> <dbl> <chr>
1 92037   Standard   La Jol~ La Jol~ <raw 20 B> San D~ CA     32.8 -117. Pacific
2 92109   Standard   San Di~ San Di~ <raw 21 B> San D~ CA     32.8 -117. Pacific
# ... with 14 more variables: radius_in_miles <dbl>, area_code_list <blob>,
#   population <int>, population_density <dbl>, land_area_in_sqmi <dbl>,
#   water_area_in_sqmi <dbl>, housing_units <int>,
#   occupied_housing_units <int>, median_home_value <int>,
#   median_household_income <int>, bounds_west <dbl>, bounds_east <dbl>,
#   bounds_north <dbl>, bounds_south <dbl>, and abbreviated variable names
#   1: zipcode_type, 2: major_city, 3: post_office_city, ...
```

```
  sd <- vax[vax$county=="San Diego", ]
  length(unique(sd$zip_code_tabulation_area))
```

```
[1] 107
```

Q11. 107

```
  sd[which.max(sd$age12_plus_population),"zip_code_tabulation_area"]
```

```
[1] 92154
```

Q12 92154

```
  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
```

```
sd.tmp <- filter(vax, county == "San Diego" &
                 as_of_date == "2022-11-15")

mean(sd.tmp$percent_of_population_fully_vaccinated, na.rm=TRUE)
```

```
[1] 0.7380452
```

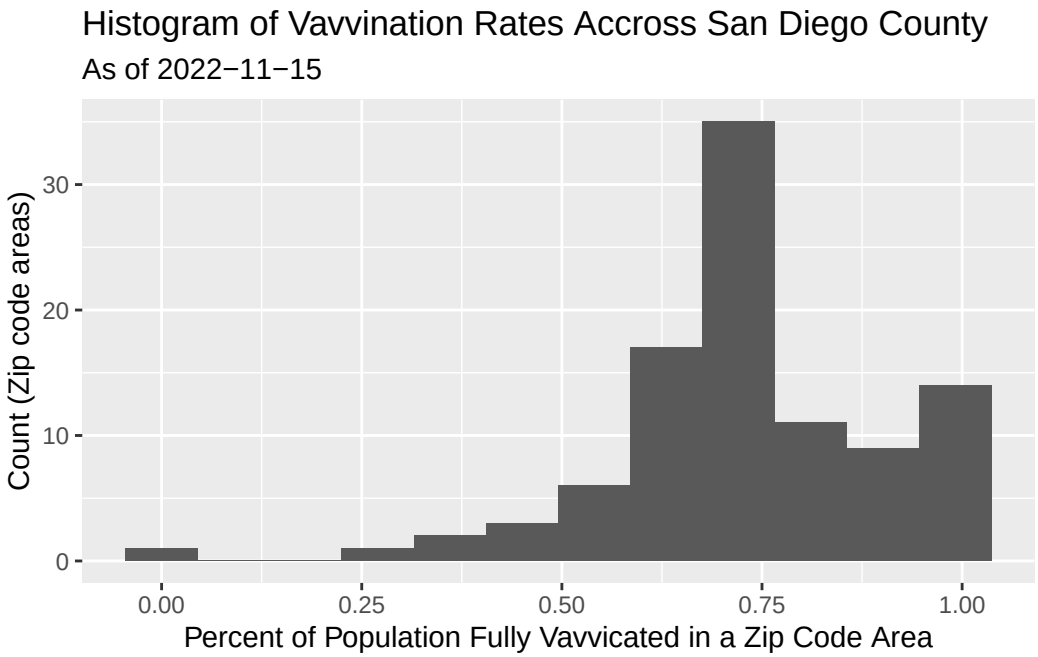
Q13 73.8%

Q14

```
library(ggplot2)

sd.tmp <- filter(vax, county == "San Diego" &
                 as_of_date == "2022-11-15")
ggplot(sd.tmp, aes(percent_of_population_fully_vaccinated)) +
  geom_histogram(bins=12) +
  labs(x="Percent of Population Fully Vavvicated in a Zip Code Area",
       y="Count (Zip code areas)",
       title="Histogram of Vavvination Rates Accross San Diego County",
       subtitle = "As of 2022-11-15")
```

```
Warning: Removed 8 rows containing non-finite values (`stat_bin()`).
```



focus on UCSD/La Jolla

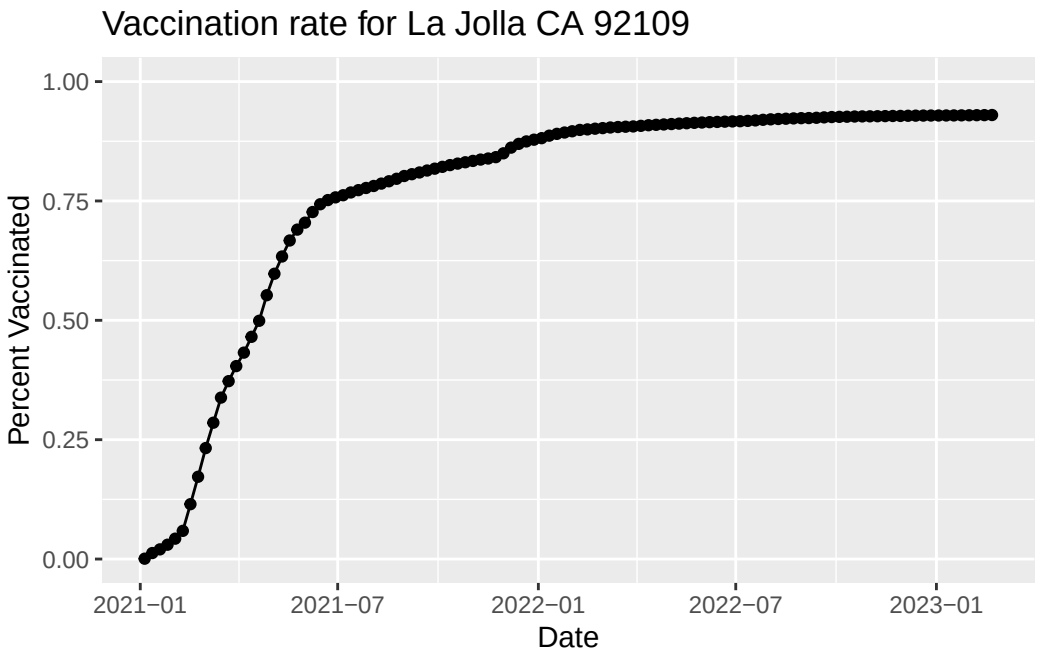
```
ucsd <- filter(sd, zip_code_tabulation_area=="92037")
ucsd[1,]$age5_plus_population
```

```
[1] 36144
```

Q15.

```
ucsd.graph <- ggplot(ucsd) +
  aes(as_of_date,
      percent_of_population_fully_vaccinated) +
  geom_point() +
  geom_line(group=1) +
  ylim(c(0,1)) +
  labs(x="Date", y="Percent Vaccinated", title="Vaccination rate for La Jolla CA 92109")

ucsd.graph
```



Similar size area

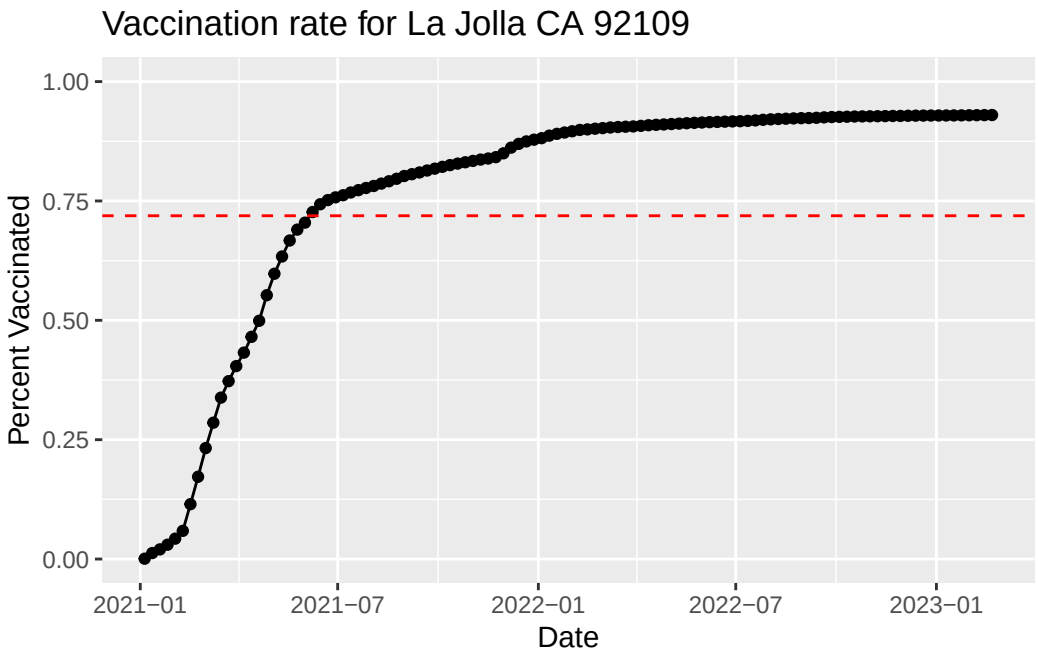
```
# Subset to all CA areas with a population as large as 92037
vax.36 <- filter(vax, age5_plus_population > 36144 &
                 as_of_date == "2022-11-15")
```

Q16.

```
vax.mean <- mean(vax.36$percent_of_population_fully_vaccinated, na.rm=TRUE)
vax.mean
```

```
[1] 0.7190084
```

```
ucsd.graph +
  geom_hline(yintercept=vax.mean, color="red", linetype=2)
```



Q17

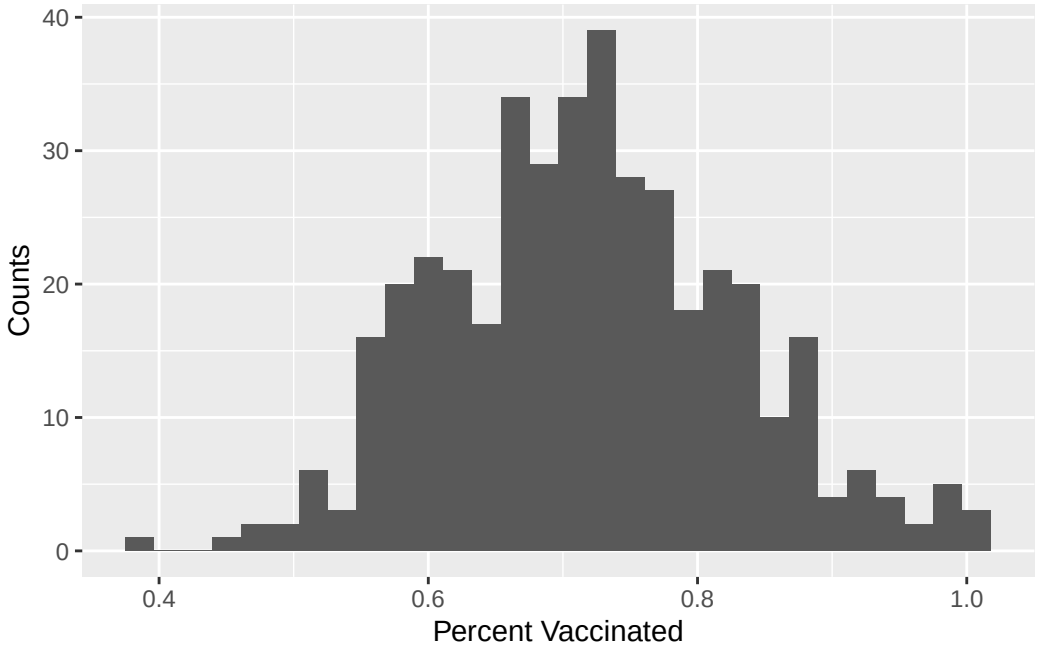
```
summary(vax.36$percent_of_population_fully_vaccinated)
```

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
 0.3784  0.6444  0.7163  0.7190  0.7883  1.0000 
```

Q18

```
ggplot(vax.36)+
  geom_histogram(aes(percent_of_population_fully_vaccinated)) +
  labs(x="Percent Vaccinated", y="Counts")
```

```
`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



Q19

```
vax %>% filter(as_of_date == "2022-11-15") %>%
  filter(zip_code_tabulation_area=="92040") %>%
  select(percent_of_population_fully_vaccinated)
```

```
  percent_of_population_fully_vaccinated
1                               0.548979
```

$0.549 < 0.719$

The area 92040 is below the average.

```
vax %>% filter(as_of_date == "2022-11-15") %>%
  filter(zip_code_tabulation_area=="92109") %>%
  select(percent_of_population_fully_vaccinated)
```

```
  percent_of_population_fully_vaccinated
1                               0.692683
```

$0.693 < 0.719$

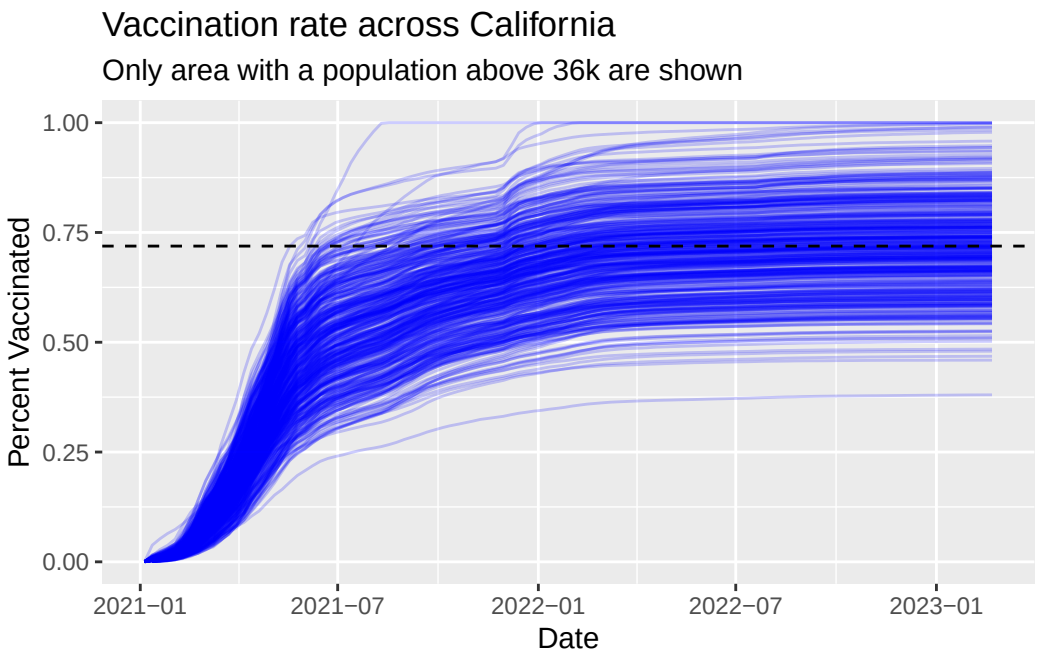
The area 92109 is below the average.

Q20

```
vax.36.all <- filter(vax, age5_plus_population>36144)

ggplot(vax.36.all) +
  aes(as_of_date,
      percent_of_population_fully_vaccinated,
      group=zip_code_tabulation_area) +
  geom_line(alpha=0.2, color="blue") +
  ylim(0.00, 1.00) +
  labs(x="Date", y="Percent Vaccinated",
title="Vaccination rate across California",
       subtitle="Only area with a population above 36k are shown") +
  geom_hline(yintercept = vax.mean, linetype=2)
```

```
Warning: Removed 183 rows containing missing values (`geom_line()`).
```



About this document

```
sessionInfo()
```

```
R version 4.2.2 (2022-10-31)
Platform: aarch64-apple-darwin20 (64-bit)
Running under: macOS Monterey 12.5

Matrix products: default
BLAS:   /Library/Frameworks/R.framework/Versions/4.2-arm64/Resources/lib/libRblas.0.dylib
LAPACK: /Library/Frameworks/R.framework/Versions/4.2-arm64/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] ggplot2_3.4.1   dplyr_1.1.0     zipcodeR_0.3.5  lubridate_1.9.2

loaded via a namespace (and not attached):
 [1] Rcpp_1.0.10        lattice_0.20-45    tidyr_1.3.0        class_7.3-21
 [5] digest_0.6.31      utf8_1.2.3         R6_2.5.1           repr_1.1.6
 [9] RSQLite_2.3.0      evaluate_0.20      e1071_1.7-13       httr_1.4.4
[13] pillar_1.8.1       rlang_1.0.6        curl_5.0.0         uuid_1.1-0
[17] rstudioapi_0.14    raster_3.6-14      blob_1.2.3         rmarkdown_2.20
[21] labeling_0.4.2     readr_2.1.4        stringr_1.5.0      munsell_0.5.0
[25] bit_4.0.5          proxy_0.4-27       compiler_4.2.2     xfun_0.37
[29] pkgconfig_2.0.3    tigris_2.0.1       base64enc_0.1-3    htmltools_0.5.4
[33] tidyselect_1.2.0   tibble_3.1.8       codetools_0.2-19   fansi_1.0.4
[37] crayon_1.5.2       tzdb_0.3.0         withr_2.5.0        sf_1.0-9
[41] tidycensus_1.3.2   rappdirs_0.3.3     grid_4.2.2         gtable_0.3.1
[45] jsonlite_1.8.4     lifecycle_1.0.3    DBI_1.1.3          magrittr_2.0.3
[49] scales_1.2.1       units_0.8-1        KernSmooth_2.23-20 cli_3.6.0
[53] stringi_1.7.12     cachem_1.0.6       farver_2.1.1       sp_1.6-0
[57] skimr_2.1.5        xml2_1.3.3         ellipsis_0.3.2     generics_0.1.3
[61] vctrs_0.5.2        tools_4.2.2        bit64_4.0.5        glue_1.6.2
[65] purrr_1.0.1        hms_1.1.2          fastmap_1.1.0      yaml_2.3.7
[69] colorspace_2.1-0   timechange_0.2.0   terra_1.7-3        classInt_0.4-9
[73] rvest_1.0.3        memoise_2.0.1      knitr_1.42
```