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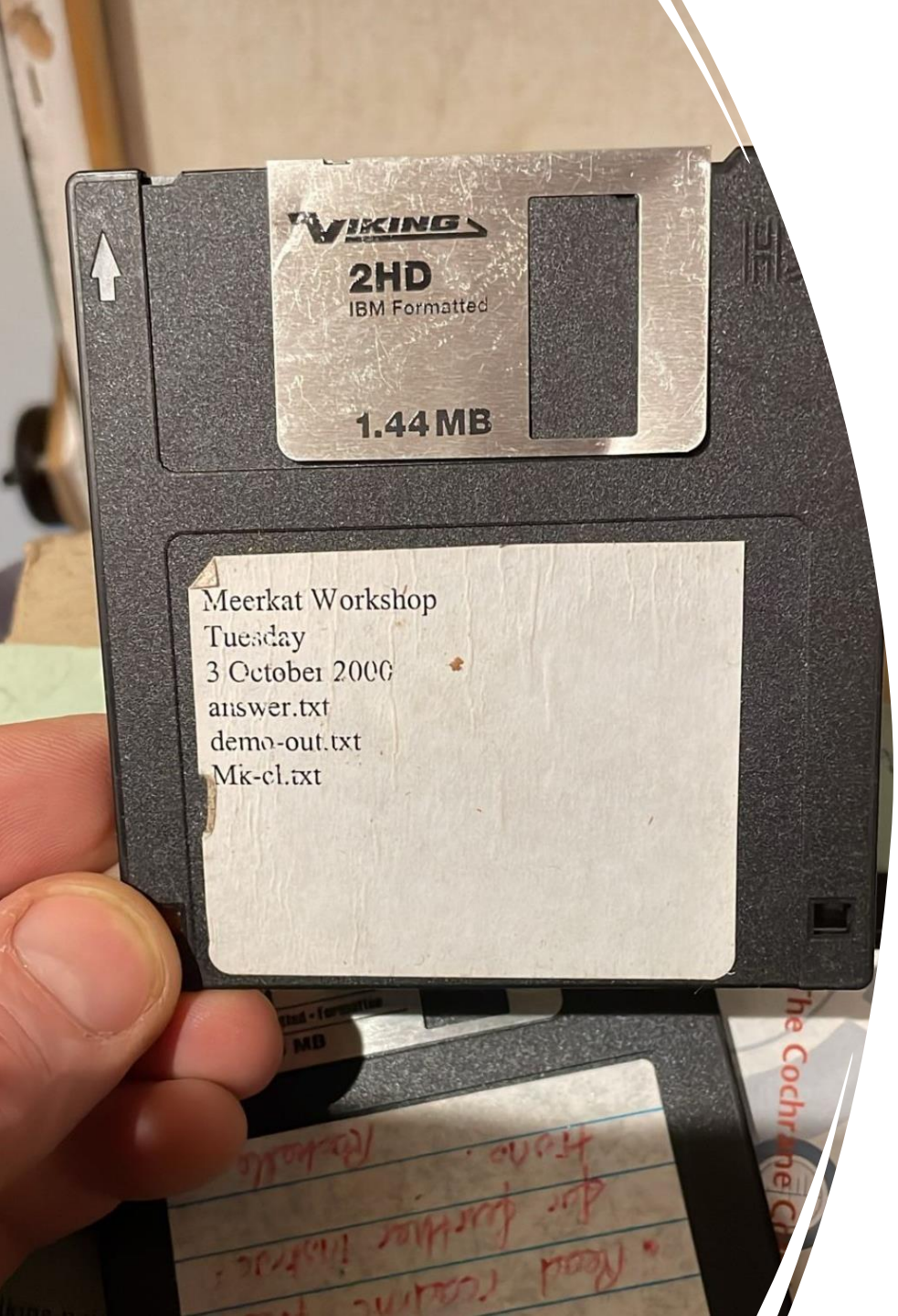
MK-2: Building an online study-based register

Lena Schmidt, Clive Adams

Acknowledgements and disclosures

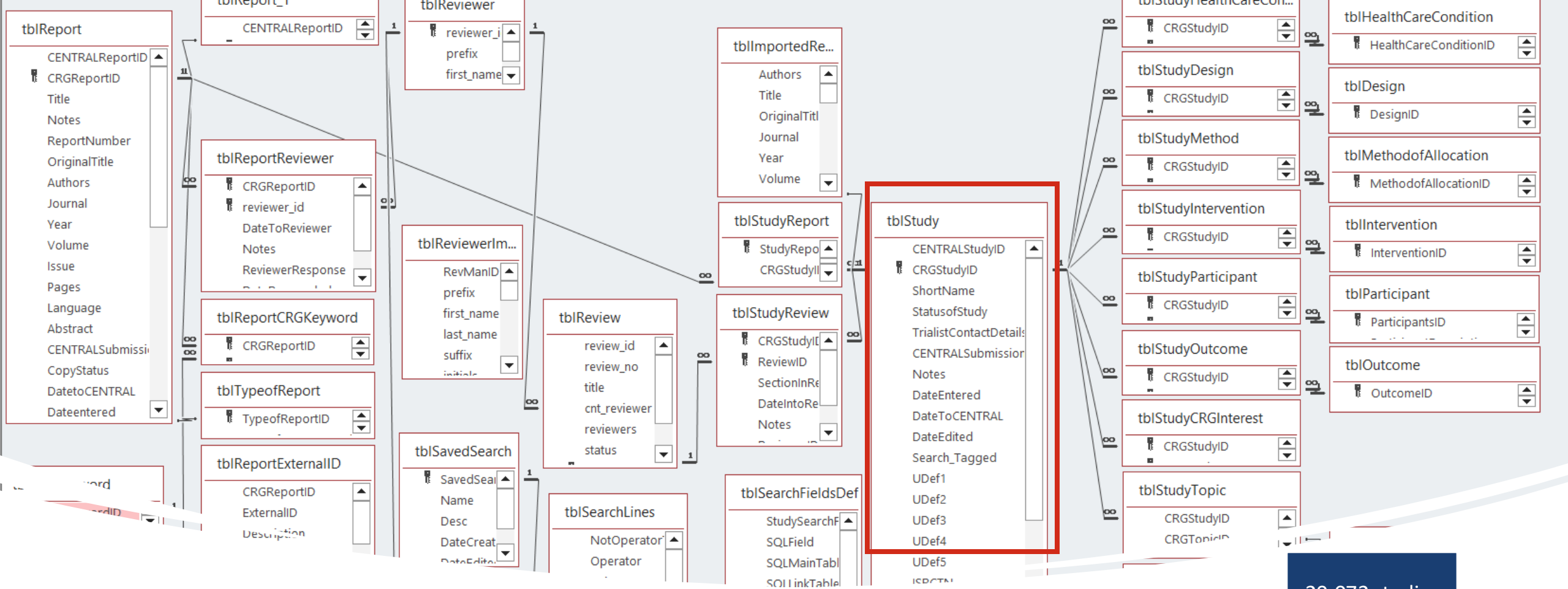
- The NIHR Innovation Observatory is funded by the National Institute for Health and Care Research (NIHR)

- 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



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



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 [...]

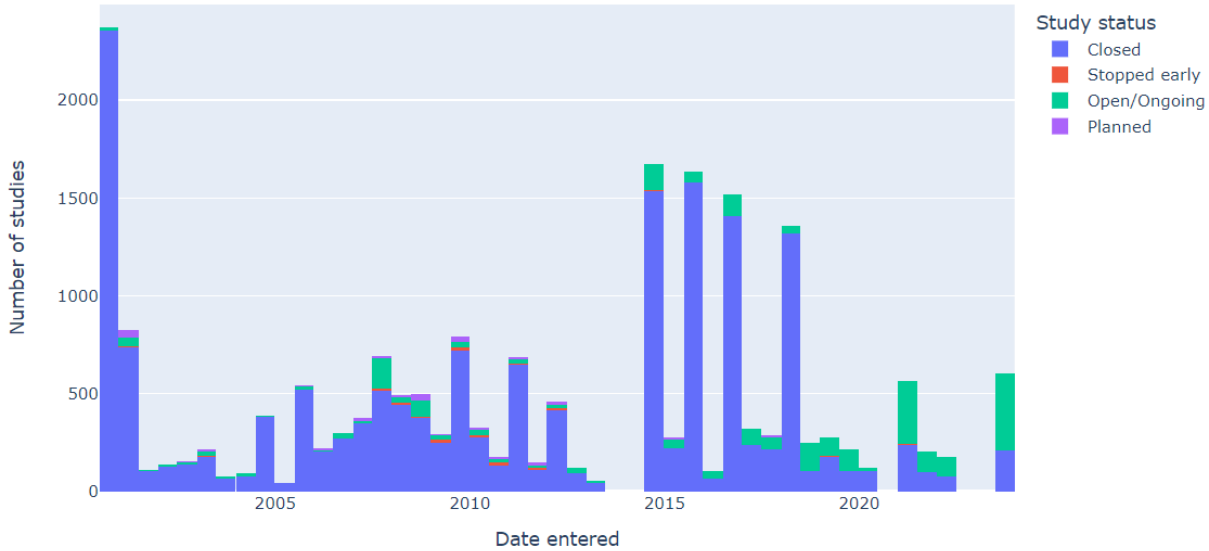
20,072 studies

29,662 references

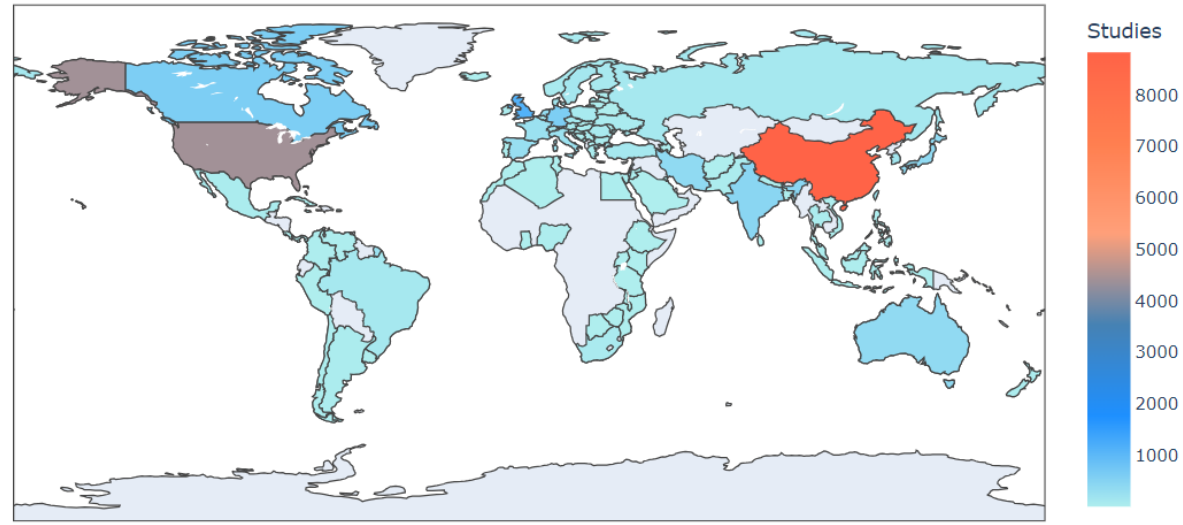
2985 interventions

276 healthcare conditions

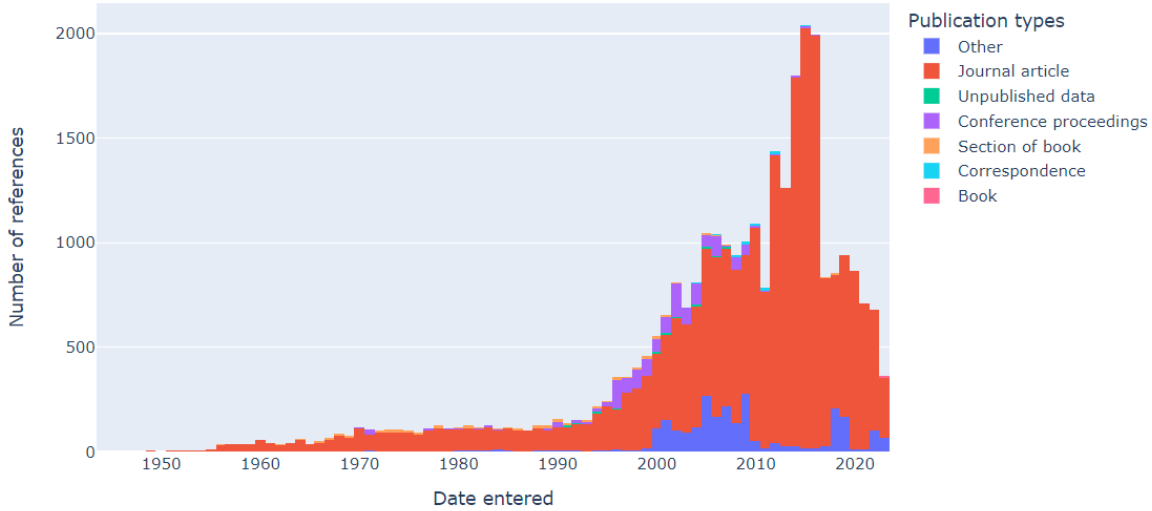
Meerkat studies by entry date



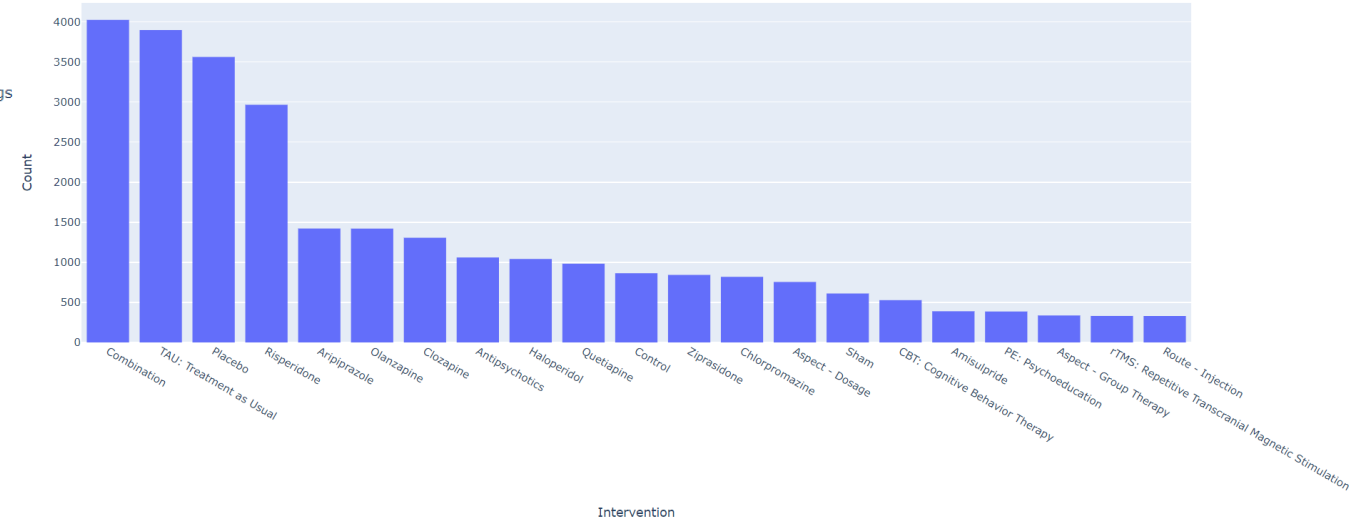
MEERKAT study countries



Meerkat references by year published



Meerkat Interventions used in >300 studies



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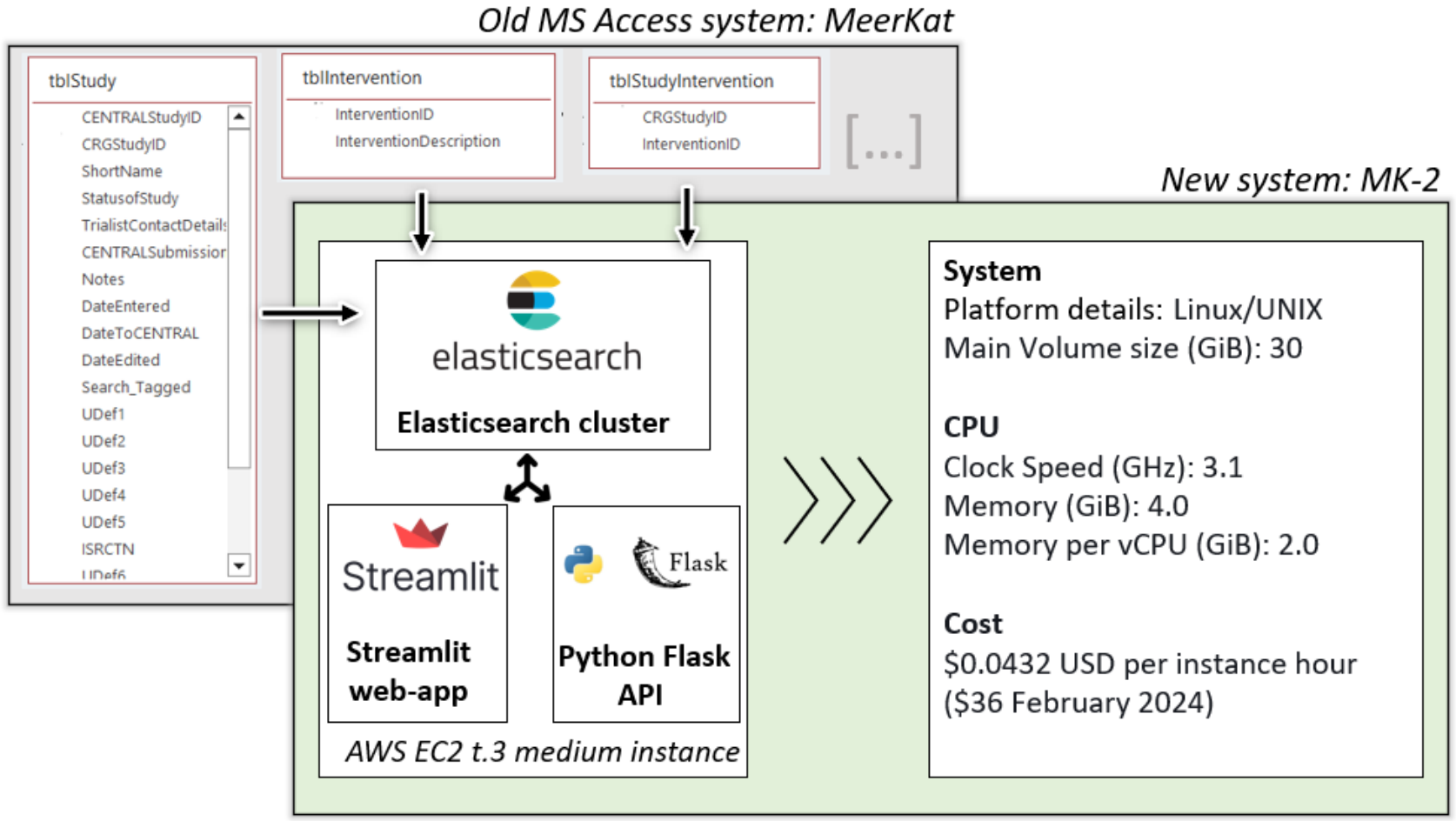
Local MS Access vs. online register

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.	**Concurrency**	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.	**Accessibility**	Yes
Easily integrate with web-based applications and services, facilitating a more seamless and connected workflow	**Integration**	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



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Web-App (User Interface): https://github.com/L-ENA/meerkatApp
Backend (Flask API): https://github.com/L-ENA/meerkatAPI

Public version

Available here (for now):

http://16.171.210.179:8501/

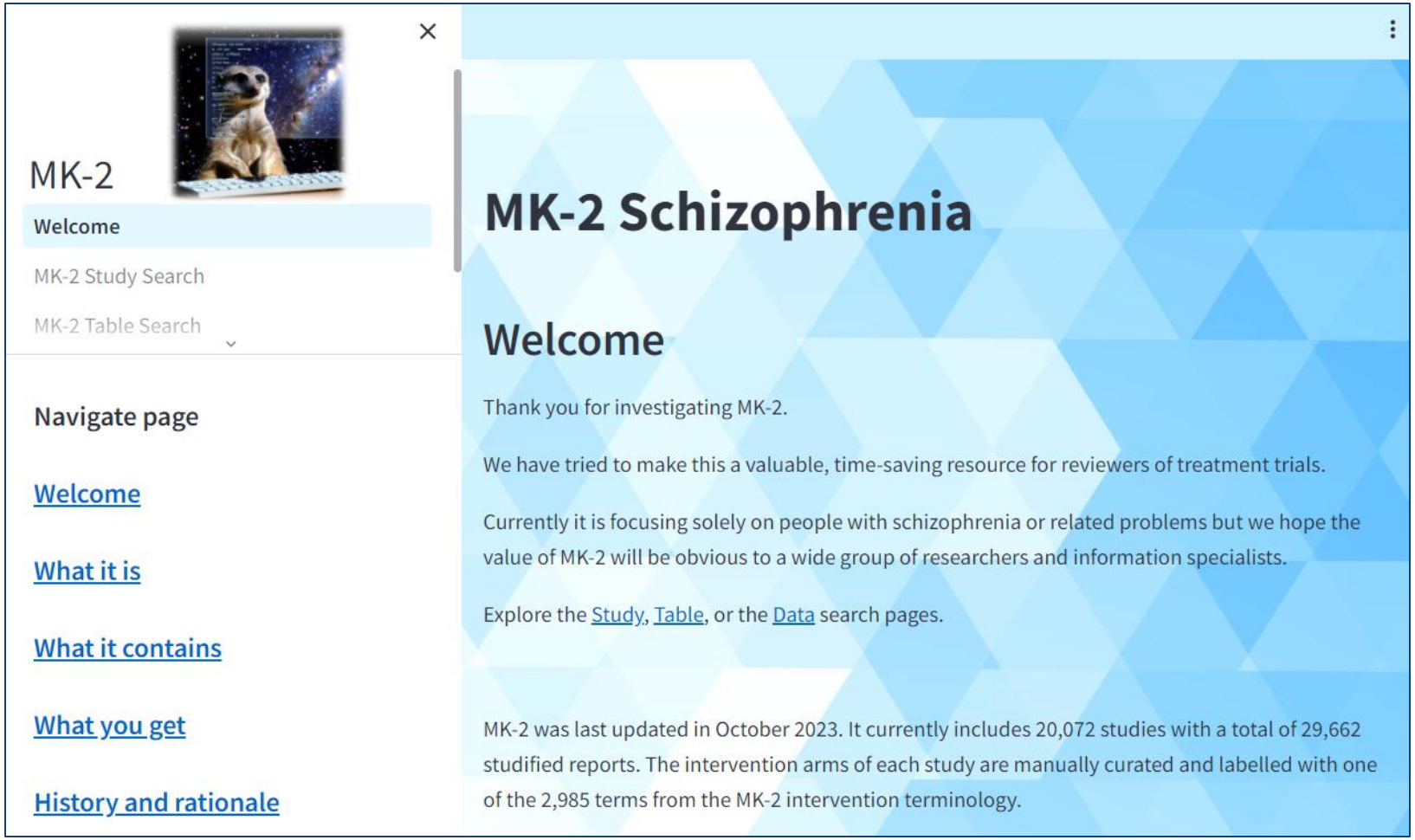
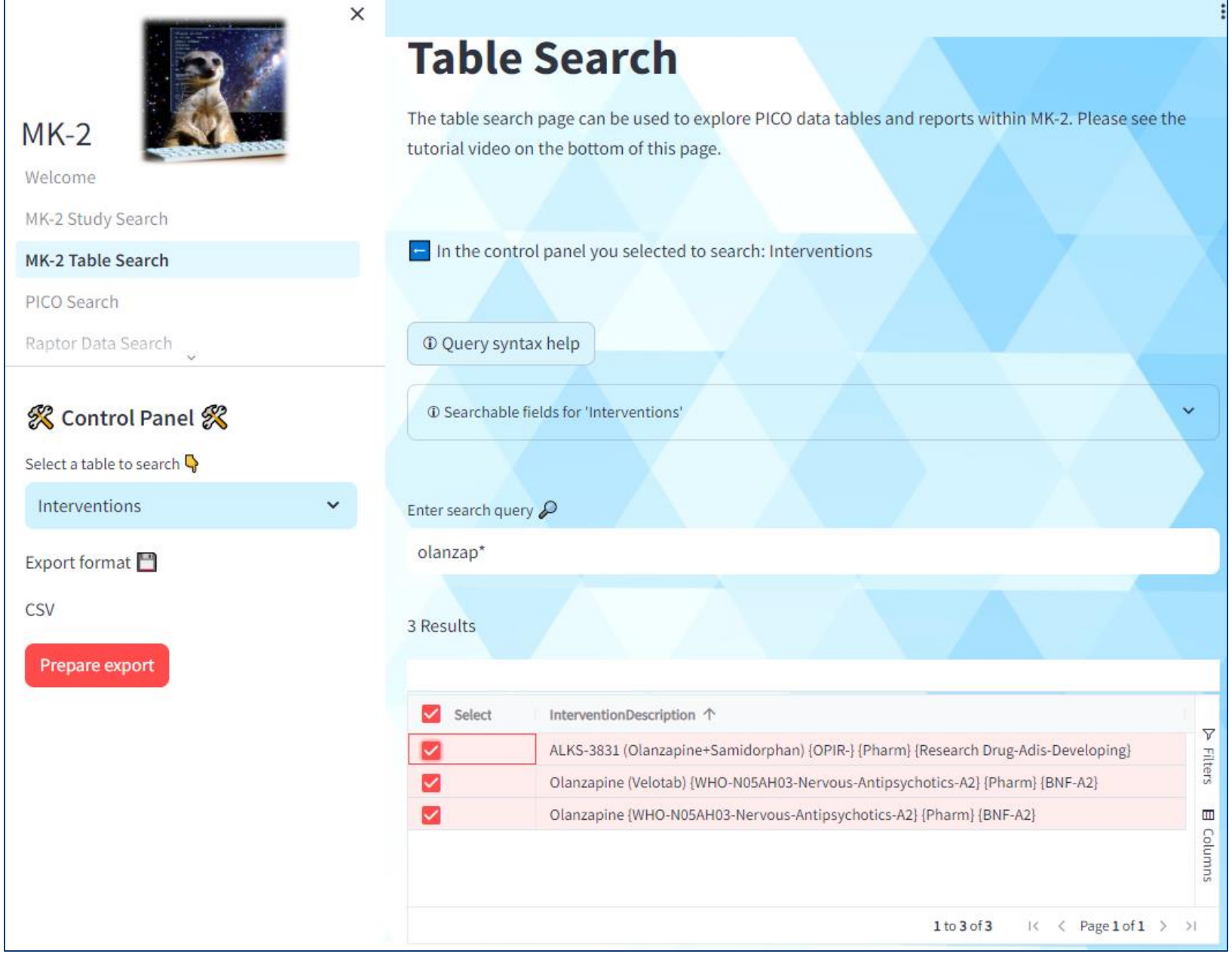
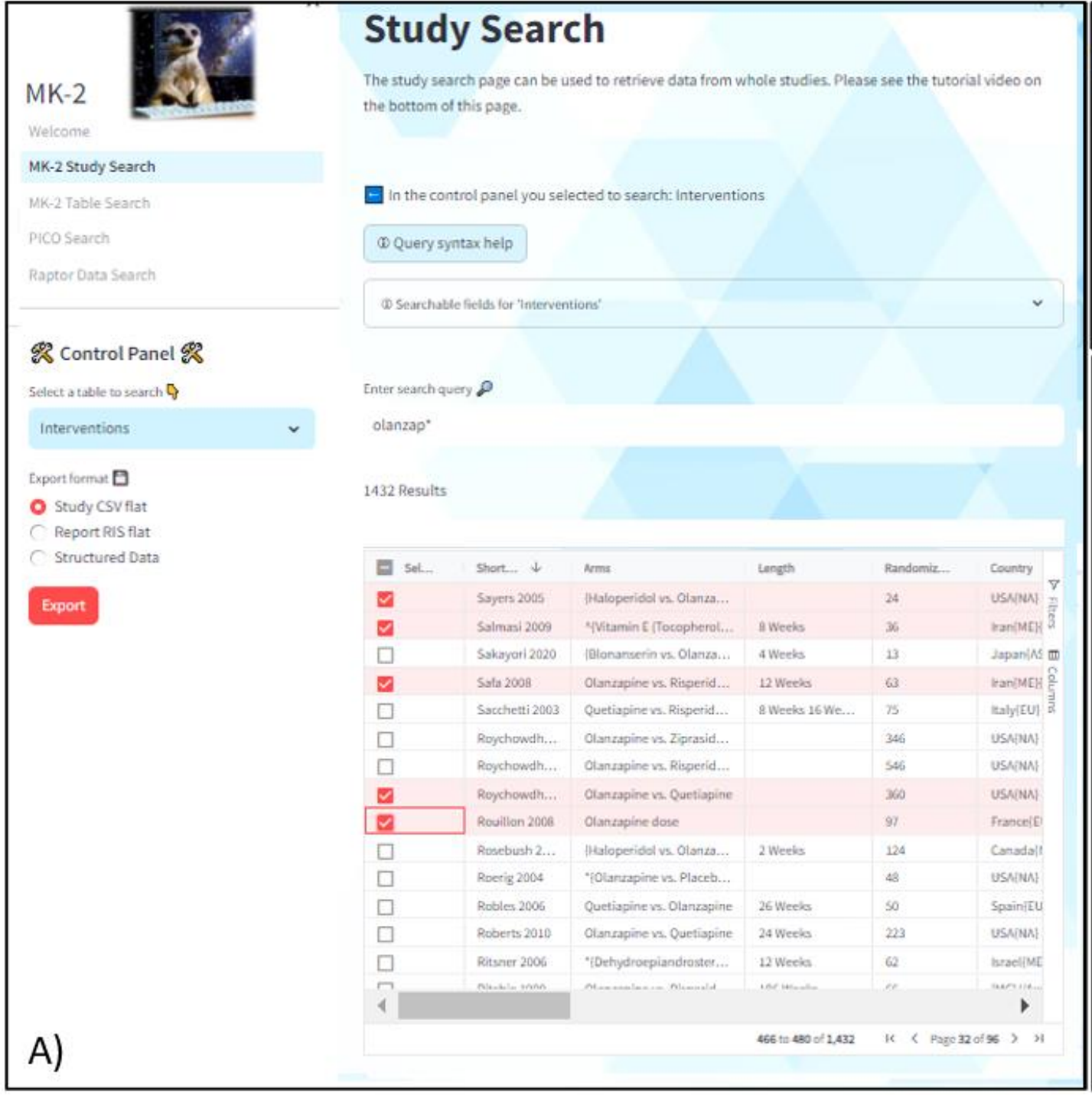


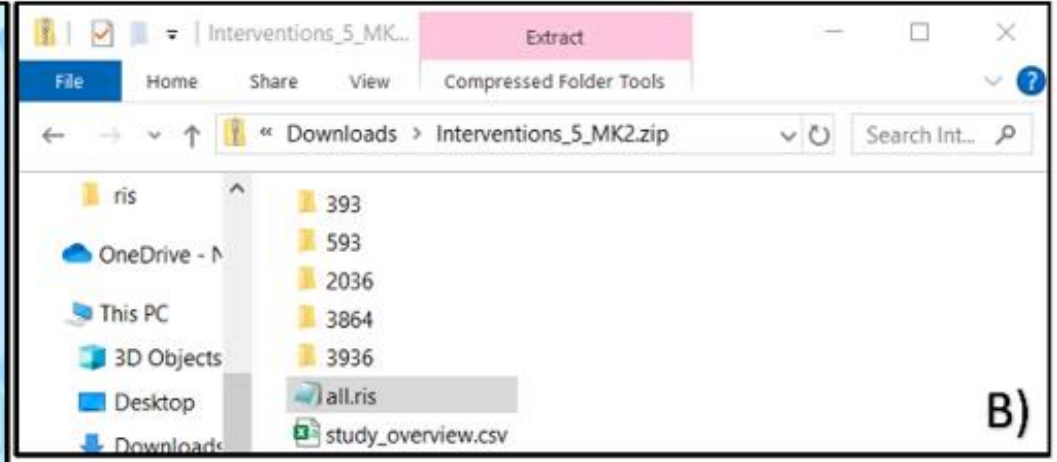
Table search

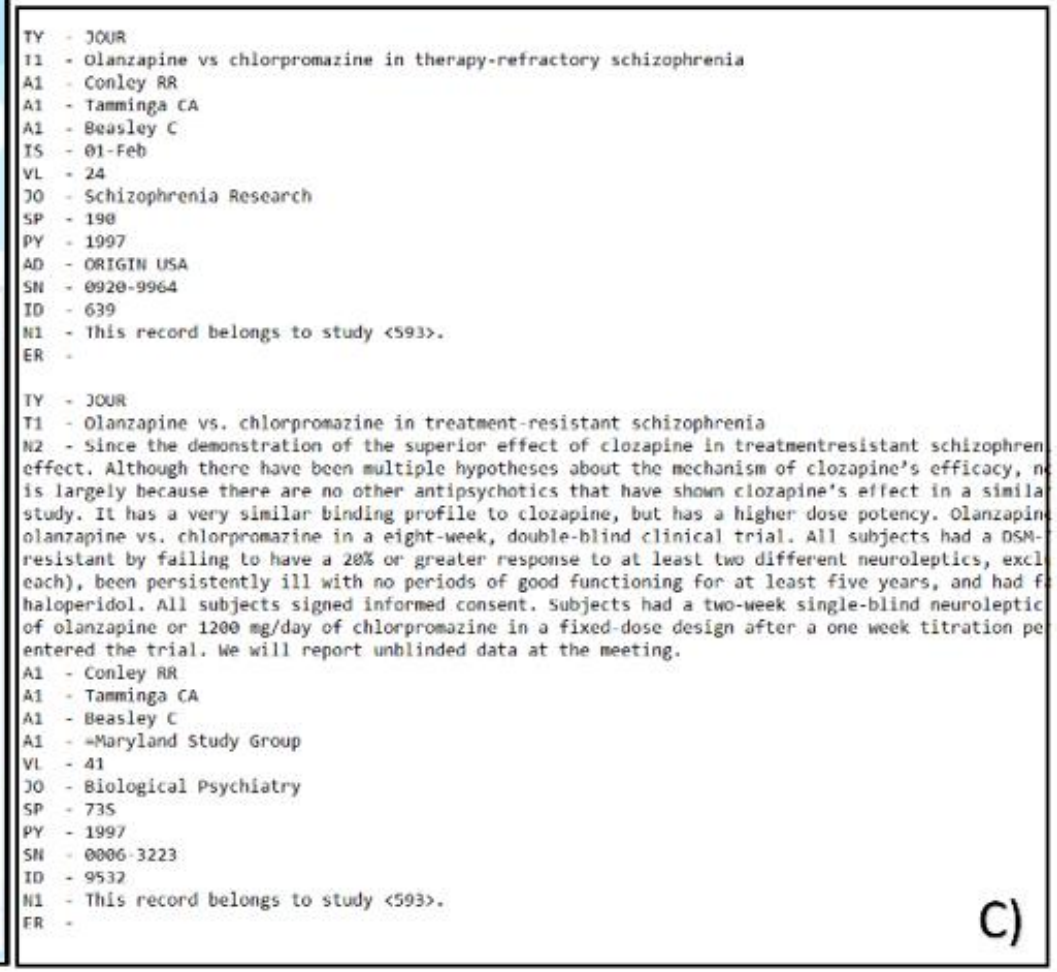


General search functionality includes:

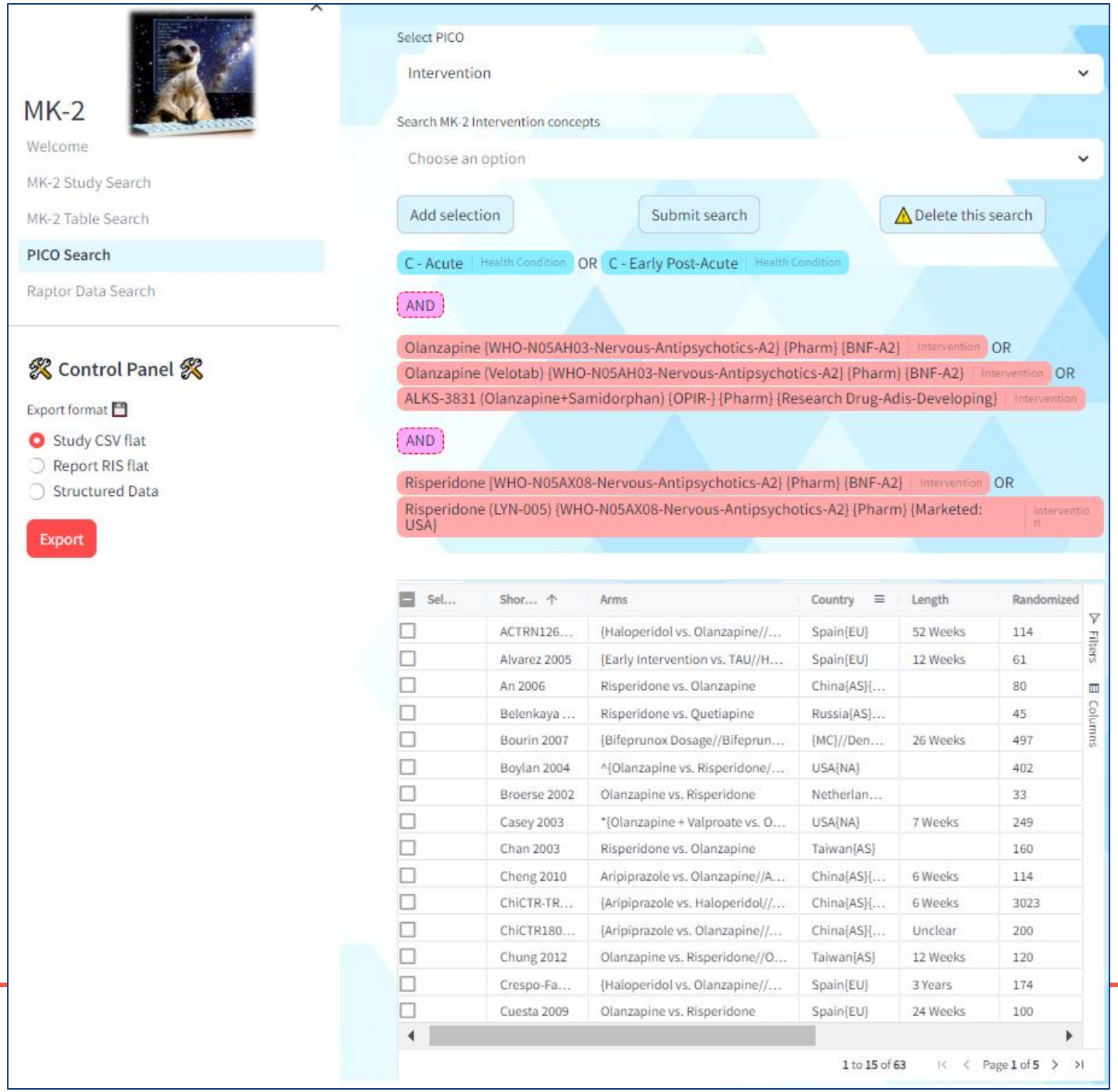
- Boolean
  - AND, OR, NOT
- Wildcards
  - *, ?
- Field search:
  - Author:”Adams”
- Proximity search
  - “schizophrenia trial”~5


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
Searchable fields for 'Interventions'
Enter search query
olanzap*
1432 Results
Sel... Short... Arms Length Randomiz... Country
Sayers 2005 |Haloperidol vs. Olanza... 24 USA(NA)
Salmasi 2009 *|Vitamin E (Tocopherol... 8 Weeks 36 Iran(ME)
Sakayori 2020 |Blonanserin vs. Olanza... 4 Weeks 13 Japan(AS
Safa 2008 Olanzapine vs. Risperid... 12 Weeks 63 Iran(ME)
Sacchetti 2003 Quetiapine vs. Risperid... 8 Weeks 16 We... 75 Italy(EU)
Roychowdh... Olanzapine vs. Ziprasid... 346 USA(NA)
Roychowdh... Olanzapine vs. Risperid... 546 USA(NA)
Roychowdh... Olanzapine vs. Quetiapine 360 USA(NA)
Rouillon 2008 Olanzapine dose 97 France(E
Rosebush 2... |Haloperidol vs. Olanza... 2 Weeks 124 Canada(
Roerig 2004 *|Olanzapine vs. Placeb... 48 USA(NA)
Robles 2006 Quetiapine vs. Olanzapine 26 Weeks 50 Spain(EU
Roberts 2010 Olanzapine vs. Quetiapine 24 Weeks 223 USA(NA)
Ritsner 2006 *|Dehydroepiandroster... 12 Weeks 62 Israel(ME
Filters
Columns
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
Search Int...
ris
OneDrive - M
This PC
3D Objects
Desktop
Downloads
393
593
2036
3864
3936
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 - 190
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 treatmentresistant schizophren
effect. Although there have been multiple hypotheses about the mechanism of clozapine's efficacy, n
is largely because there are no other antipsychotics that have shown clozapine's effect in a simila
study. It has a very similar binding profile to clozapine, but has a higher dose potency. Olanzapin
olanzapine vs. chlorpromazine in a eight-week, double-blind clinical trial. All subjects had a DSM-
resistant by failing to have a 20% or greater response to at least two different neuroleptics, excl
each), been persistently ill with no periods of good functioning for at least five years, and had f
haloperidol. All subjects signed informed consent. Subjects had a two-week single-blind neuroleptic
of olanzapine or 1200 mg/day of chlorpromazine in a fixed-dose design after a one week titration pe
entered the trial. 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



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

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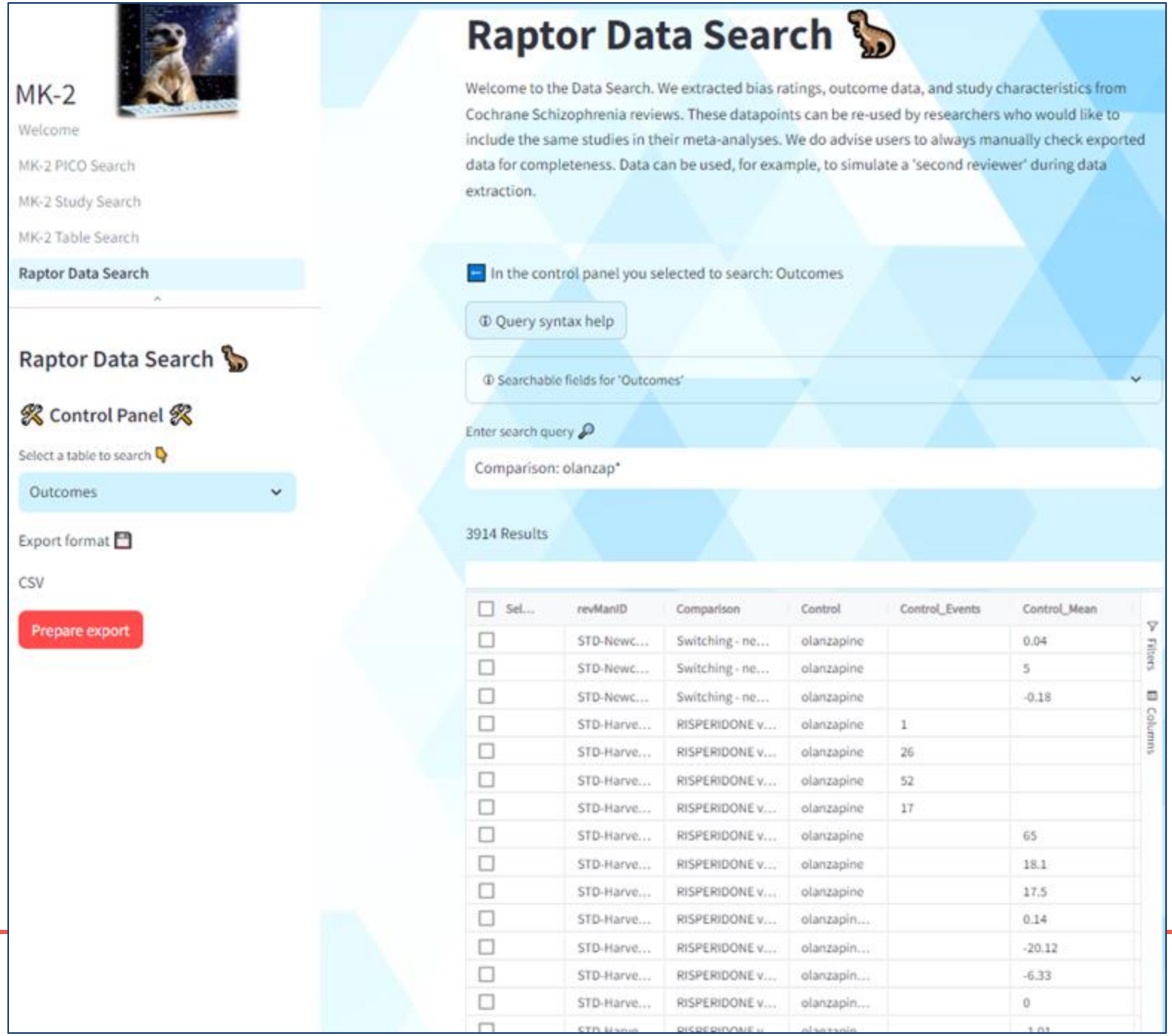
Note on linking Cochrane review data

- 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



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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

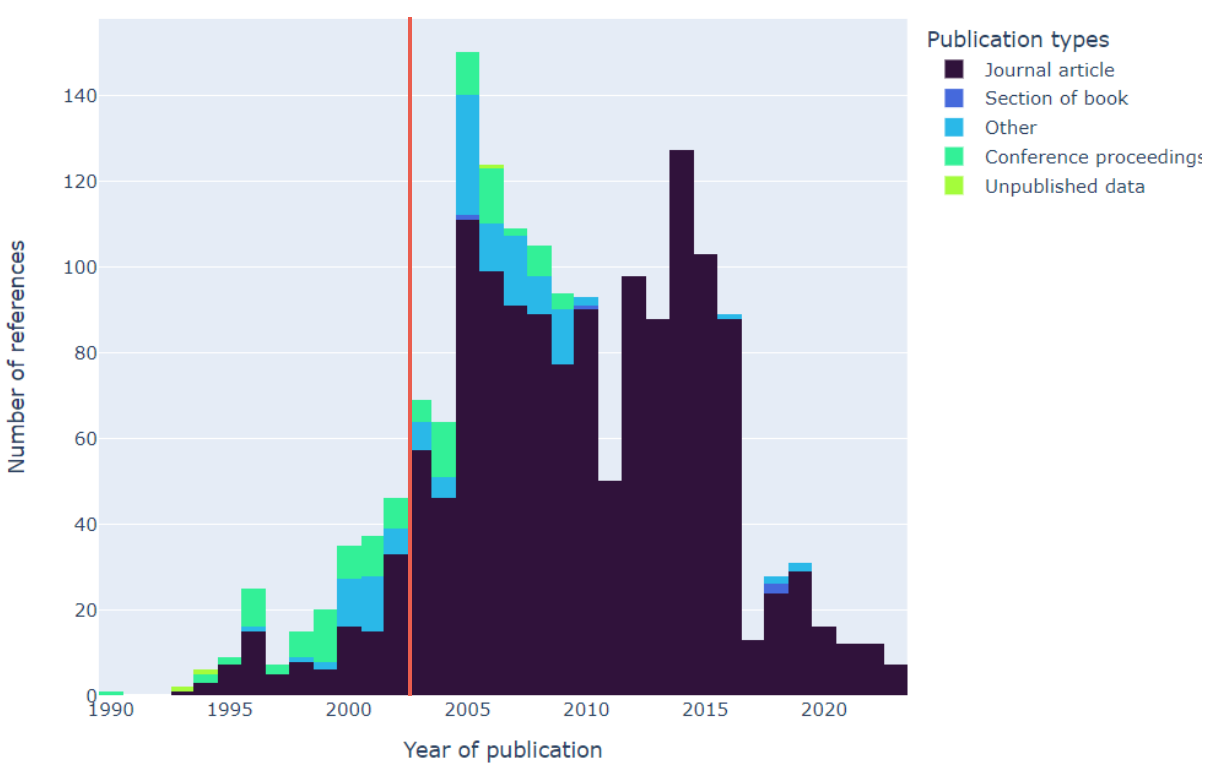
‘Instant’ Living, scoping, mapping reviews with MK-2

- 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.

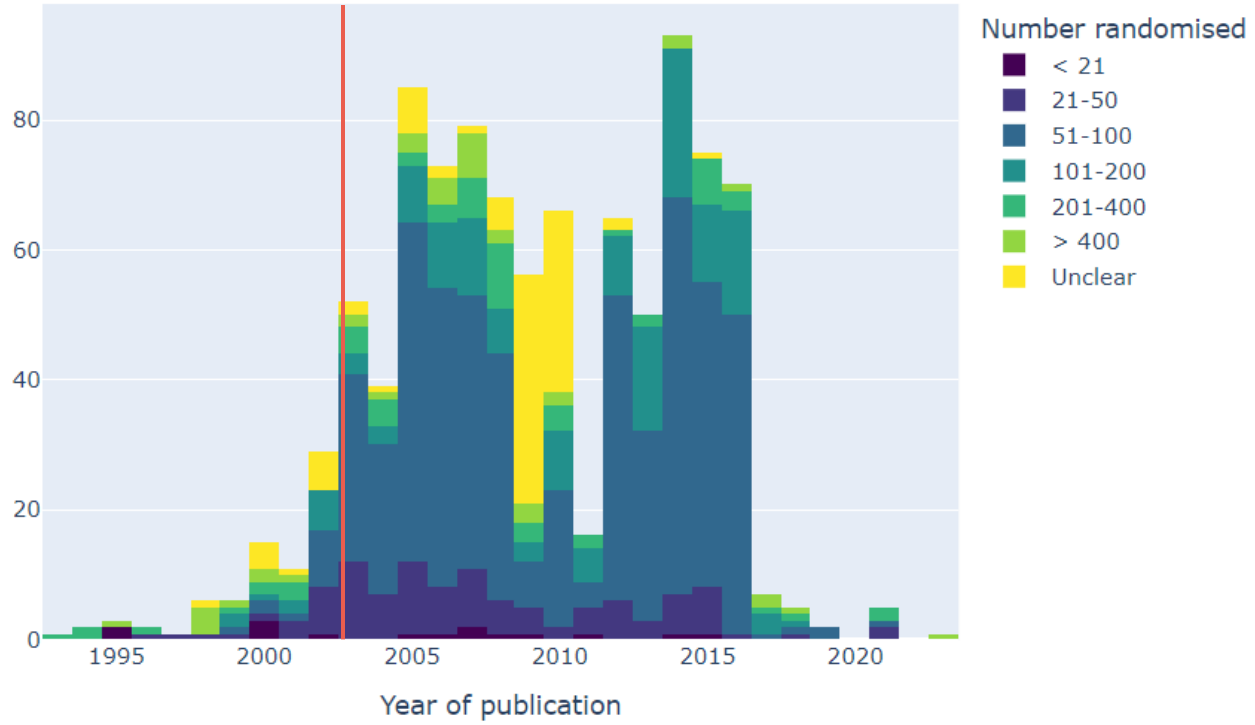
Quetiapine for Schizophrenia

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)



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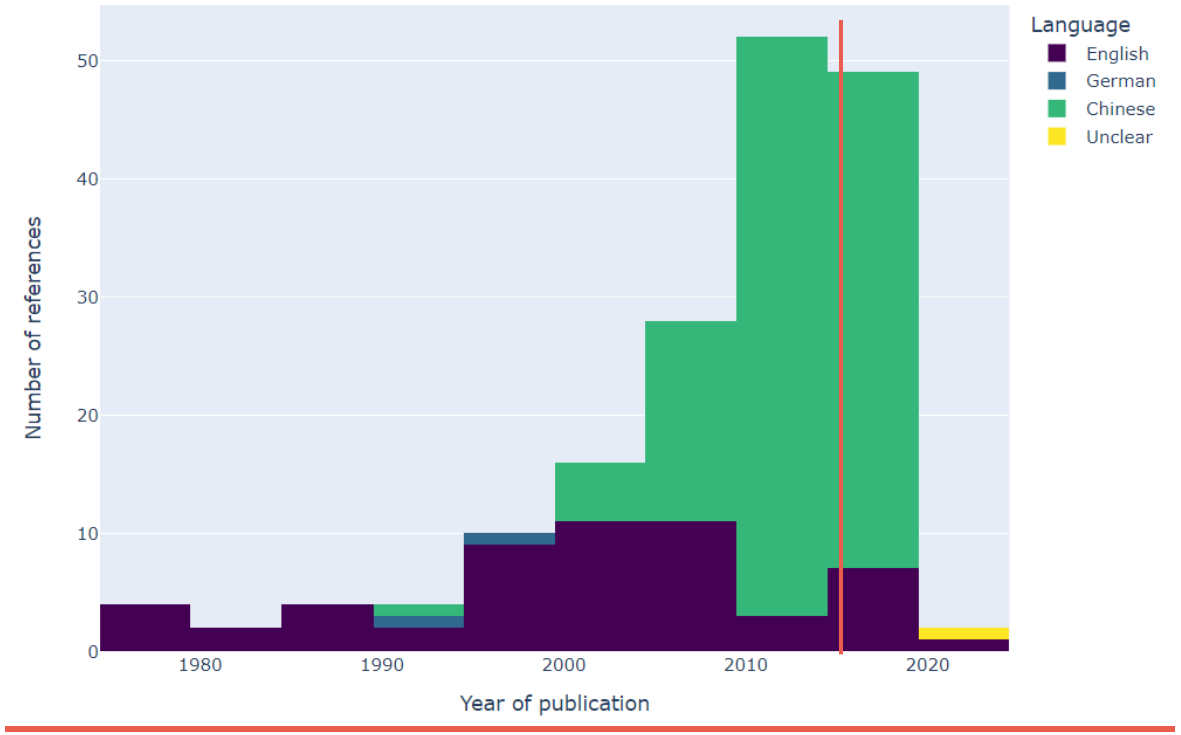
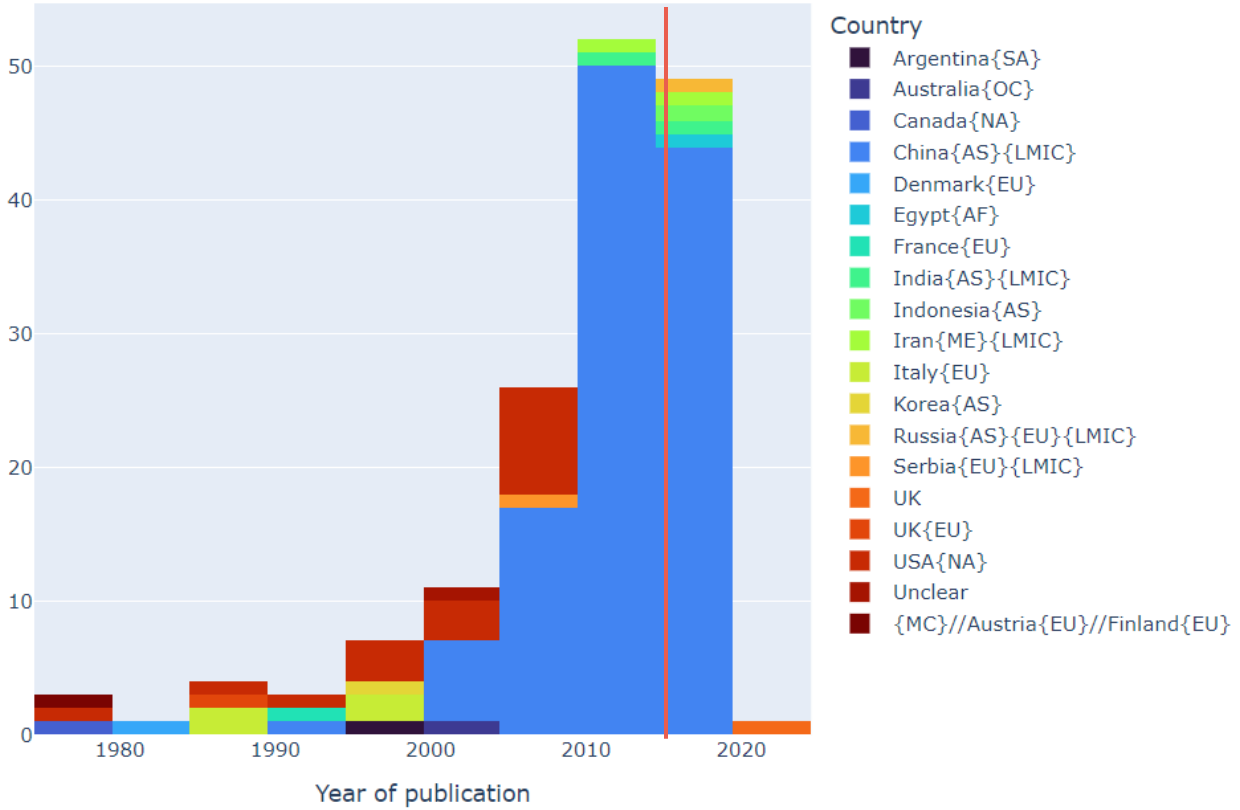
Valproate for Schizophrenia

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

References (by language)



Studies (by country)



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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

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Thanks! Any Questions?