Chapter 5. Clinical Trial Usage–- Incorporate with drug repurposing

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https://clinicaltrials.gov/

ClinicalTrials.gov
A service of the U.S. National Institutes of Health
Try our beta test site

ClinicalTrials.gov is a registry and results database of publicly and privately supported clinical studies of human participants conducted around the world. Learn more about clinical studies and about this site, including relevant history, policies, and laws.

Find Studies About Clinical Studies Submit Studies Resources About This Site

ClinicalTrials.gov currently lists 238,752 studies with locations in all 50 States and in 196 countries.

Text Size ▼

Search for Studies
Example: "Heart attack" AND "Los Angeles"
Search
Advanced Search | See Studies by Topic
See Studies on Map

Search Help
- How to search
- How to find results of studies
- How to read a study record

Locations of Recruiting Studies
- Non-U.S. only (56%)
- U.S. only (39%)
- Both U.S. and non-U.S. (5%)
Total N = 41,211 studies
(Data as of March 09, 2017)
- See more trends, charts, and maps

For Patients and Families
- How to find studies
- See studies by topic
- Learn about clinical studies
- Learn more

For Researchers
- How to submit studies
- Download content for analysis
- About the results database
- Learn more

For Study Record Managers
- Why register?
- How to register your study
- FDAAA 801 requirements
- Learn more

Learn More
- Final Rule Webinar Series
- Tutorials for using ClinicalTrials.gov
- Glossary of common site terms
- For the press
- Using our RSS feeds

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R package rclinicaltrials and structure of CT data

```
install.packages("devtools")
library(devtools)
install_github("sachsmc/rclinicaltrials")
library(rclinicaltrials)
z <- clinicaltrials_search(query= 'epilepsy' )
str(z)

'data.frame':    20 obs. of 8 variables:
$ score         : chr "0.98068" "0.97631" "0.9756" "0.97548" ...
$ nct_id        : chr "NCT02098759" "NCT02126774" "NCT01046760" "NCT00736424" ...
$ url           : chr "https://ClinicalTrials.gov/show/NCT02098759"
"https://ClinicalTrials.gov/show/NCT02126774"
"https://ClinicalTrials.gov/show/NCT01046760"
"https://ClinicalTrials.gov/show/NCT00736424" ...
$ title         : chr "Long-term, Prospective Study Evaluating Clinical and Molecular
Biomarkers of Epileptogenesis in a Genetic Model of Epilepsy - T"| __truncated__ "The
Human Epilepsy Project" "Scholar Performance and Praxis Assessment in Children With
Rolandic Epilepsy" "Brain Stimulation for Epilepsy Long Term Follow-up" ...
$ status.text   : chr "Recruiting" "Recruiting" "Unknown status" "Completed" ... $
condition_summary   : chr "TSC; Tuberous Sclerosis Complex; Epilepsy" "Focal Epilepsy"
"Rolandic Epilepsy; Apraxia" "Epilepsy" ...
$ intervention_summary: chr "Device: epilepsy early diagnosis protocol" NA "Behavioral:
Language Assessment" "Device: Itrel II™ and Soletra™ Epilepsy Control System" ...
$ last_changed  : chr "April 3, 2014" "October 11, 2016" "October 19, 2010" "January
10, 2014" ...
```

R package rclinicaltrials and structure of CT data

```
epilepsy_information <- clinicaltrials_download(query = "epilepsy",
count = 1e6, include_results = TRUE)

summary(epilepsy_information)
                      Length   Class   Mode
study_information     6        -none-  - list
study_results         3        -none-  - list
'data.frame':         2

summary(epilepsy_information$study_information)
              Length    Class        Mode
study_info    330       data.frame   list
locations     41        data.frame   list
arms          4         data.frame   list
interventions 50        data.frame   list
outcomes      5         data.frame   listt
extblocks     0         -none-       NULL

save(epilepsy_information, file = "epilepsy_information.RData")
#1.8Mb
```
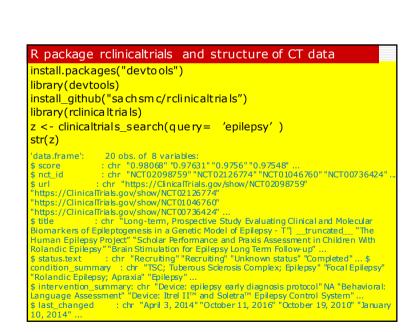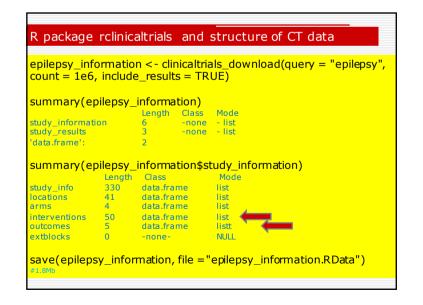
Slide 1

R package rclinicaltrials and structure of CT data
Now we explore "interventions"

```
nct_id <- epilepsy_information$study_information$interventions$nct_id  #2019
name <- epilepsy_information$study_information$interventions$intervention_name
type <- epilepsy_information$study_information$interventions$intervention_type
description <- epilepsy_information$study_information$interventions$description

write.table(name, file = "epilepsy_drug", row.names = F, quote = F, sep="\n")
write.table(type, file = "epilepsy_type", row.names = F, quote = F, sep="\n")
write.table(nct_id, file = "epilepsy_nct_id", row.names = F, quote = F, sep="\n")
#There are a couple of \n in "description", so we cannot write.table.
writeLines("description", con = "epilepsy_description", sep = "\n", useBytes = F)
for (i in 1: length(description))
{
        description[i]=gsub("\\n", " ", description[i])
        out=paste(description[i], "\n")
        cat(out, file = "epilepsy_description", append = TRUE)
}
```

In total, there are 2019 NCT entries.

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Slide 2

R package rclinicaltrials and structure of CT data
What if we explore the "outcomes"?

```
outcomedescription <-
epilepsy_information$study_information$outcomes$description
```

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Slide 3

Acetaminophen	Gabapentin	prempro
Alprazolam	Gliclazide	Primidone
Amantadine	Haloperido	propofol
amitriptyline	hydrocortisone	PTK787/ZK
Arimidex	hydroxyprogesterone caproate	Remegal
atorvastatin	Imipramine	Ribavirin
Bortezomib	Januvia (sitagliptin)	Risperidone
BOTOX	Keppra	Ropinirole
Bumetanide	ketamine	Rufinamide
Carboplatin	Lacosamide	Sabril
chlordiazepoxide	Levobupivacaine	sevoflurane
Clevidipine	Lidocaine	Succinylcholine
Clobazam	Lithium	Sulfasalazine
Clonazepam	lorazepam	Sunitinib
CNS	Lyrica (pregabalin)	Talampanel
Dasatinib	Melatonin	Temsirolimus
DEPAKOTE	Memantine	thiopental
dexamethasone	Methadone	Tiagabine
Dextromethorphan	midazolam	Trametinib
diazepam	NaCl	valproate microgranules
Diclofenac	Nepeta menthoides Boiss	Vandetanib
Dilantin	nimodipine	verapamil
docetaxel	nitrazepam	ziconotide
Erlotinib	Orlistat	Zonegran
Everolimus	Paclitaxel	
EZG	pentobarbital	
Fampridine	Perampanel	80 candidate drugs for epilepsy
Fluoxetine	PF-04895162	

Slide 4

Assignment:

Currently, you know how to curate Clinical Trial data from database.

For 80 drugs in the list, find clues and explain:
1. Have it been used for curing epilepsy?
2. Find possible molecular explanation. (You can also use those databases introduced in the last chapter)

Find something novel and prepare a 10 minutes talk in next class. Two members win the points.