Dealing with a new kind of team: the crowd

EFSA Conference 2018, Parma, Italy
20 September 2018

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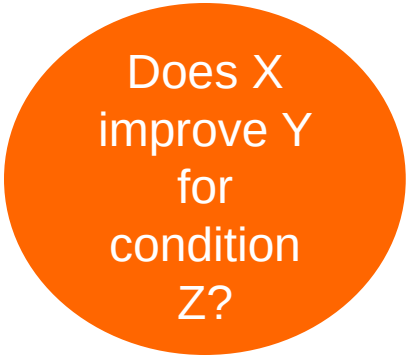
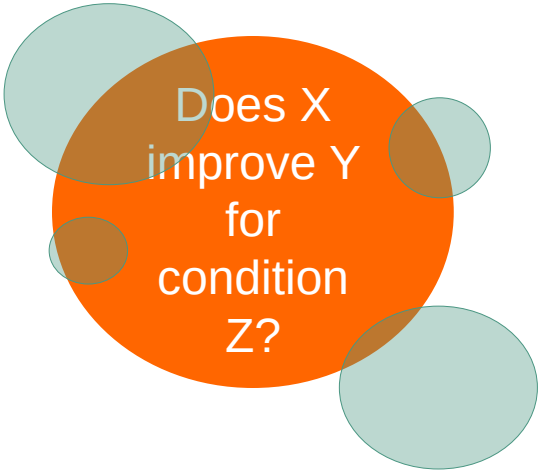
Trusted evidence.
Informed decisions.
Better health.

Evidence synthesis



Question

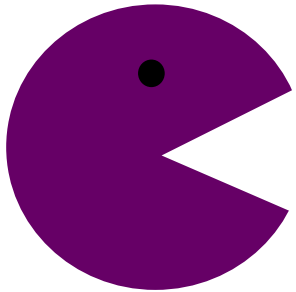
Evidence synthesis

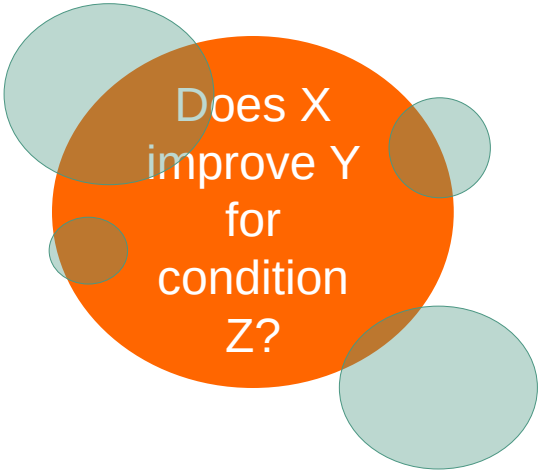


Question

Primary research

Evidence synthesis





- Evidence synthesis
- Question
- Primary research

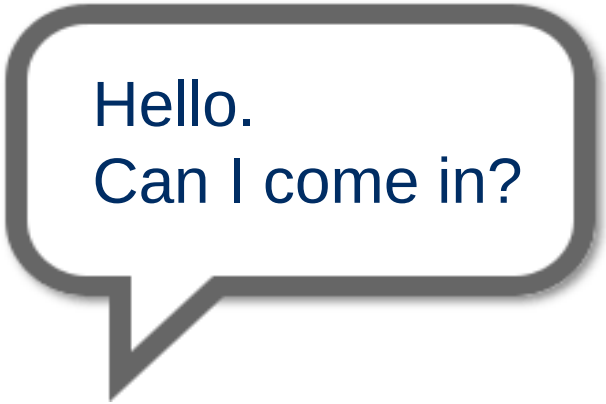
Then **evidence synthesis** comes along in the form of meta-analysis or systematic review and **finds all the relevant studies** to **combine them** in order to reach the best possible answer to the question

The problem (well, one problem)

Information → Knowledge

Turning information into knowledge and wisdom is challenging as the amount of information increases exponentially

Another problem

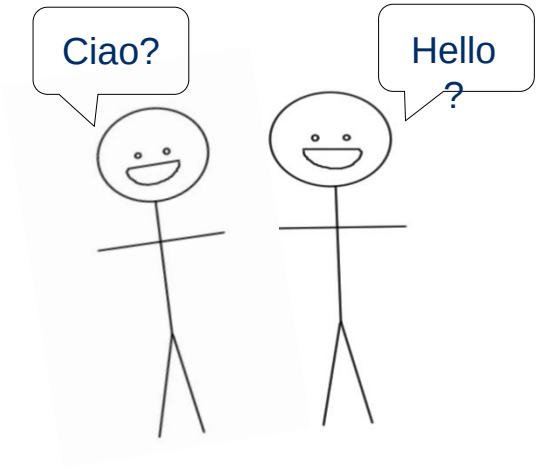


It can be challenging to enable people to contribute meaningfully

Problem number 3

We also struggle to **retain** contributors with meaningful ways **to remain involved**

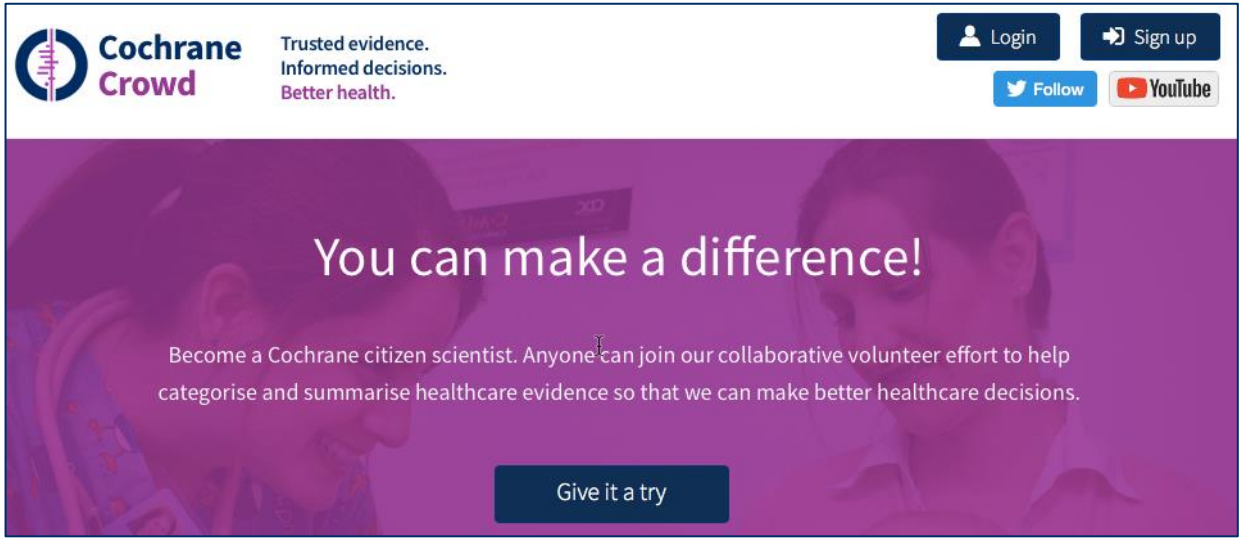
So wait a minute…



We are struggling to keep up with the amount of information, yet we have people who want to help

Cochrane

The solution



Cochrane Crowd: a citizen science platform that offers potential contributors 'micro-tasks'

Cochrane

The ingredients

Large datasets

Multiple classifications

Agreement algorithm

Three key elements: lots of data that needs processing, being able to create doable tasks to help process, and having a robust agreement algorithm to ensure collective accuracy

Classifying or categorising

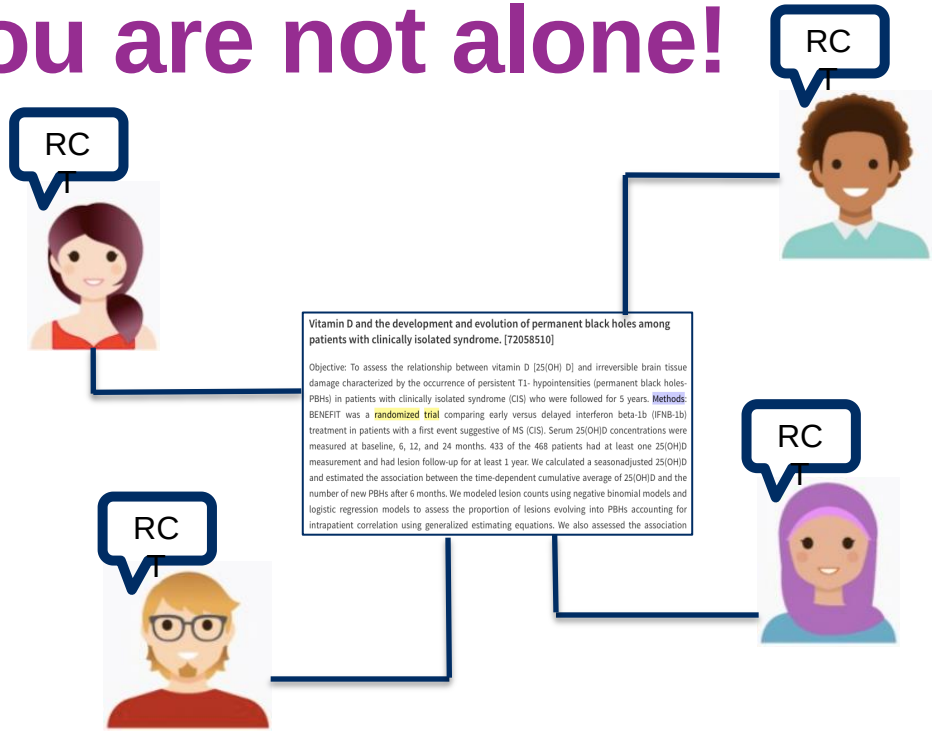
Vitamin D and the development and evolution of permanent black holes among patients with clinically isolated syndrome. [72058510]

Objective: To assess the relationship between vitamin D [25(OH) D] and irreversible brain tissue damage characterized by the occurrence of persistent T1- hypointensities (permanent black holes-PBHs) in patients with clinically isolated syndrome (CIS) who were followed for 5 years. Methods: BENEFIT was a randomized trial comparing early versus delayed interferon beta-1b (IFNB-1b) treatment in patients with a first event suggestive of MS (CIS). Serum 25(OH)D concentrations were measured at baseline, 6, 12, and 24 months. 433 of the 468 patients had at least one 25(OH)D measurement and had lesion follow-up for at least 1 year. We calculated a seasonadjusted 25(OH)D and estimated the association between the time-dependent cumulative average of 25(OH)D and the number of new PBHs after 6 months. We modeled lesion counts using negative binomial models and logistic regression models to assess the proportion of lesions evolving into PBHs accounting for intrapatient correlation using generalized estimating equations. We also assessed the association

Is the record describing a randomised controlled trial (RCT)?

- Yes
- No
- Unsure

You are not alone!



No record is just looked at once. Most records need 4 agreements for it to either be deemed an RCT or not.

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Types of task

Identify health research

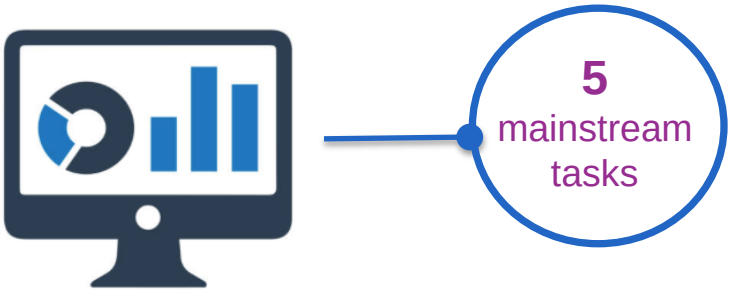
Describe health research

In Cochrane Crowd the micro-tasks are about identifying and describing health research

Has it worked?

Cochrane Crowd (crowd.cochrane.org) was launched in May 2016

High level metrics



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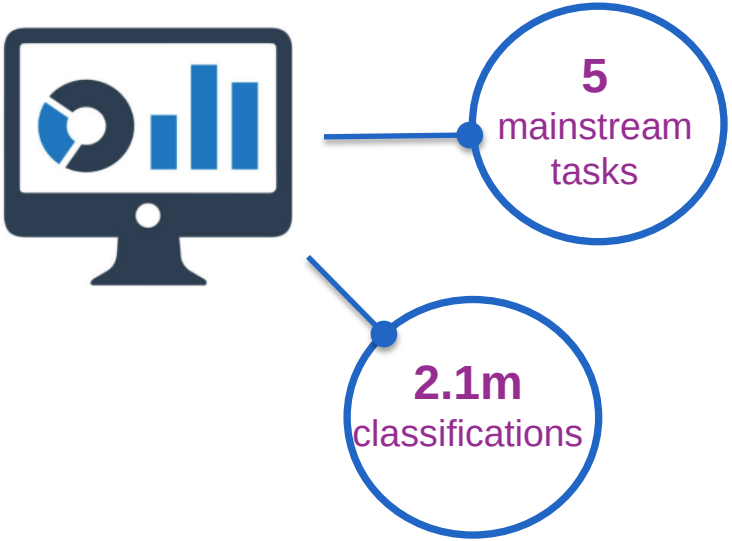

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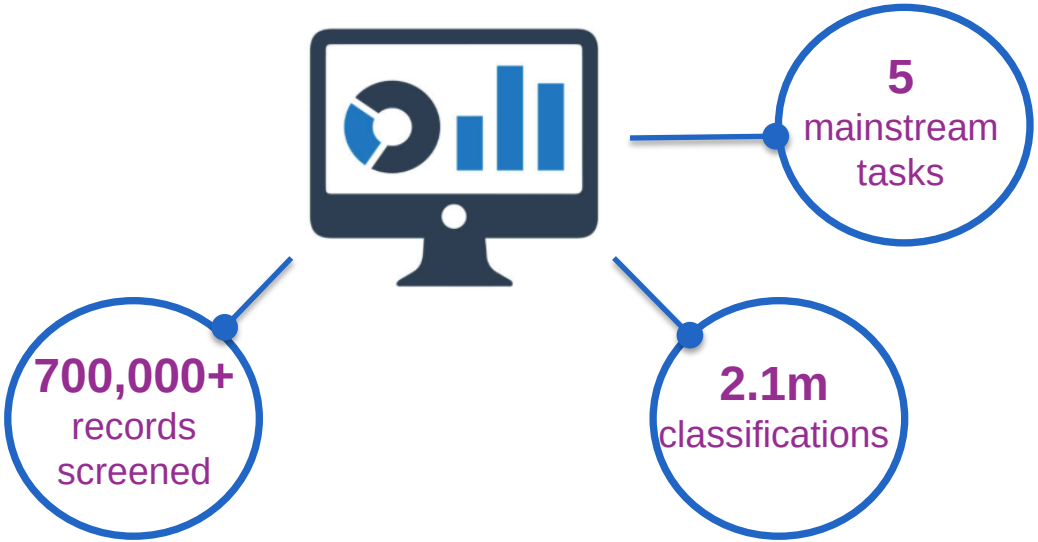
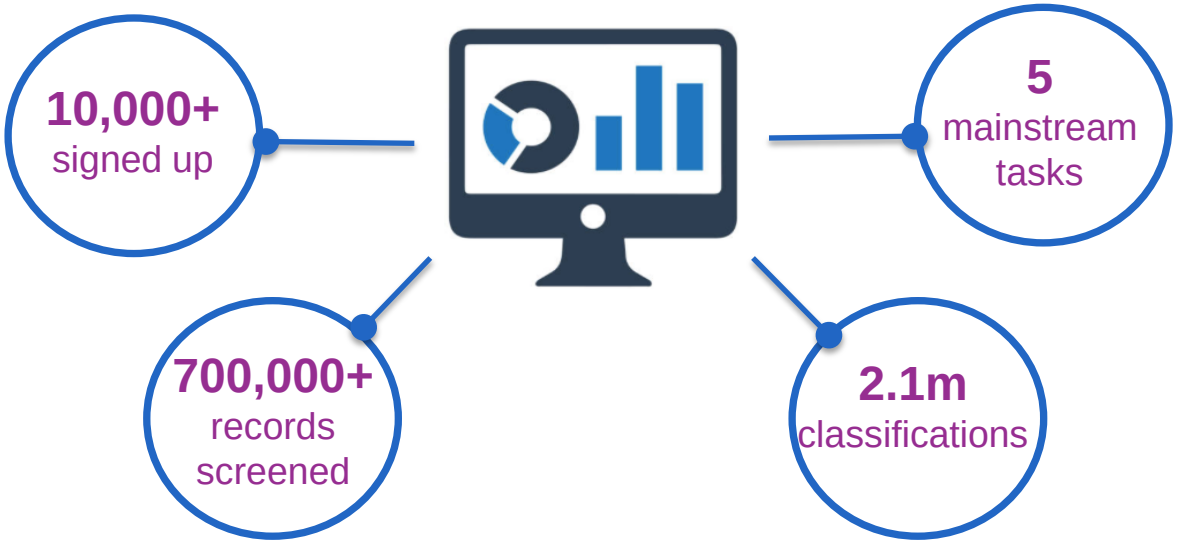


Data as of 09 Sept 2018

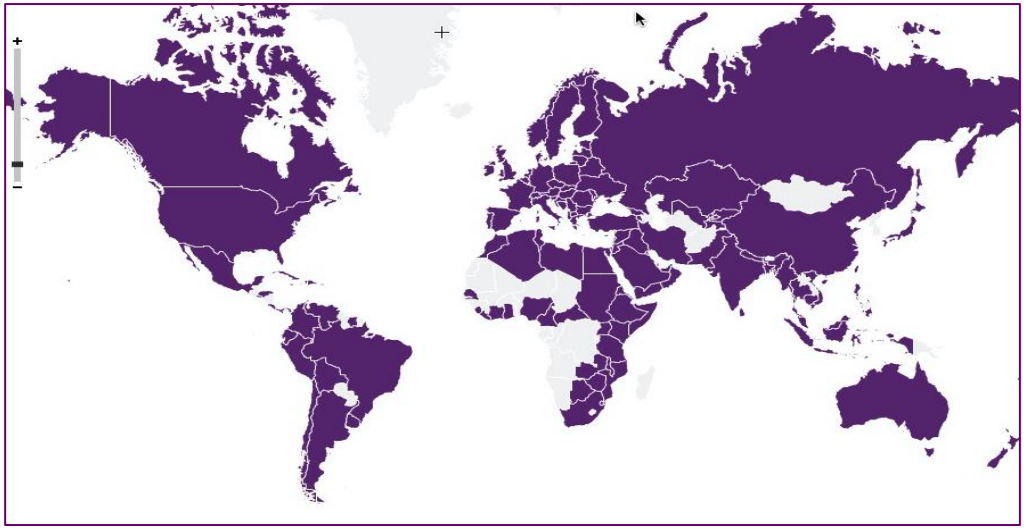
Cochrane

High level metrics



Data as of 09 Sept 2018

The contributors



Contributors come from 180 countries (56% from lower and middle income countries)

The contributors

"I like that I can make a small contribution to Cochrane from my own home, on my own schedule"

"Feels like something useful you can do if you have just a few minutes and can't get into something bigger workwise. It's great being part of the team"

"I hope to be able to contribute as much as I can in college and in my life after graduation, but I'd like to do something now. When I saw that I can work directly with Cochrane I was really excited"

"It's fun, and is actually useful."

Crowd accuracy

RCT Identification

	Info specialist and methodologist	
Cochrane Crowd	TP 457	FP 58
	FN 4	TN 5522

Sensitivity: **99.1%** Specificity: **99%**

DTA Identification

	Info specialist and methodologist	
Cochrane Crowd	TP 100	FP 22
	FN 20	TN 978

Sensitivity: **83%** Specificity: **97%**

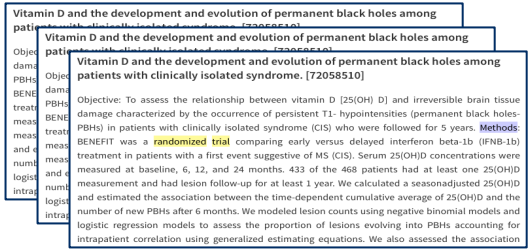
CTgov Identification

	Info specialist	
Cochrane Crowd	TP 8191	FP 77
	FN 17	TN 5823

Sensitivity: **99.7%** Specificity: **98.6%**

With the right agreement algorithm in place very high collective accuracy is possible.

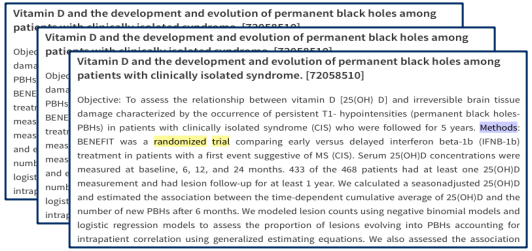
Impact



42,500 RCTs

The Crowd has identified 42,500 reports of randomised trials that had not been indexed as randomised trials. This has significantly enriched our central repository of trials

Impact



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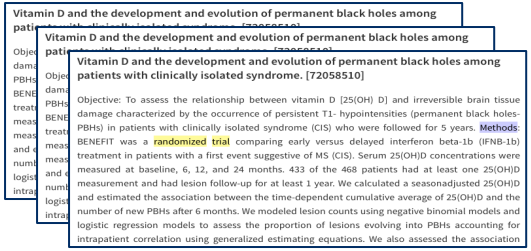

465,000 ‘not RCTs’

The Crowd has also labelled 465,000 records that might have been RCTs as ‘not RCTs’

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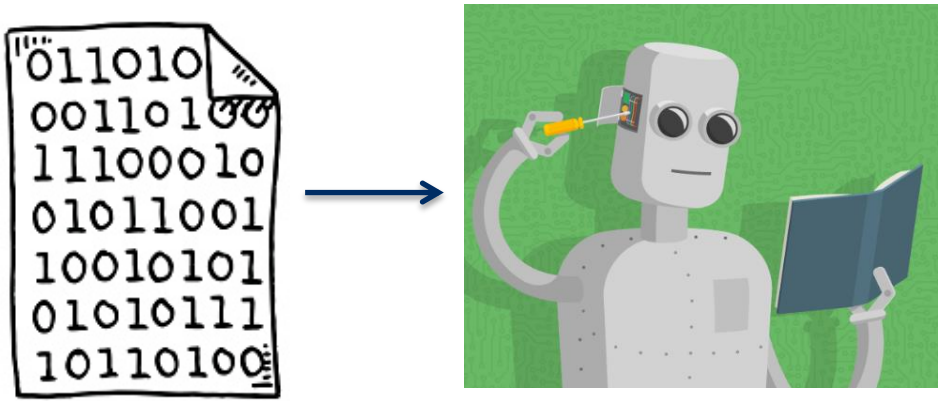
Machine learning



This dataset, generated by the Crowd has enabled us to train a machine to do the task
(well, a significant proportion of the task)

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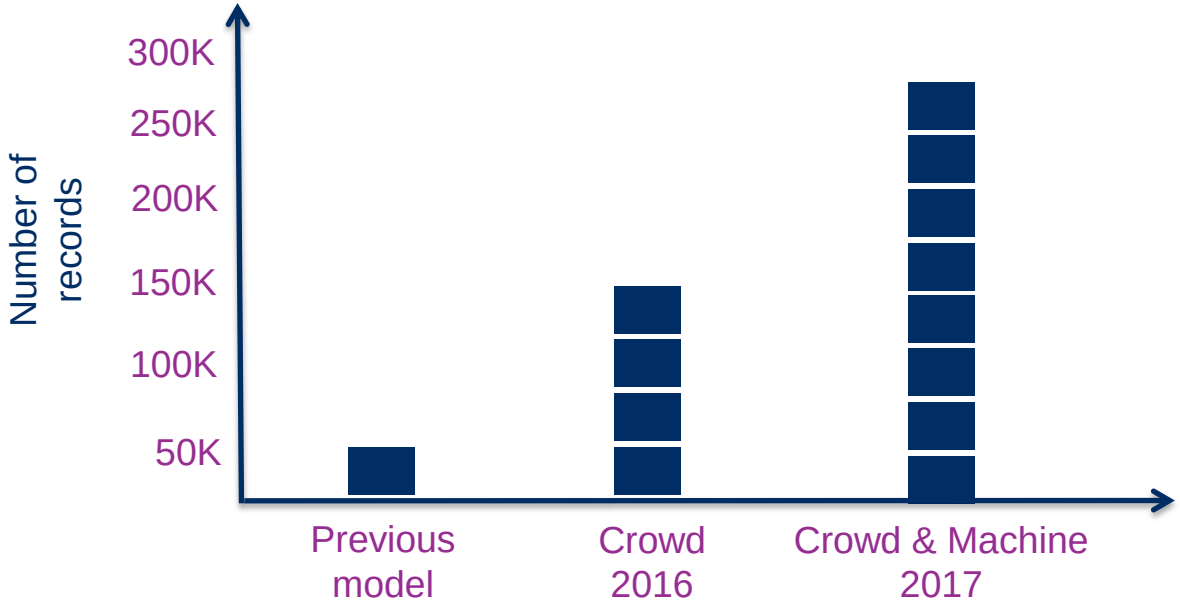
Machine learning

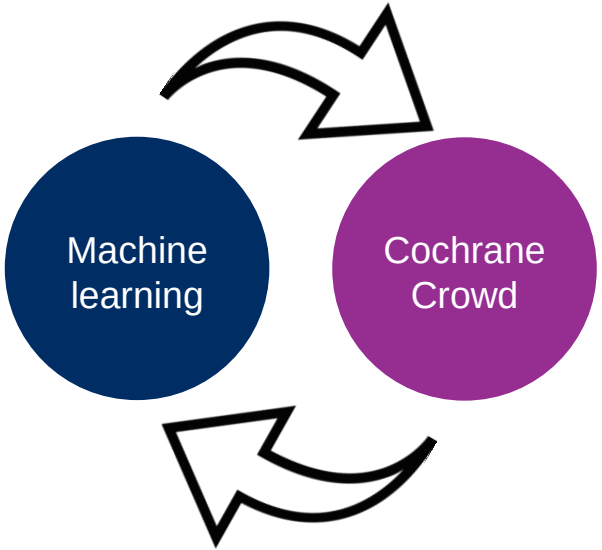
Machine learning gives “computers the ability to learn without being explicitly programmed”. In the context of Cochrane, this is about building classifiers that provide likelihood scores

Increasing capacity



Crowd and machine working together enables scale-up

Virtuous circle



As the Crowd generate more data, it is fed to the machine who continues to learn

In summary

Cochrane Crowd is helping us meet the challenge of information overload

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Cochrane Crowd is helping us meet the challenge of information overload

It provides potential contributors with meaningful ways to get involved

Thank you

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Support for Project Transform was provided by Cochrane and the National Health and Medical Research Council of Australia (APP1114605). The contents of the published material are solely the responsibility of the Administering Institution, a Participating Institution or individual authors and do not reflect the views of the NHMRC.