Chapter 9. Pragmatic clinical trials in the elderly

Analysis of studies in PubMed and ClinicalTrials.gov

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2024-05-06

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Packages and session information

```
R version 4.4.0 (2024-04-24 ucrt)
Platform: x86_64-w64-mingw32/x64
Running under: Windows 11 x64 (build 22631)

Matrix products: default


locale:
[1] LC_COLLATE=Spanish_Mexico.utf8  LC_CTYPE=Spanish_Mexico.utf8
[3] LC_MONETARY=Spanish_Mexico.utf8 LC_NUMERIC=C
[5] LC_TIME=Spanish_Mexico.utf8

time zone: Europe/Berlin
tzcode source: internal

attached base packages:
[1] stats     graphics  grDevices utils     datasets  methods   base

other attached packages:
 [1] gt_0.10.1          report_0.5.8       flextable_0.9.5    officer_0.6.5
 [5] gridExtra_2.3      RColorBrewer_1.1-3 maps_3.4.2         readxl_1.4.3
 [9] lubridate_1.9.3    forcats_1.0.0      stringr_1.5.1      dplyr_1.1.4
[13] purrr_1.0.2        readr_2.1.5        tidyr_1.3.1        tibble_3.2.1
[17] ggplot2_3.5.1      tidyverse_2.0.0    pacman_0.5.1
```

Total of studies retrieved from ClinicalTrials.gov:

n
1488

Number of registrations which do not disclose the location:

n
118

There are 1076 countries matched according to the countries extracted from locations, which does not match the expected number of countries after excluding missing locations.

Perhaps using other synonyms for the USA and UK will solve this:

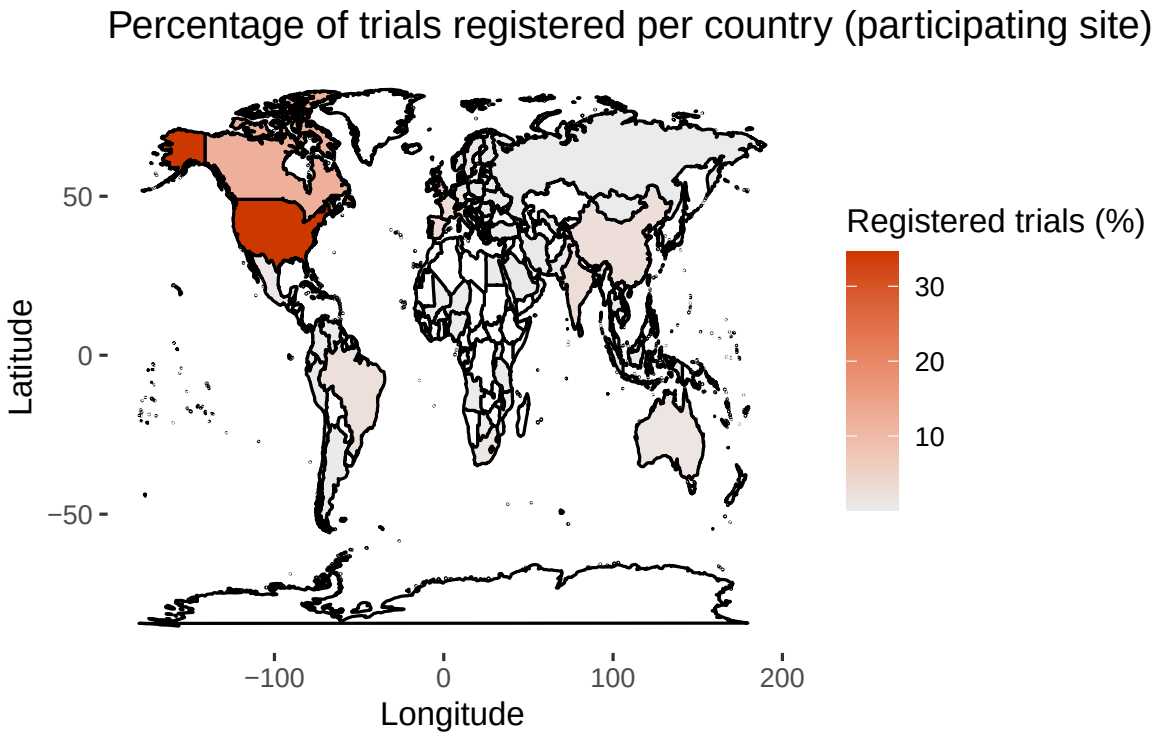
```
[1] 1665
```

Yes, this was increased significantly up to expected number of locations as some studies are expected to be multicountry studies.

I will proceed to join the dataset with the world map data `map_data("world")`.

```
[1] 1665
```

Map



The USA has way too many studies. Here are the absolute counts and percentages per country, in descending order:

country	n	percentage
USA	575	34.53
Canada	198	11.89
UK	109	6.55
Denmark	54	3.24
Spain	53	3.18
India	49	2.94
France	46	2.76
China	43	2.58
Brazil	41	2.46
Italy	40	2.40
Switzerland	31	1.86
Norway	30	1.80
Belgium	25	1.50
Germany	24	1.44

Netherlands	24	1.44
Australia	22	1.32
Sweden	21	1.26
Mexico	18	1.08
South Africa	16	0.96
Ireland	14	0.84
Israel	13	0.78
Singapore	12	0.72
Lebanon	10	0.60
New Zealand	10	0.60
Taiwan	10	0.60
Finland	9	0.54
Saudi Arabia	9	0.54
Portugal	8	0.48
Austria	7	0.42
Oman	7	0.42
Greece	6	0.36
Iran	6	0.36
Malaysia	6	0.36
Poland	6	0.36
Tanzania	6	0.36
Argentina	5	0.30
Pakistan	5	0.30
Romania	5	0.30
Uganda	5	0.30
United Arab Emirates	5	0.30
Egypt	4	0.24
Hungary	4	0.24
Jamaica	4	0.24
Malawi	4	0.24
Colombia	3	0.18
Ghana	3	0.18
Indonesia	3	0.18
Peru	3	0.18
Turkey	3	0.18
Grenada	2	0.12
Kuwait	2	0.12
Mali	2	0.12
Monaco	2	0.12
Mongolia	2	0.12
Panama	2	0.12
Philippines	2	0.12
Puerto Rico	2	0.12

Russia	2	0.12
Slovakia	2	0.12
Vietnam	2	0.12
Angola	1	0.06
Bangladesh	1	0.06
Belarus	1	0.06
Benin	1	0.06
Botswana	1	0.06
Bulgaria	1	0.06
Cambodia	1	0.06
Chile	1	0.06
Ecuador	1	0.06
El Salvador	1	0.06
Iceland	1	0.06
Japan	1	0.06
Jordan	1	0.06
Latvia	1	0.06
Lesotho	1	0.06
Lithuania	1	0.06
Martinique	1	0.06
Mozambique	1	0.06
Niger	1	0.06
Nigeria	1	0.06
Palestine	1	0.06
Rwanda	1	0.06
Senegal	1	0.06
Serbia	1	0.06
Slovenia	1	0.06
Thailand	1	0.06
Ukraine	1	0.06
Uzbekistan	1	0.06
Venezuela	1	0.06

Income group

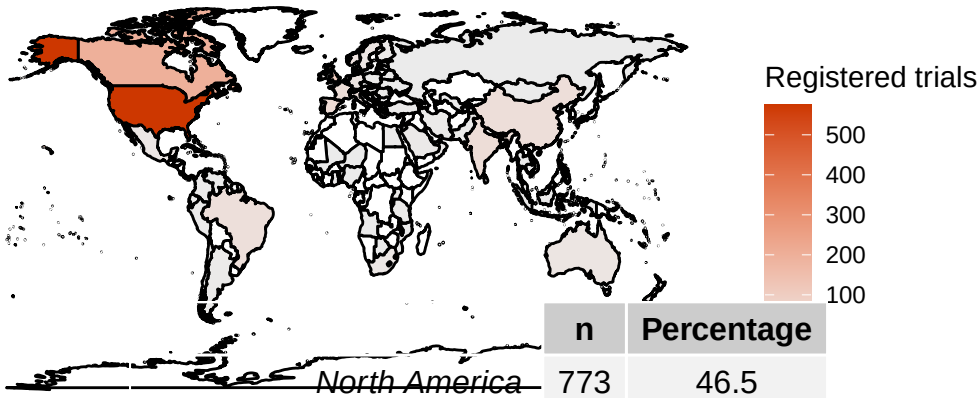
Income	n	Percentage
High income	1393	83.8
Upper middle income	157	9.4
Lower middle income	99	6
Low income	14	0.8

Regions

Region	n	Percentage
North America	773	46.5
Europe & Central Asia	534	32.1
East Asia & Pacific	115	6.9
Latin America & Caribbean	84	5
Middle East & North Africa	58	3.5
South Asia	55	3.3
Sub-Saharan Africa	45	2.7

Figure 1

Number of trials registered per country (participating site)



	n	Percentage
North America	773	46.5
Europe & Central Asia	534	32.1
East Asia & Pacific	115	6.9
Latin America & Caribbean	84	5
Middle East & North Africa	58	3.5

Descriptive analyses of registered studies, regardless of country:

Type of intervention

Frequencies:

```
type_intervention
         behavioral          biological combination_product              device
                441                  11                   8                 107
    diagnostic_test  dietary_supplement                drug             genetic
                 41                  11                 315                   3
              other           procedure           radiation
                456                  87                   8
```

Percentage:

```
type_intervention
         behavioral          biological combination_product              device
               29.6                 0.7                 0.5                 7.2
    diagnostic_test  dietary_supplement                drug             genetic
                2.8                 0.7                21.2                 0.2
              other           procedure           radiation
               30.6                 5.8                 0.5
```

Study results published in clinicaltrials.gov

Frequencies:

```
Study.Results
  NO  YES
1356  132
```

Percentage:

```
Study.Results
  NO  YES
91.1  8.9
```

Study status

Frequencies:

```
Study.Status
  ACTIVE_NOT_RECRUITING               COMPLETED ENROLLING_BY_INVITATION
                    131                     599                      49
     NOT_YET_RECRUITING               RECRUITING               SUSPENDED
                    112                     364                       6
             TERMINATED                 UNKNOWN               WITHDRAWN
                     50                     153                      24
```

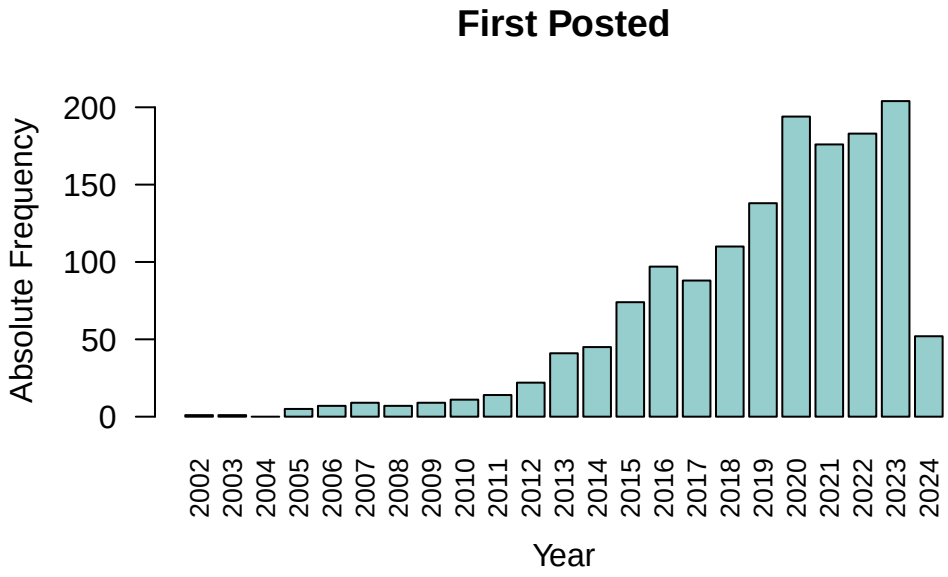
Percentage:

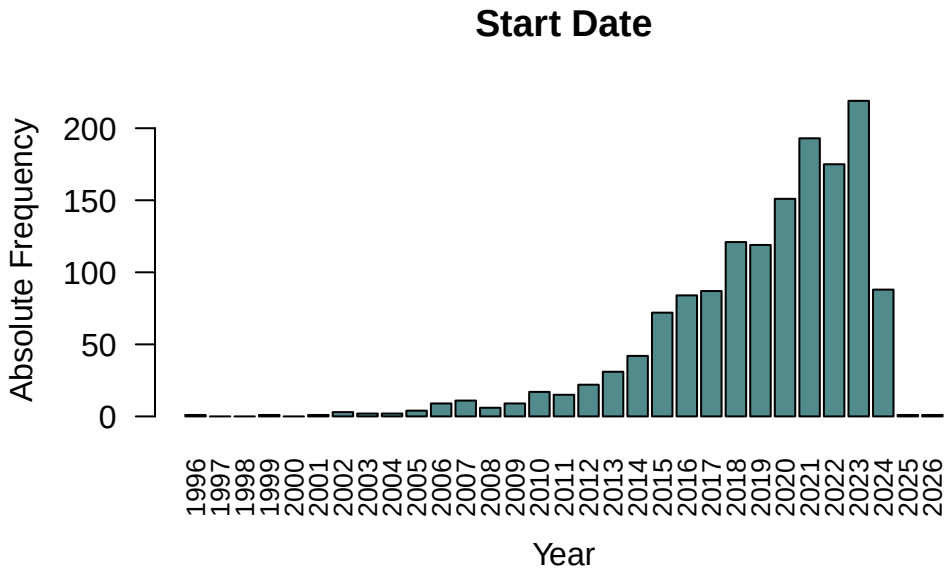
```
Study.Status
  ACTIVE_NOT_RECRUITING               COMPLETED ENROLLING_BY_INVITATION
                    8.8                    40.3                     3.3
     NOT_YET_RECRUITING               RECRUITING               SUSPENDED
                    7.5                    24.5                     0.4
             TERMINATED                 UNKNOWN               WITHDRAWN
                    3.4                    10.3                     1.6
```

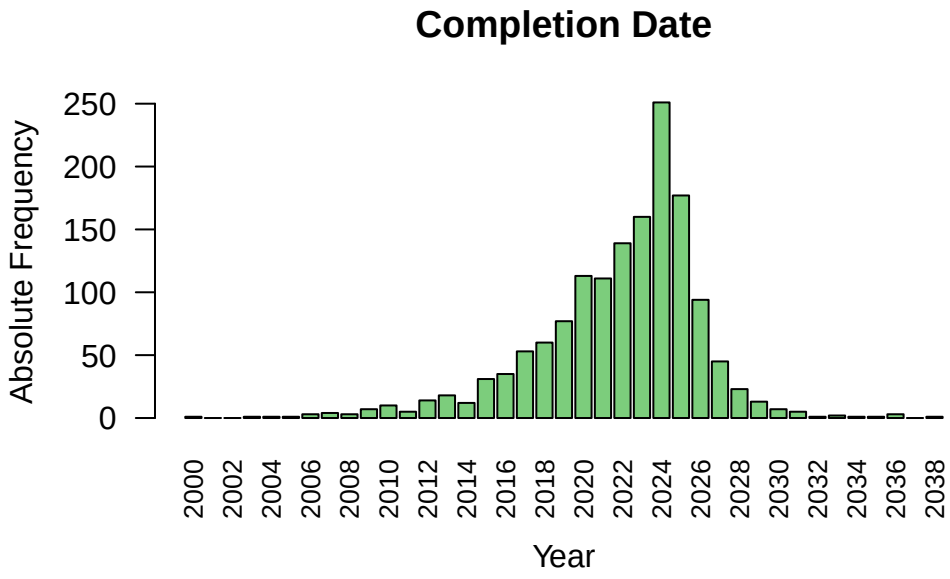
Sample size

median	Q1	Q3	min	max
300	100	1024	1	973759

Dates ClinicalTrials.gov



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Absolute Frequency
250
200
150
100
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0
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2002
2004
2006
2008
2010
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2014
2016
2018
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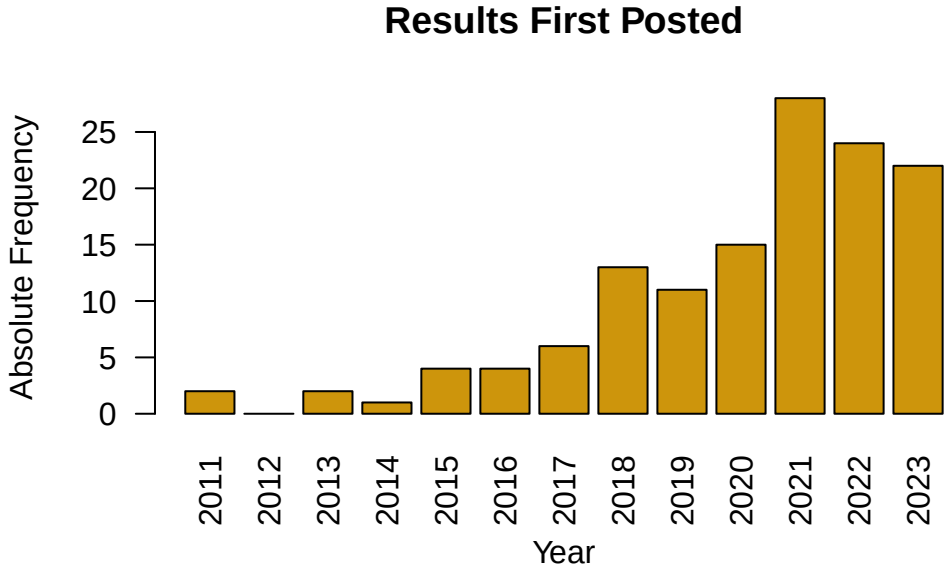
2022
2024
2026
2028
2030
2032
2034
2036
2038
Year


Results First Posted
Absolute Frequency
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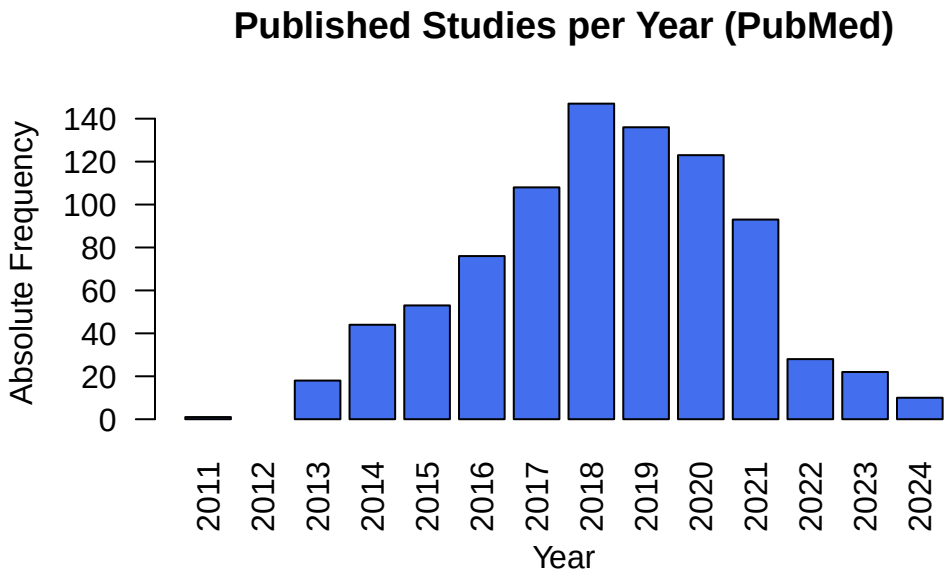
20
15
10
5
0
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Year

Dates PubMed



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