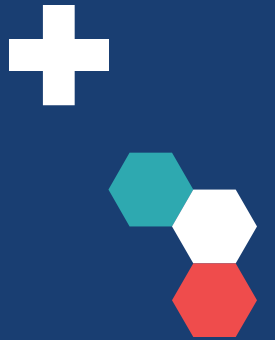


# MK-2: Building an online study-based register

*Lena Schmidt, Clive Adams*



# Acknowledgements and disclosures

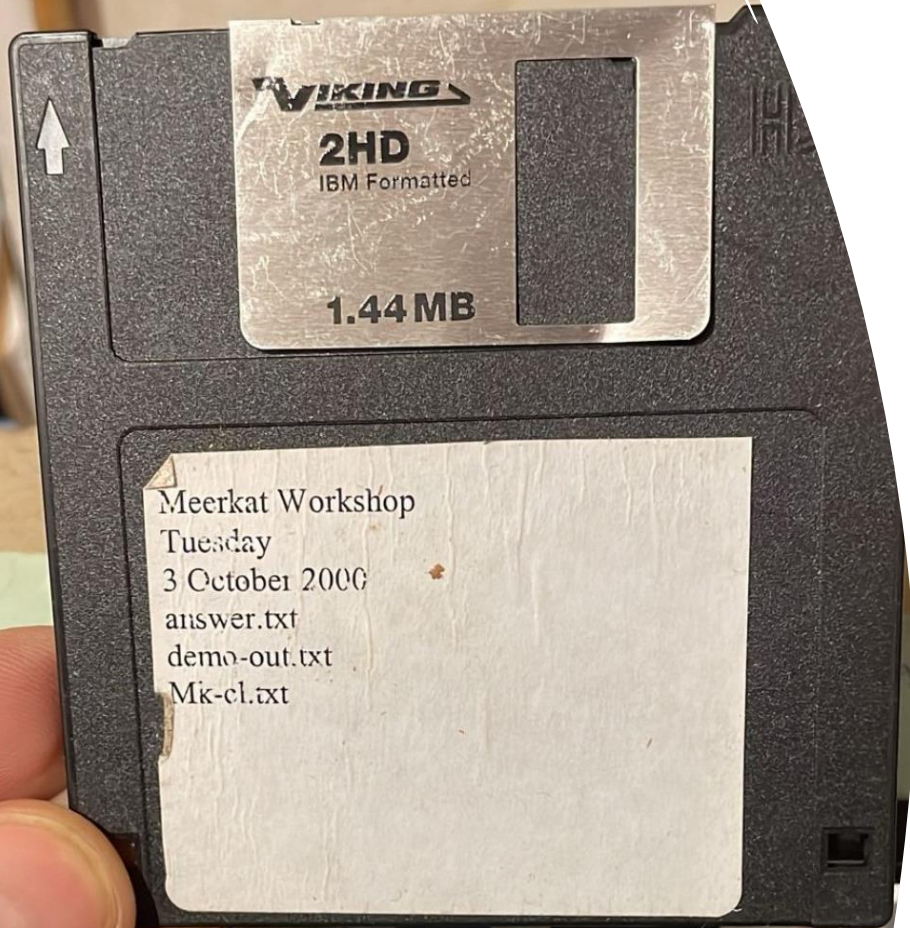
- The NIHR Innovation Observatory is funded by the National Institute for Health and Care Research (NIHR)
- The views expressed are those of the author(s) and not necessarily those of the NIHR or the UK Department of Health and Social Care

Copyright © National Institute for Health and Care Research Innovation Observatory (NIHRIO), The University of Newcastle upon Tyne

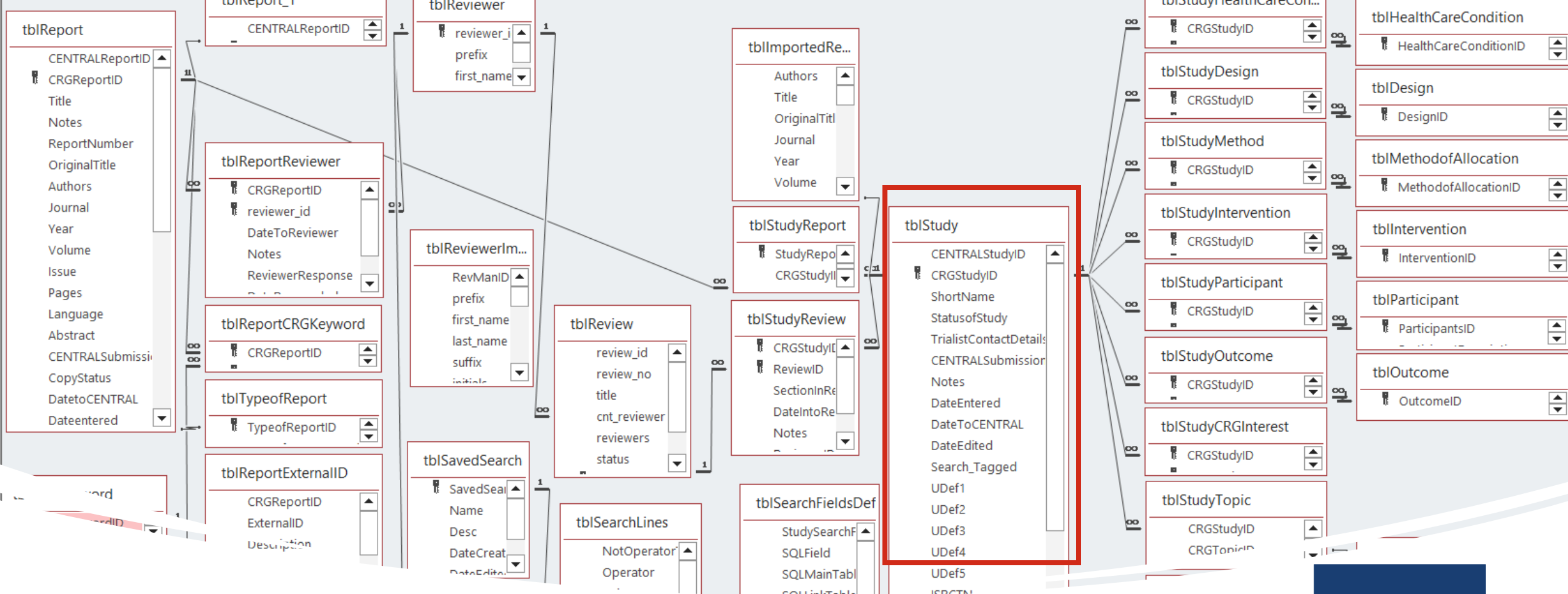
# Background

---

- MeerKat is the study-based register maintained by the former Cochrane Schizophrenia Group (CSZG)
- ← Exists since **2000**
- Used in **>220 Cochrane reviews** and their updates
- Information specialist **hand-curated data** on schizophrenia **RCTs**
- **Local MS Access Database**

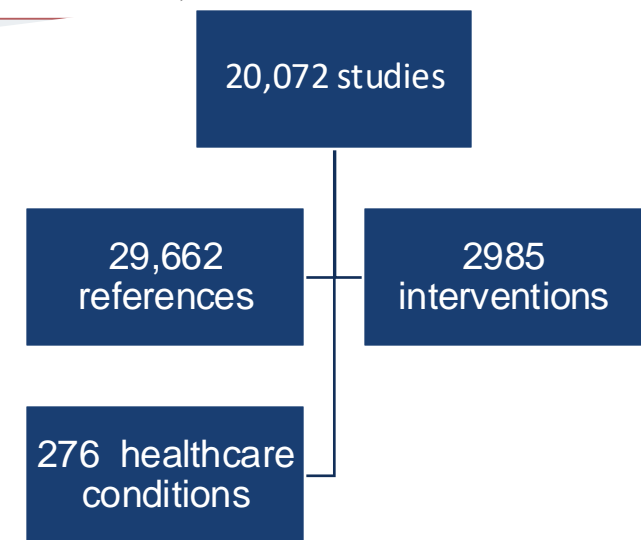


Meerkat Workshop  
Tuesday  
3 October 2000  
answer.txt  
demo-out.txt  
Mk-cl.txt

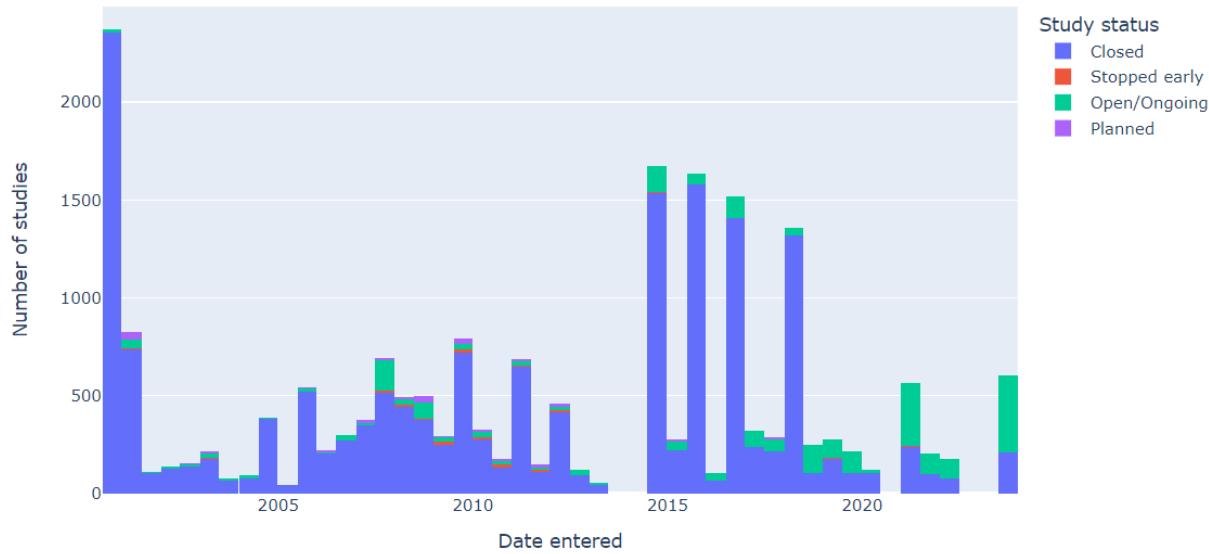


# Content of MeerKat

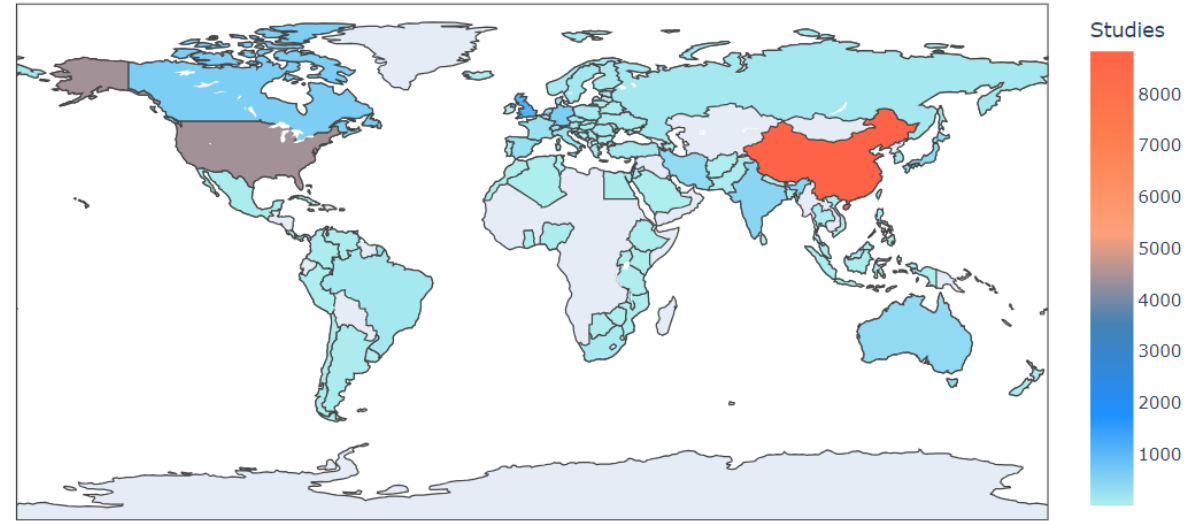
- Contains hand-curated RCTs
- 'Study' as central data point
- A study is a **group of people** taking part in an experiment.
- It typically has: 1+ reports, 2+ arms, a design, N randomised [...]



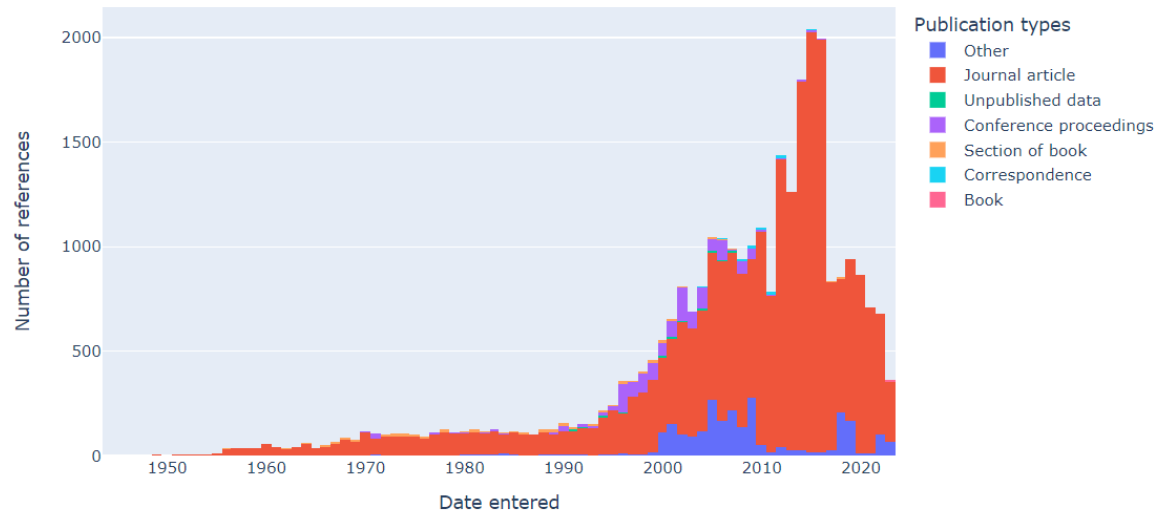
Meerkat studies by entry date



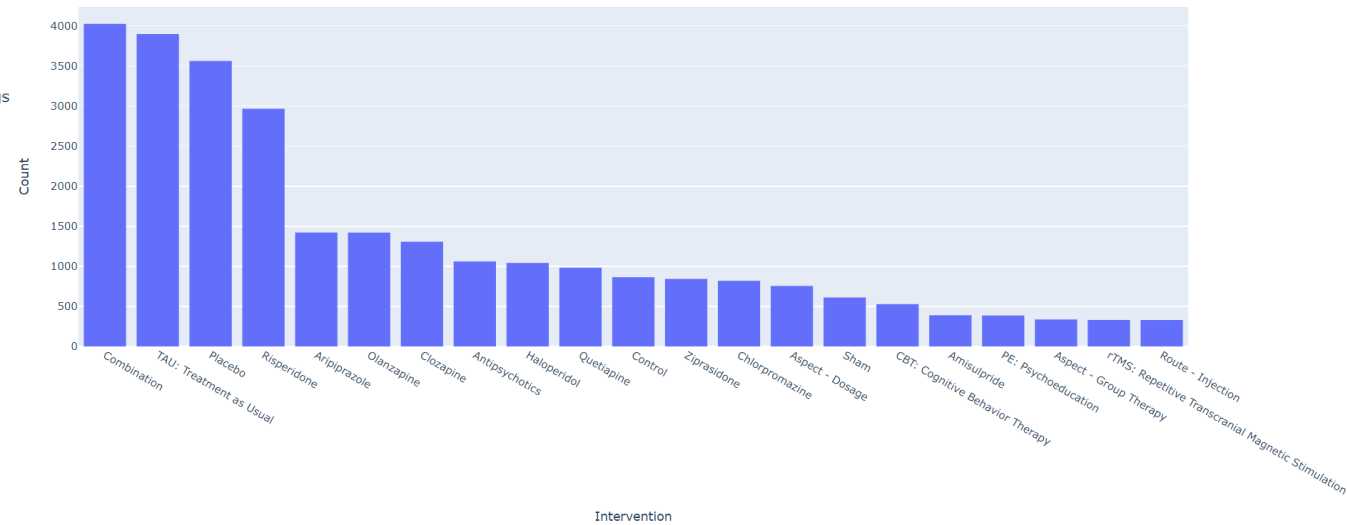
MEERKAT study countries



Meerkat references by year published



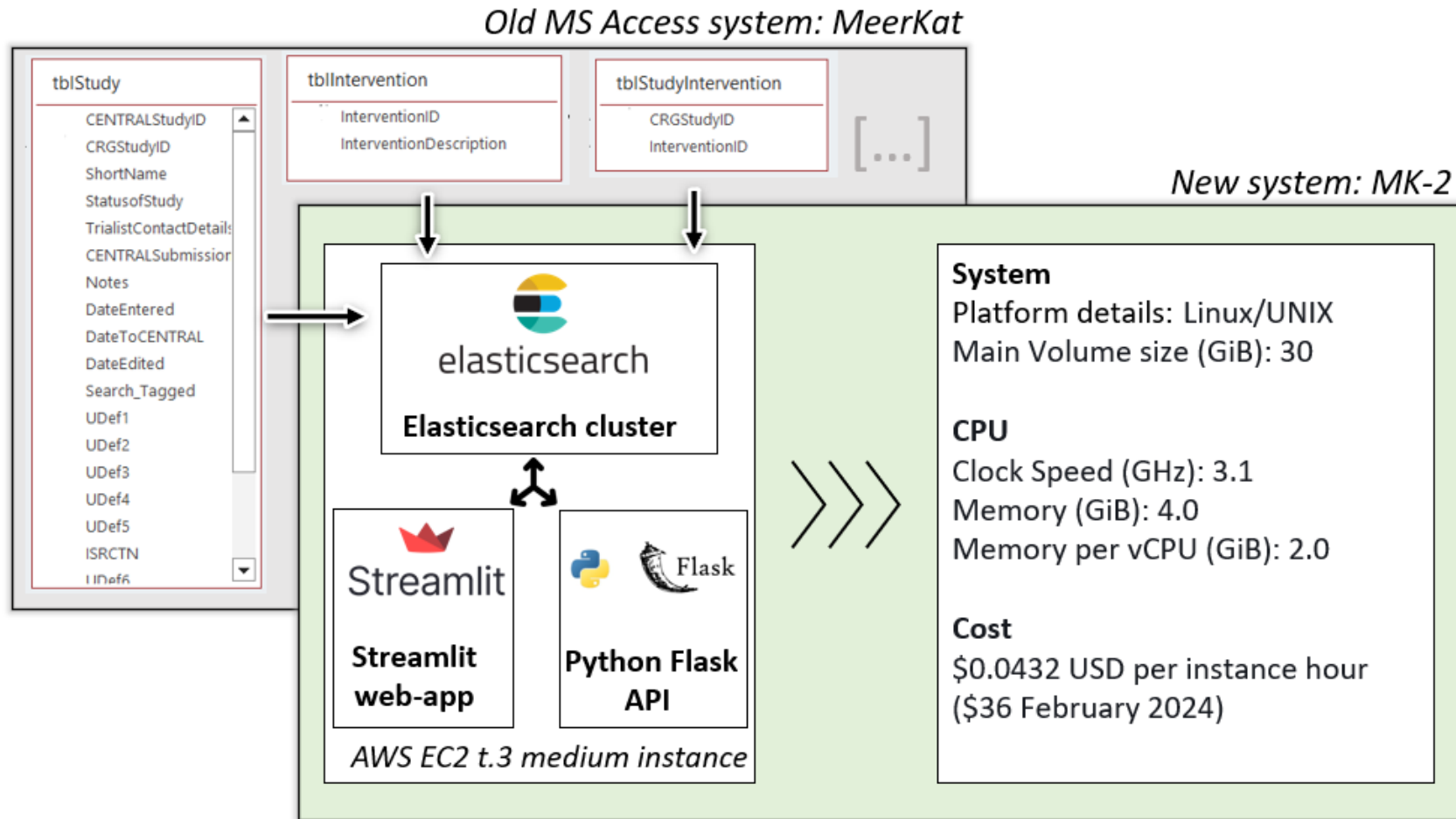
Meerkat Interventions used in >300 studies



# Local MS Access vs. online register

Online databases:	Advantage	Addressed by Mk-2
Should be able to handle large amounts of data and users.	Scalability	Yes
Support concurrent access by multiple users, enabling collaboration and preventing data conflicts.	<b>Concurrency</b>	Yes
Provide better performance for handling complex queries and large datasets, delivering faster response times.	Performance	Yes
Typically have robust security features, including user authentication, access controls, and encryption.	Security	Partly
Have high availability and backup mechanisms, reducing the risk of data loss due to system failures.	Reliability	Yes
Can be accessed from anywhere with an internet connection, promoting flexibility and remote collaboration.	<b>Accessibility</b>	Yes
Easily integrate with web-based applications and services, facilitating a more seamless and connected workflow	<b>Integration</b>	Future work
Are often maintained and updated, ensuring that the latest features, performance enhancements, and security patches are applied automatically.	Maintenance	Yes
Typically have automated backup and recovery options, providing a more reliable way to safeguard data.	Backup and recovery	Yes
Often come with built-in collaboration tools, allowing multiple users to work on the same dataset simultaneously, enhancing teamwork and productivity.	Collaborative working	NA

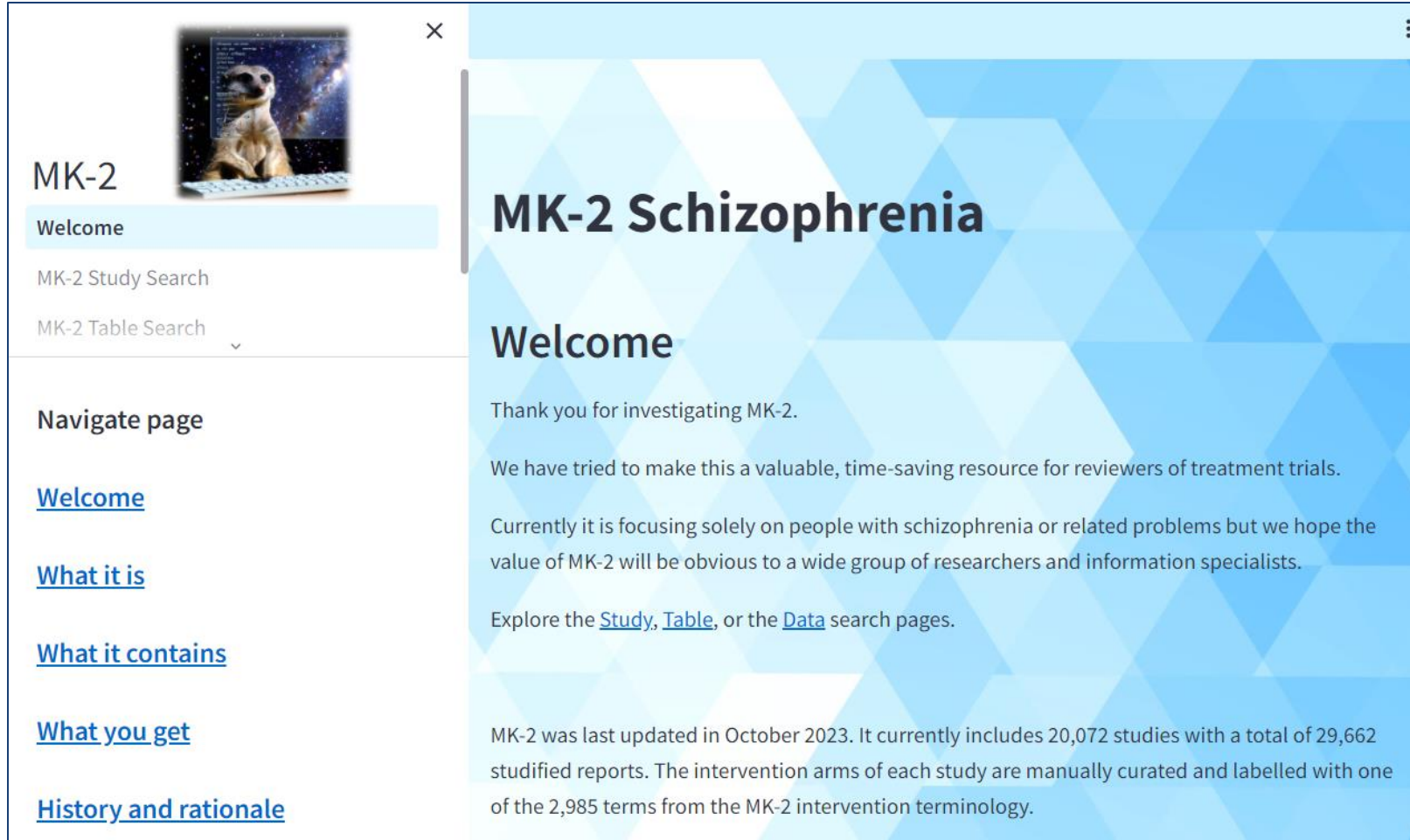
# Infrastructure of web-based MK-2



# Public version

Available here (for now):

<http://16.171.210.179:8501/>



The screenshot shows a web browser window with a sidebar on the left and a main content area on the right. The sidebar contains a profile picture of a dog, the text 'MK-2', and a 'Welcome' button. Below this are search options: 'MK-2 Study Search' and 'MK-2 Table Search'. A 'Navigate page' section lists several links: 'Welcome', 'What it is', 'What it contains', 'What you get', and 'History and rationale'. The main content area has a blue geometric background and features the title 'MK-2 Schizophrenia' and a 'Welcome' heading. The text in the main area reads: 'Thank you for investigating MK-2. We have tried to make this a valuable, time-saving resource for reviewers of treatment trials. Currently it is focusing solely on people with schizophrenia or related problems but we hope the value of MK-2 will be obvious to a wide group of researchers and information specialists. Explore the [Study](#), [Table](#), or the [Data](#) search pages. MK-2 was last updated in October 2023. It currently includes 20,072 studies with a total of 29,662 studied reports. The intervention arms of each study are manually curated and labelled with one of the 2,985 terms from the MK-2 intervention terminology.'



**MK-2**  
Welcome  
MK-2 Study Search  
**MK-2 Table Search**  
PICO Search  
Raptor Data Search

**Control Panel**  
Select a table to search  
Interventions  
Export format  
CSV  
Prepare export

## Table Search

The table search page can be used to explore PICO data tables and reports within MK-2. Please see the tutorial video on the bottom of this page.

In the control panel you selected to search: Interventions

Query syntax help

Searchable fields for 'Interventions'

Enter search query  
olanzap\*

3 Results

<input checked="" type="checkbox"/> Select	InterventionDescription ↑
<input checked="" type="checkbox"/>	ALKS-3831 (Olanzapine+Samidorphan) {OPIR-} {Pharm} {Research Drug-Adis-Developing}
<input checked="" type="checkbox"/>	Olanzapine (Velotab) {WHO-N05AH03-Nervous-Antipsychotics-A2} {Pharm} {BNF-A2}
<input checked="" type="checkbox"/>	Olanzapine {WHO-N05AH03-Nervous-Antipsychotics-A2} {Pharm} {BNF-A2}

1 to 3 of 3 | Page 1 of 1

# Table search

General search functionality includes:

- Boolean
  - AND, OR, NOT
- Wildcards
  - \*, ?
- Field search:
  - Author:"Adams"
- Proximity search
  - "schizophrenia trial"~5

MK-2



Welcome

MK-2 Study Search

MK-2 Table Search

PICO Search

Raptor Data Search

## Control Panel

Select a table to search

Interventions

Export format

 Study CSV flat

 Report RIS flat

 Structured Data

Export

## Study Search

The study search page can be used to retrieve data from whole studies. Please see the tutorial video on the bottom of this page.

In the control panel you selected to search: Interventions

[Query syntax help](#)


Enter search query

olanzap\*

1432 Results

Sel...	Short...	Arms	Length	Randomiz...	Country
<input checked="" type="checkbox"/>	Sayers 2005	{Haloperidol vs. Olanza...		24	USA(NA)
<input checked="" type="checkbox"/>	Salmasi 2009	*[Vitamin E (Tocopherol...	8 Weeks	36	Iran(ME)
<input type="checkbox"/>	Sakayori 2020	{Blonanserin vs. Olanza...	4 Weeks	13	Japan(AS)
<input checked="" type="checkbox"/>	Safa 2008	Olanzapine vs. Risperid...	12 Weeks	63	Iran(ME)
<input type="checkbox"/>	Sacchetti 2003	Quetiapine vs. Risperid...	8 Weeks 16 We...	75	Italy(EU)
<input type="checkbox"/>	Roychowdh...	Olanzapine vs. Ziprasid...		346	USA(NA)
<input type="checkbox"/>	Roychowdh...	Olanzapine vs. Risperid...		546	USA(NA)
<input checked="" type="checkbox"/>	Roychowdh...	Olanzapine vs. Quetiapine		360	USA(NA)
<input checked="" type="checkbox"/>	Rouillon 2008	Olanzapine dose		97	France(EU)
<input type="checkbox"/>	Rosebush 2...	{Haloperidol vs. Olanza...	2 Weeks	124	Canada(NA)
<input type="checkbox"/>	Roerig 2004	*[Olanzapine vs. Placeb...		48	USA(NA)
<input type="checkbox"/>	Robles 2006	Quetiapine vs. Olanzapine	26 Weeks	50	Spain(EU)
<input type="checkbox"/>	Roberts 2010	Olanzapine vs. Quetiapine	24 Weeks	223	USA(NA)
<input type="checkbox"/>	Ritsner 2006	*[Dehydroepiandroster...	12 Weeks	62	Israel(ME)
<input type="checkbox"/>	Rubio 2006	Olanzapine vs. Olanza...	108 Weeks	77	Spain(EU)

466 to 480 of 1,432 Page 32 of 96

A)

Interventions\_5\_MK... Extract

File Home Share View Compressed Folder Tools

Downloads > Interventions\_5\_MK2.zip

- ris 393
- OneDrive - 593
- This PC 2036
- 3D Objects 3864
- Desktop 3936
- Downloads all.ris
- study\_overview.csv

B)

```

TY - JOUR
T1 - Olanzapine vs chlorpromazine in therapy-refractory schizophrenia
A1 - Conley RR
A1 - Tamminga CA
A1 - Beasley C
IS - 01-Feb
VL - 24
JO - Schizophrenia Research
SP - 198
PY - 1997
AD - ORIGIN USA
SN - 0920-9964
ID - 639
N1 - This record belongs to study <593>.
ER -

```

```

TY - JOUR
T1 - Olanzapine vs. chlorpromazine in treatment-resistant schizophrenia
N2 - Since the demonstration of the superior effect of clozapine in treatment-resistant schizophrenia, there have been multiple hypotheses about the mechanism of clozapine's efficacy, none of which is largely because there are no other antipsychotics that have shown clozapine's effect in a similar study. It has a very similar binding profile to clozapine, but has a higher dose potency. Olanzapine vs. chlorpromazine in an eight-week, double-blind clinical trial. All subjects had a DSM-IV diagnosis of schizophrenia, were resistant to at least two different neuroleptics, each (each), been persistently ill with no periods of good functioning for at least five years, and had failed to respond to haloperidol. All subjects signed informed consent. Subjects had a two-week single-blind neuroleptic challenge of olanzapine or 1200 mg/day of chlorpromazine in a fixed-dose design after a one week titration period. We will report unblinded data at the meeting.
A1 - Conley RR
A1 - Tamminga CA
A1 - Beasley C
A1 - Maryland Study Group
VL - 41
JO - Biological Psychiatry
SP - 735
PY - 1997
SN - 0006-3223
ID - 9532
N1 - This record belongs to study <593>.
ER -

```

C)

# PICO search

MK-2



Welcome

MK-2 Study Search

MK-2 Table Search

PICO Search

Raptor Data Search

Control Panel

Export format

- Study CSV flat
- Report RIS flat
- Structured Data

Export

Select PICO

Intervention

Search MK-2 Intervention concepts

Choose an option

Add selection

Submit search

Delete this search

C - Acute Health Condition OR C - Early Post-Acute Health Condition

AND

Olanzapine {WHO-N05AH03-Nervous-Antipsychotics-A2} {Pharm} {BNF-A2} Intervention OR  
Olanzapine (Velotab) {WHO-N05AH03-Nervous-Antipsychotics-A2} {Pharm} {BNF-A2} Intervention OR  
ALKS-3831 (Olanzapine+Samidorphan) {OPIR-} {Pharm} {Research Drug-Adis-Developing} Intervention

AND


Risperidone {WHO-N05AX08-Nervous-Antipsychotics-A2} {Pharm} {BNF-A2} Intervention OR  
Risperidone (LYN-005) {WHO-N05AX08-Nervous-Antipsychotics-A2} {Pharm} {Marketed: USA} Intervention

Sel...	Shor... ↑	Arms	Country	Length	Randomized
<input type="checkbox"/>	ACTRN126...	{Haloperidol vs. Olanzapine//...	Spain{EU}	52 Weeks	114
<input type="checkbox"/>	Alvarez 2005	{Early Intervention vs. TAU//H...	Spain{EU}	12 Weeks	61
<input type="checkbox"/>	An 2006	Risperidone vs. Olanzapine	China{AS}{...		80
<input type="checkbox"/>	Belenkaya ...	Risperidone vs. Quetiapine	Russia{AS}...		45
<input type="checkbox"/>	Bourin 2007	{Bifeproxolol Dosage//Bifeprox...	{MC}//Den...	26 Weeks	497
<input type="checkbox"/>	Boylan 2004	^{Olanzapine vs. Risperidone}/...	USA{NA}		402
<input type="checkbox"/>	Broerse 2002	Olanzapine vs. Risperidone	Netherlan...		33
<input type="checkbox"/>	Casey 2003	*{Olanzapine + Valproate vs. O...	USA{NA}	7 Weeks	249
<input type="checkbox"/>	Chan 2003	Risperidone vs. Olanzapine	Taiwan{AS}		160
<input type="checkbox"/>	Cheng 2010	Aripiprazole vs. Olanzapine//A...	China{AS}{...	6 Weeks	114
<input type="checkbox"/>	ChiCTR-TR...	{Aripiprazole vs. Haloperidol}/...	China{AS}{...	6 Weeks	3023
<input type="checkbox"/>	ChiCTR180...	{Aripiprazole vs. Olanzapine}/...	China{AS}{...	Unclear	200
<input type="checkbox"/>	Chung 2012	Olanzapine vs. Risperidone//O...	Taiwan{AS}	12 Weeks	120
<input type="checkbox"/>	Crespo-Fa...	{Haloperidol vs. Olanzapine}/...	Spain{EU}	3 Years	174
<input type="checkbox"/>	Cuesta 2009	Olanzapine vs. Risperidone	Spain{EU}	24 Weeks	100

# Note on linking Cochrane review data

- In 2018 we pulled full review data from 2865 studies in published CSZG reviews, including:
  - Studification data (references, identifiers)
  - Extracted data (full outcomes data extraction, RoB)
  - Study characteristics (design, intervention description, ..)
- We published a paper, made the dataset available, and ... nobody cared?
  - Nobody knew
  - Dataset in clumsy CSV tables stashed on GitHub
  - Not user-friendly or intuitive
- For MK-2 we linked the data back to registry studies and will add it to the default download option



# Raptor search





MK-2  
Welcome


MK-2 PICO Search  
MK-2 Study Search  
MK-2 Table Search  
**Raptor Data Search**

## Raptor Data Search

 Control Panel 

Select a table to search 

Outcomes 

Export format 

CSV


**Prepare export**


## Raptor Data Search

Welcome to the Data Search. We extracted bias ratings, outcome data, and study characteristics from Cochrane Schizophrenia reviews. These datapoints can be re-used by researchers who would like to include the same studies in their meta-analyses. We do advise users to always manually check exported data for completeness. Data can be used, for example, to simulate a 'second reviewer' during data extraction.

In the control panel you selected to search: Outcomes

[Query syntax help](#)

Searchable fields for "Outcomes" 

Enter search query 

Comparison: olanzap\*

3914 Results

<input type="checkbox"/> Sel...	revManID	Comparison	Control	Control_Events	Control_Mean
<input type="checkbox"/>	STD-Newc...	Switching - ne...	olanzapine		0.04
<input type="checkbox"/>	STD-Newc...	Switching - ne...	olanzapine		5
<input type="checkbox"/>	STD-Newc...	Switching - ne...	olanzapine		-0.18
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapine	1	
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapine	26	
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapine	52	
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapine	17	
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapine		65
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapine		18.1
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapine		17.5
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapin...		0.14
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapin...		-20.12
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapin...		-6.33
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapin...		0
<input type="checkbox"/>	STD-Harve...	RISPERIDONE v...	olanzapin...		1.01

# How a study-based register accelerates SR

Having hand-curated readily-available registry data helps to **avoid duplicate efforts**, as **workload is shifted** to the information specialist and carried out **once**

- Searching: One comprehensive central approach
  - reduces need for downstream searches
- Screening: Pre-categorised data allows high-precision AND high-sensitivity retrieval
  - reduces N results for each SR to screen
- Studification and identification of study reports: Covered
- Full texts: PDFs centrally retrieved (not public)
- Data extraction: Data from published CSZG reviews linked
  - Potential to use as 'second reviewer'

Potential of fully automated scoping, mapping, and living review updates

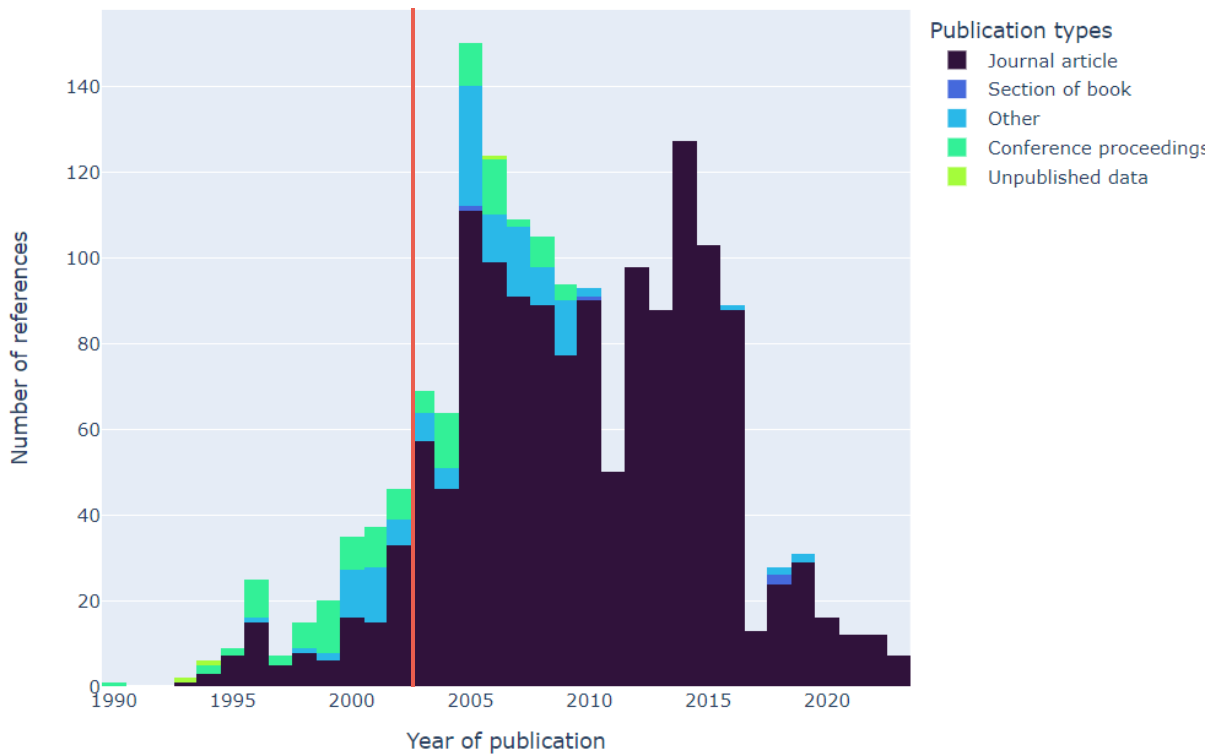
# 'Instant' Living, scoping, mapping reviews with MK-2

- As MK-2 is based on a living, hand-curated registry, it is possible to **export high-quality data** that should be sufficient for more 'rapid' review methodologies that **prioritise time** over methodology
- We're working on query mechanisms, visualisations and output formats for this, examples are given on the next slides.

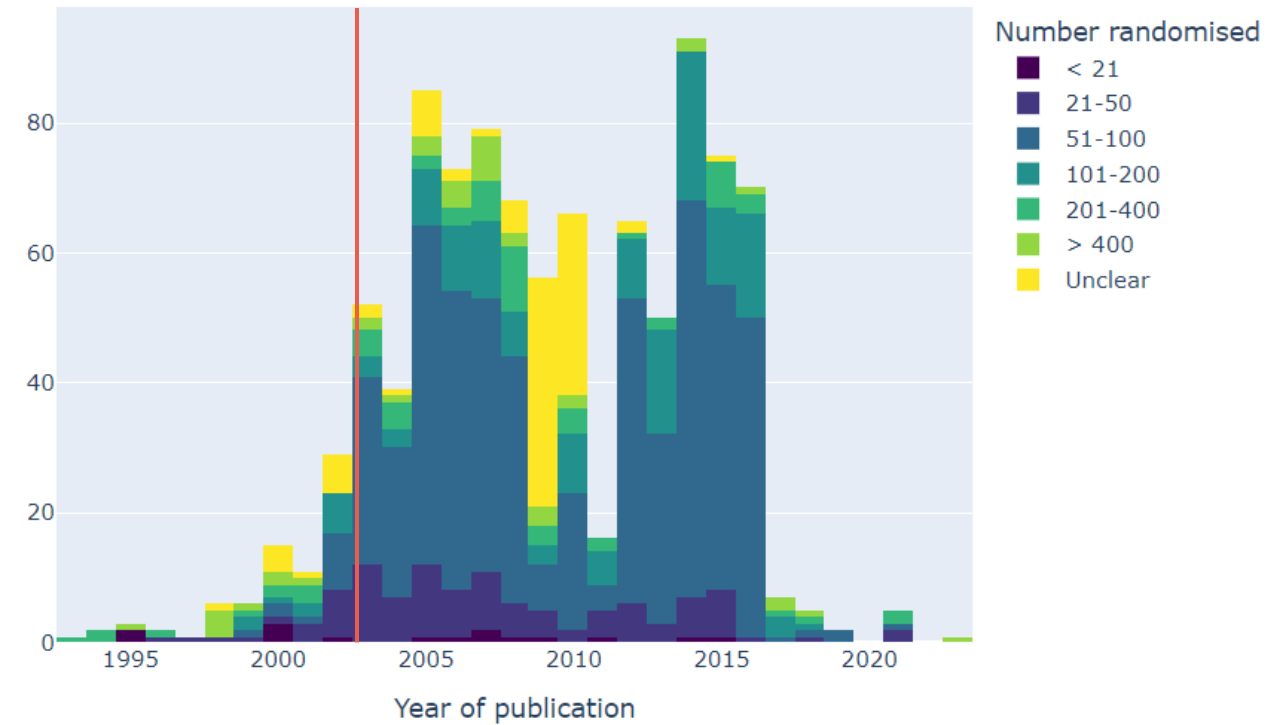
# Quetiapine for Schizophrenia

Cochrane review last updated 2003: <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD000967.pub2/full>

### References (by publication type)



### Studies (by N randomised)

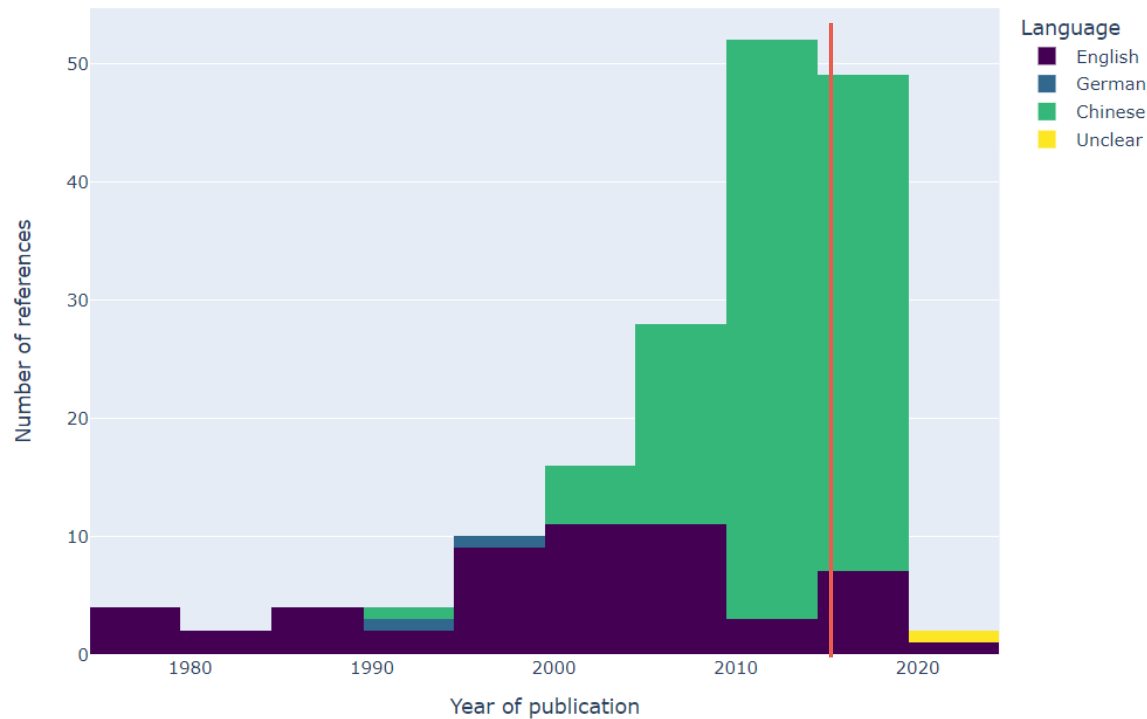




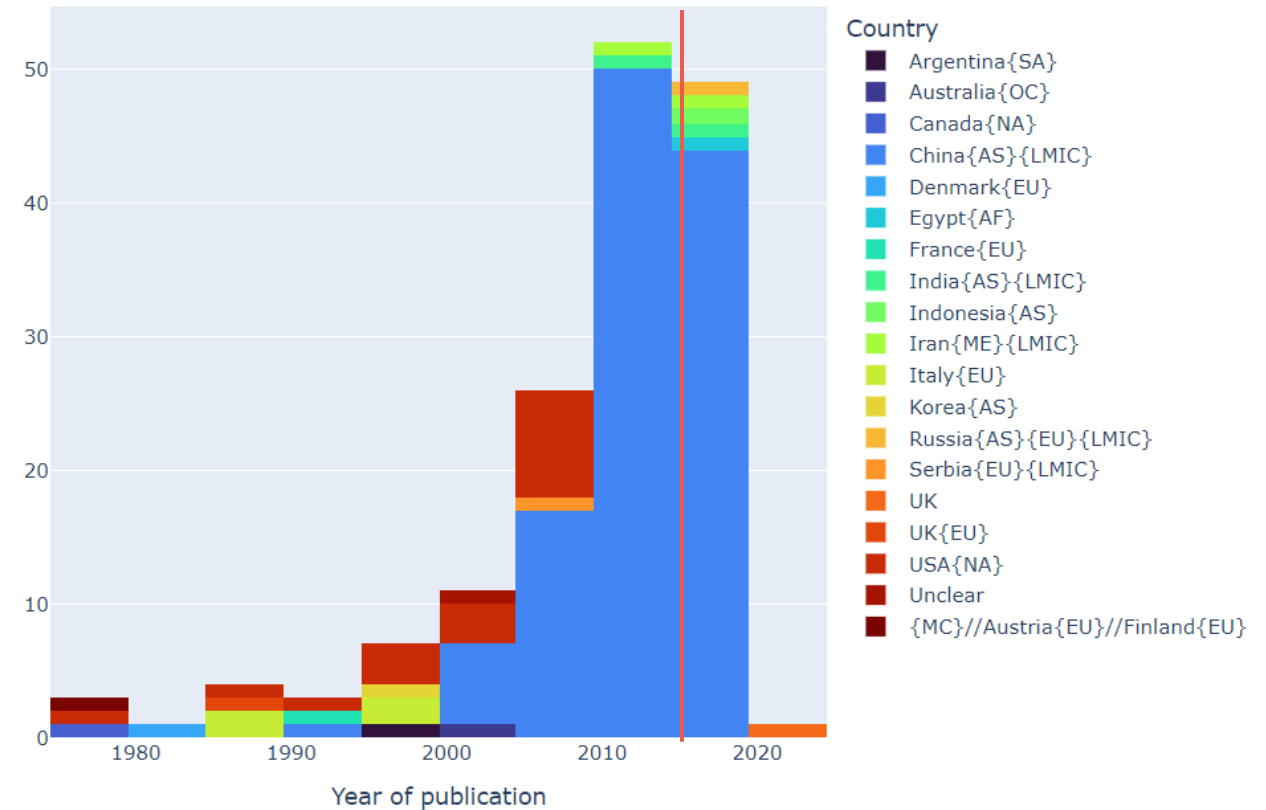
# Valproate for Schizophrenia

Cochrane review last updated 2016: <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD004028.pub4/full>

## References (by language)



## Studies (by country)



# Limitations

- Depending on review methodology (SR vs. rapid methods) there is more or less manual work and 'sanity checks' needed
- After transitioning away from Cochrane, register update frequency declined
  - Funding to keep register 'alive' might require small subscription charges from institutions (can be limited to high-income countries)
- Full texts (PDFs) not available in public version (do we dare to do it? Or can we just mine them?)

# Further work

- Use dataset for training and evaluation of automated data extraction
  - Apply automated data extraction methods to the fulltexts
- Add registry-update functions (deduplication, data ingestion, user management)
- Create a living review functionality to visualise data for any intervention or comparison on-demand

Thanks! Any Questions?

