June 2nd, 2020

Ermanno Cavalli

Experiences in implementation of new digital solutions in the regulatory domain

Trusted science for safe food

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The Information Age

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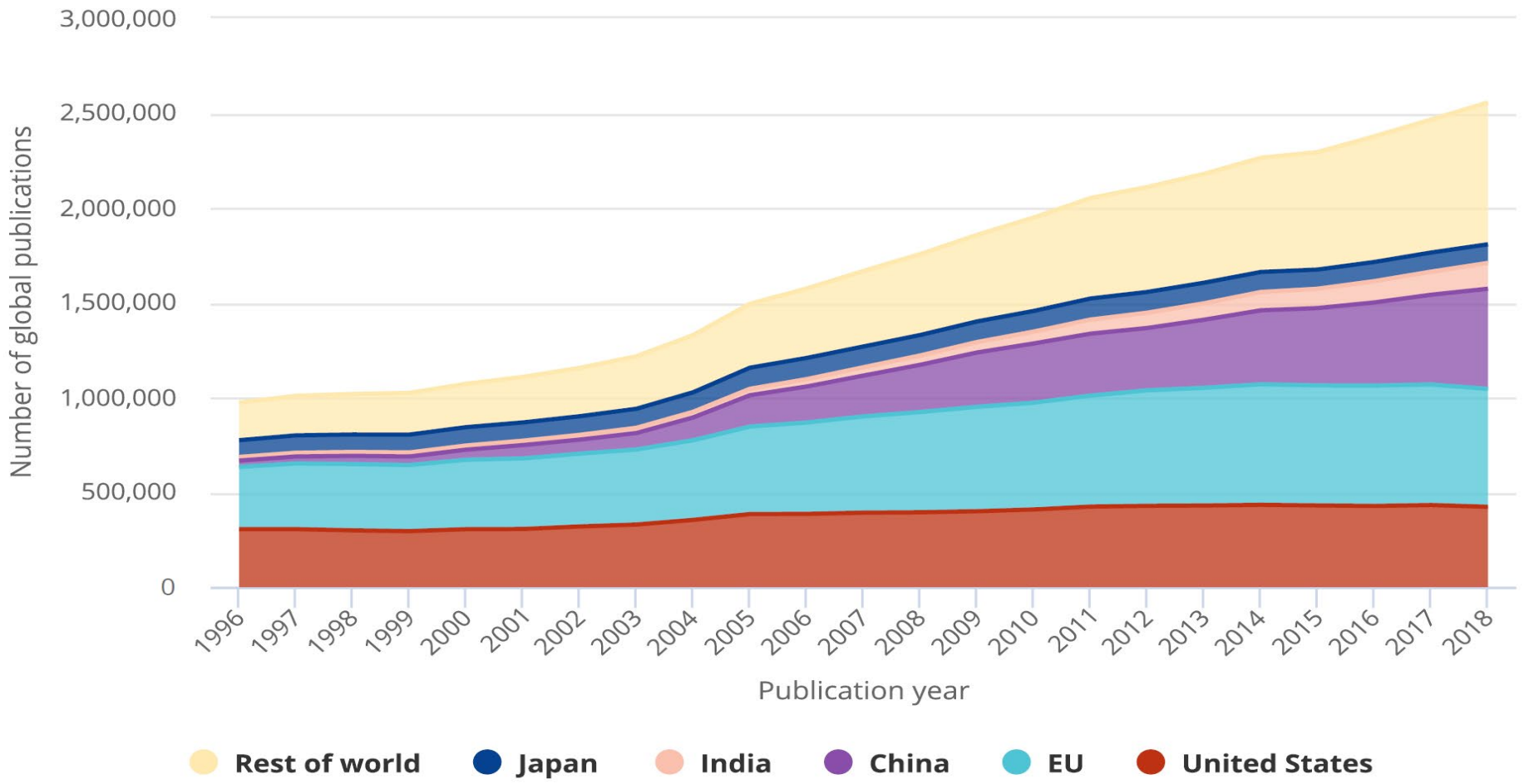
S&E articles in all fields, for selected regions, countries, and economies and rest of world: 1996–2018

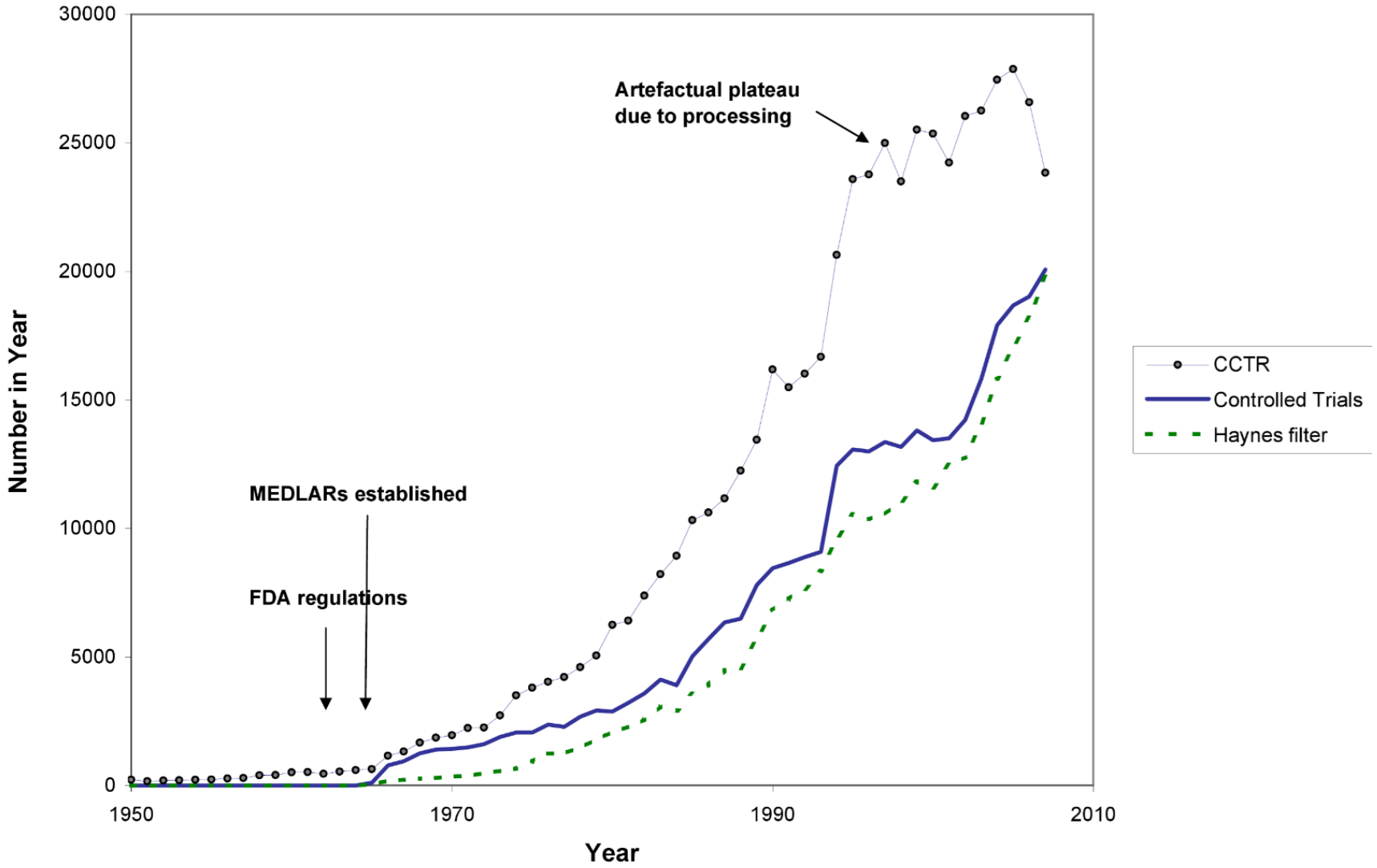


NATIONAL SCIENCE BOARD
SCIENCE & ENGINEERING INDICATORS 2020

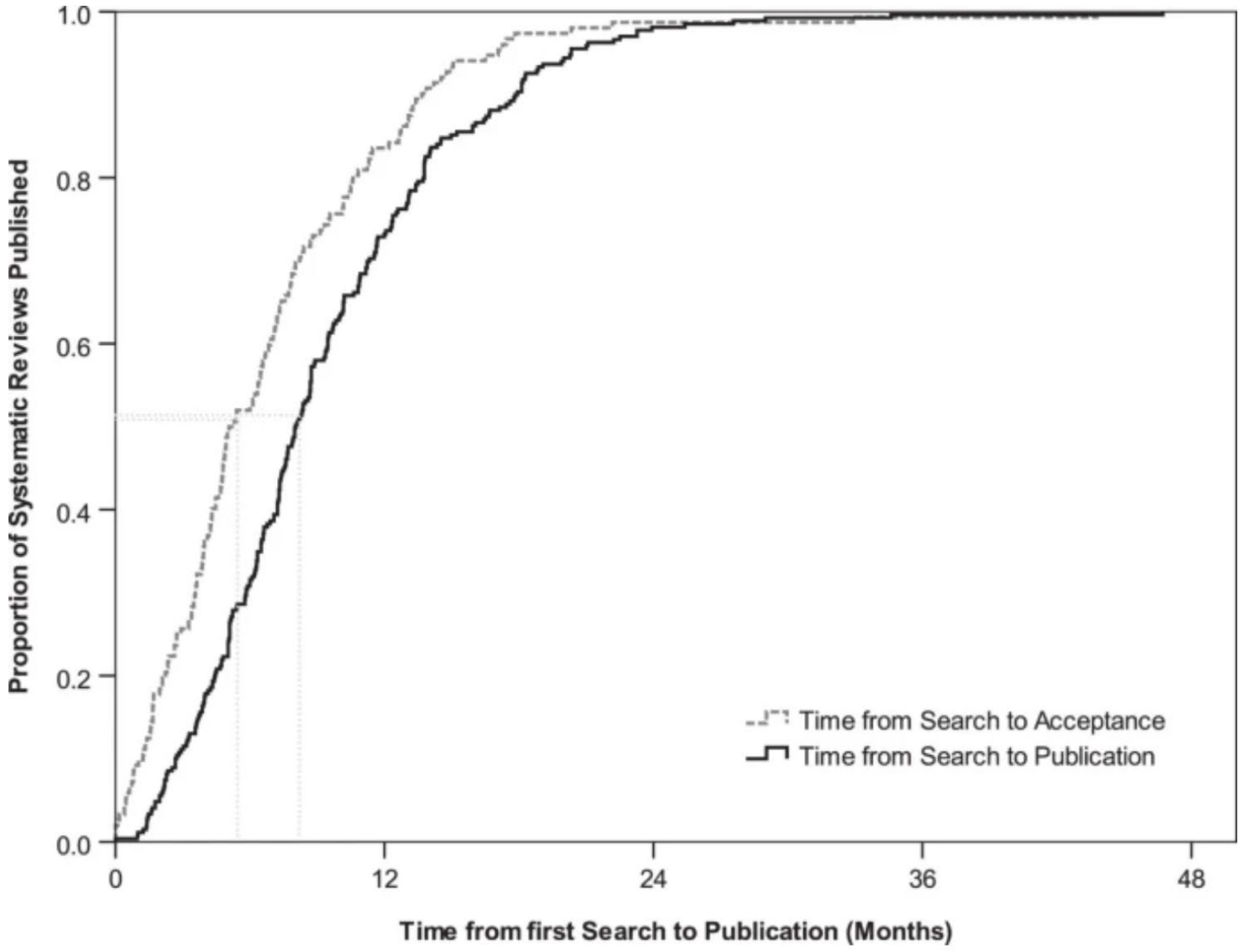
How to keep pace?

Seventy-five trials and eleven systematic reviews a day: how will we ever keep up?

Hilda Bastian [1], Paul Glasziou, Iain Chalmers



How to stay on time?



Are systematic reviews up-to-date at the time of publication?

Elaine M Beller, Joyce Kee-Hsin Chen, Una Li-Hsiang Wang & Paul P Glasziou

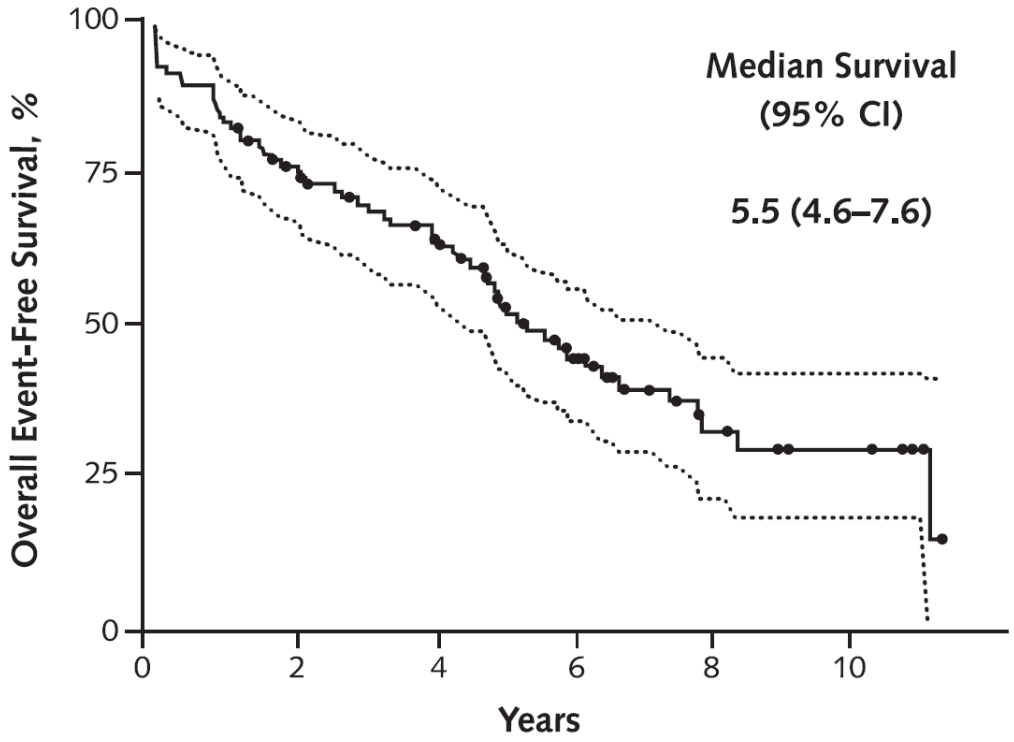
How to stay relevant?

How Quickly Do Systematic Reviews Go Out of Date? A Survival Analysis

Article *in* Annals of internal medicine · August 2007
DOI: 10.7326/0003-4819-147-4-200708210-00179

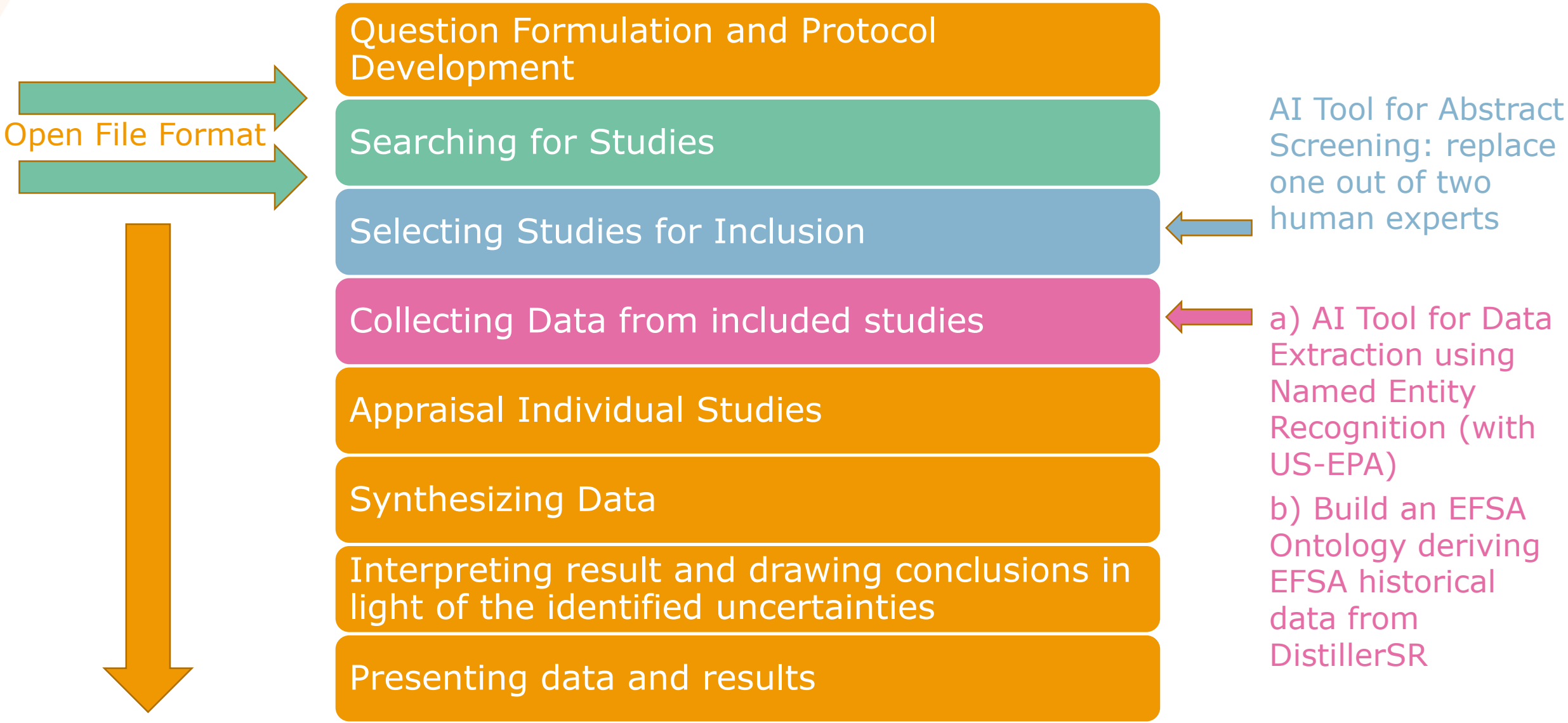
Kaveh Shojania
University of Toronto
208 PUBLICATIONS **13,013** CITATIONS

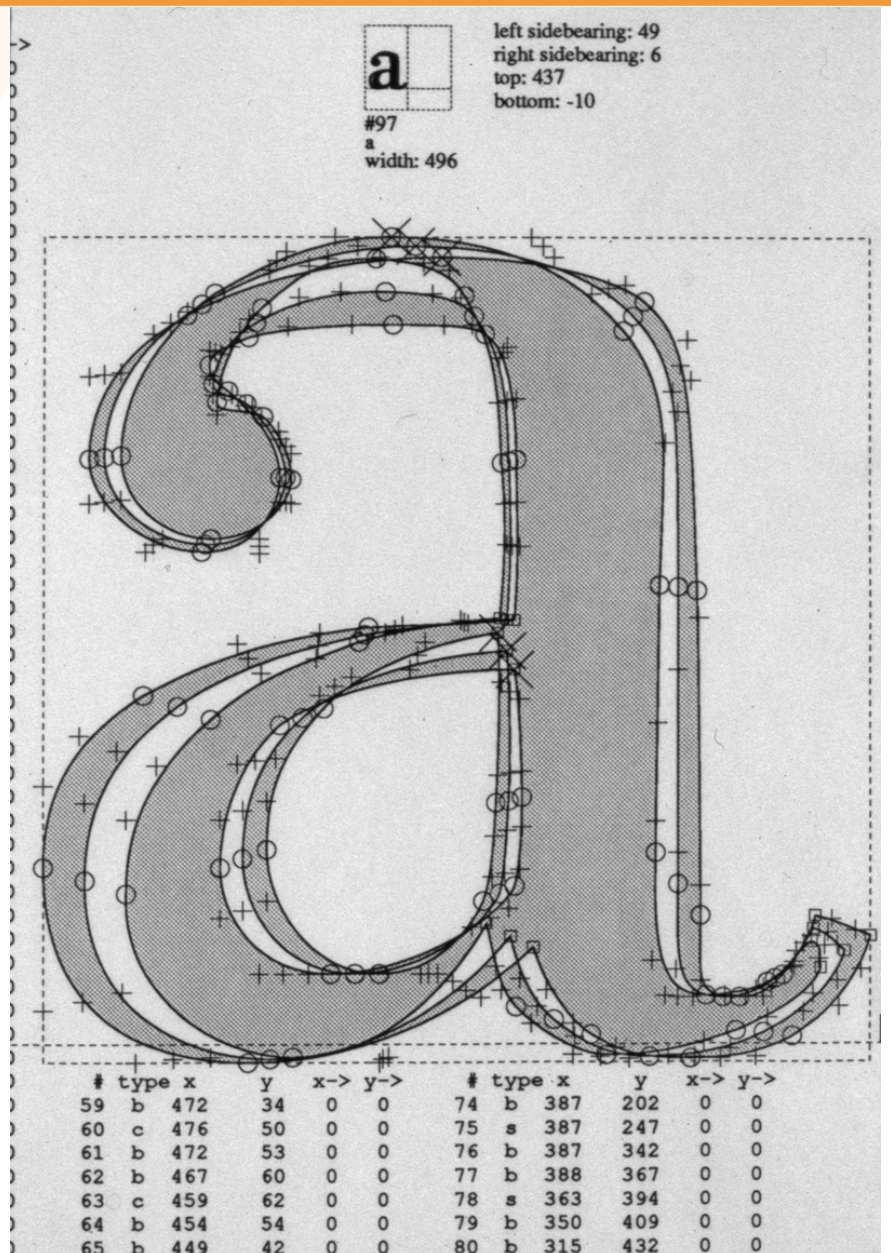
Figure 2. **Overall survival time (95% CI) free of signals for updating.**



Systematic reviews at risk, *n*	100	73	59	34	14	6

Our Current Activities in Systematic Reviews





bstract Screening

Do Human Reviewers Agree? A practical case

		Human Reviewer 2	
		Excluded	Included
Human Reviewer 1	Excluded	**162**	**88**
	Included	**21**	**99**

- 70 % agreement

Abstract Screening: Yeasts QPS

		AI-Powered DistillerSR	
		Excluded	Included
Human Reviewers	Excluded	**937**	**238**
	Included	**4**	**31**

- Sensitivity: 88.6%
- Specificity: 79.7%

Overall performances ok -> AI included an higher number of papers for following phases

Is there a problem with the 4 papers excluded from AI?

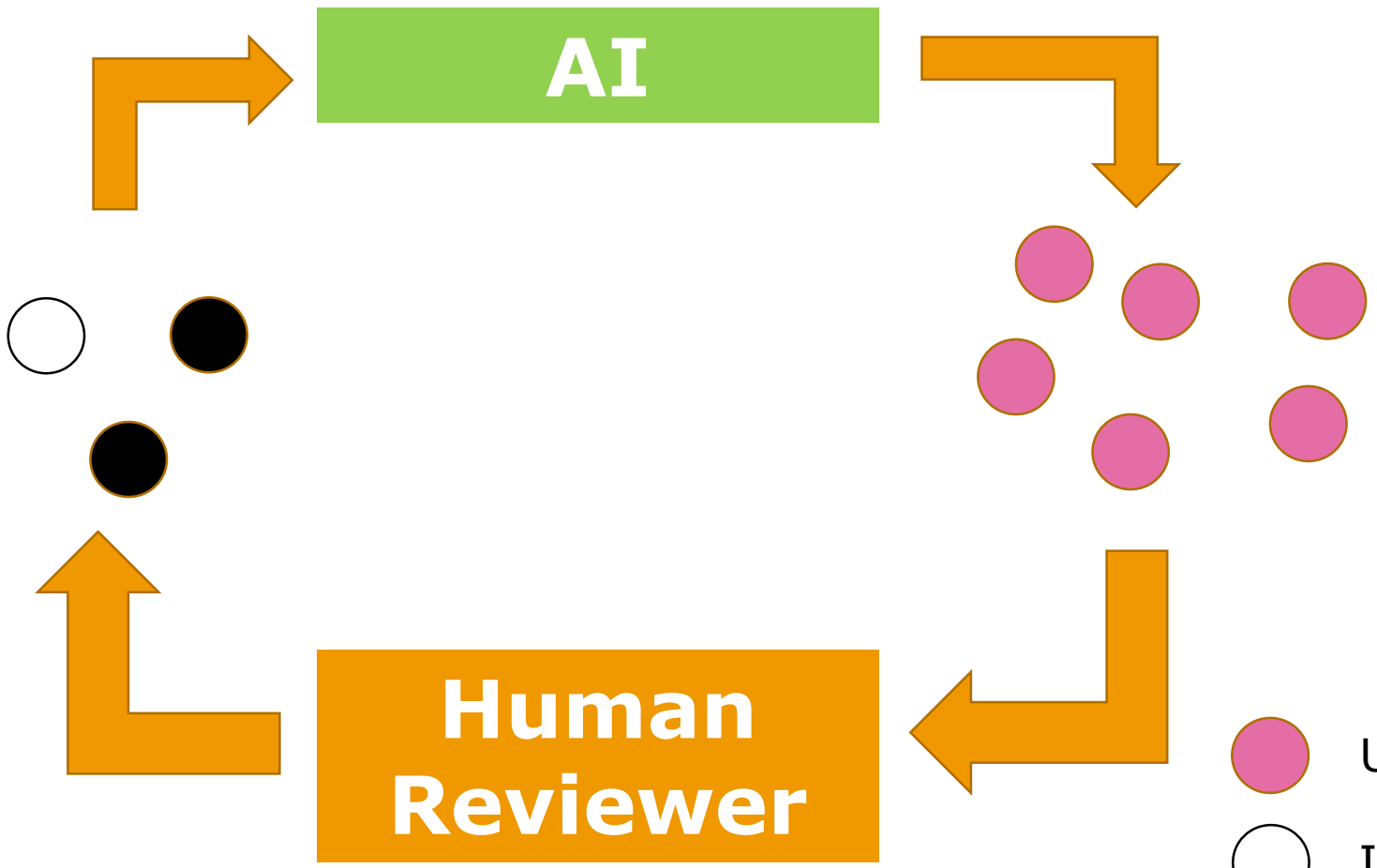
Would have we missed any relevant paper using AI and 1 Human Reviewer?

Scenario	Missed papers (refid)
AI and Human Reviewer 1	"6542" , "6719"
AI and Human Reviewer 2	"60[illegible]

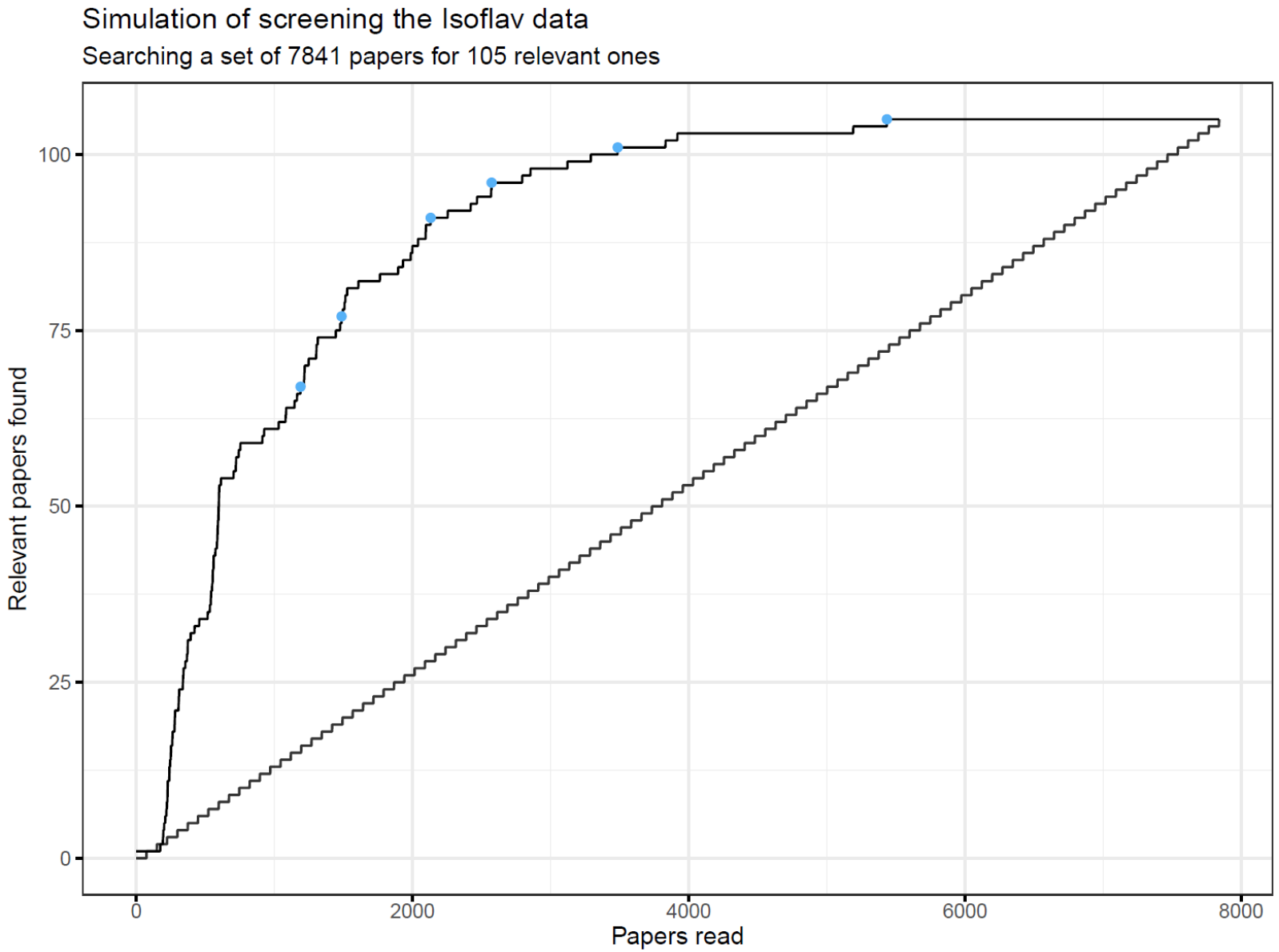
No information relevant for the QPS status would have been missed when using AI as a reviewer in both scenarios (with either Human Reviewer 1 or Human Reviewer 2).

Papers [illegible]	
	[illegible]uded at Article evaluation
	Included at Article evaluation but no info that could lead to a change on QPS status (subcutaneous administration of *S. cerevisiae*)

Active Learning



When is AI ready?



Data Extraction

Finding Entities in Text: Data Extraction

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/Relations-Training/TR_relations_QA/PMC2669469

Collection | Data | Search | Groups

3 All experiments on animals were performed according to the European Community Council Directive 86/609/EEC and to Ita
116/92).

4 Sex [Equiv-2][Animal-1] Male and Sex [Equiv-1][Animal-0] female Species [Equiv-0][Animal-0][Animal-1] mice of a Strain [Animal-0][Animal-1] Swiss-derived outbreed strain (CD-1, Harlan,
12-hr light-dark cycle (light on 20:00-8:00) and with free access to food and water.

5 Sex [Equiv-1] Females were inspected daily for the presence of the vaginal plug (GD 0).

Deriving an Ontology from DistillerSR

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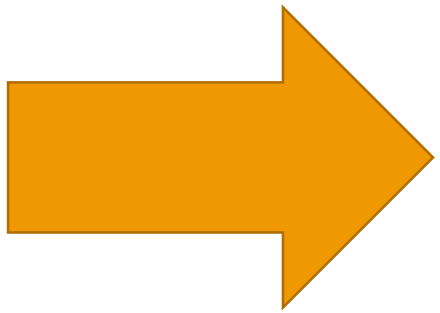
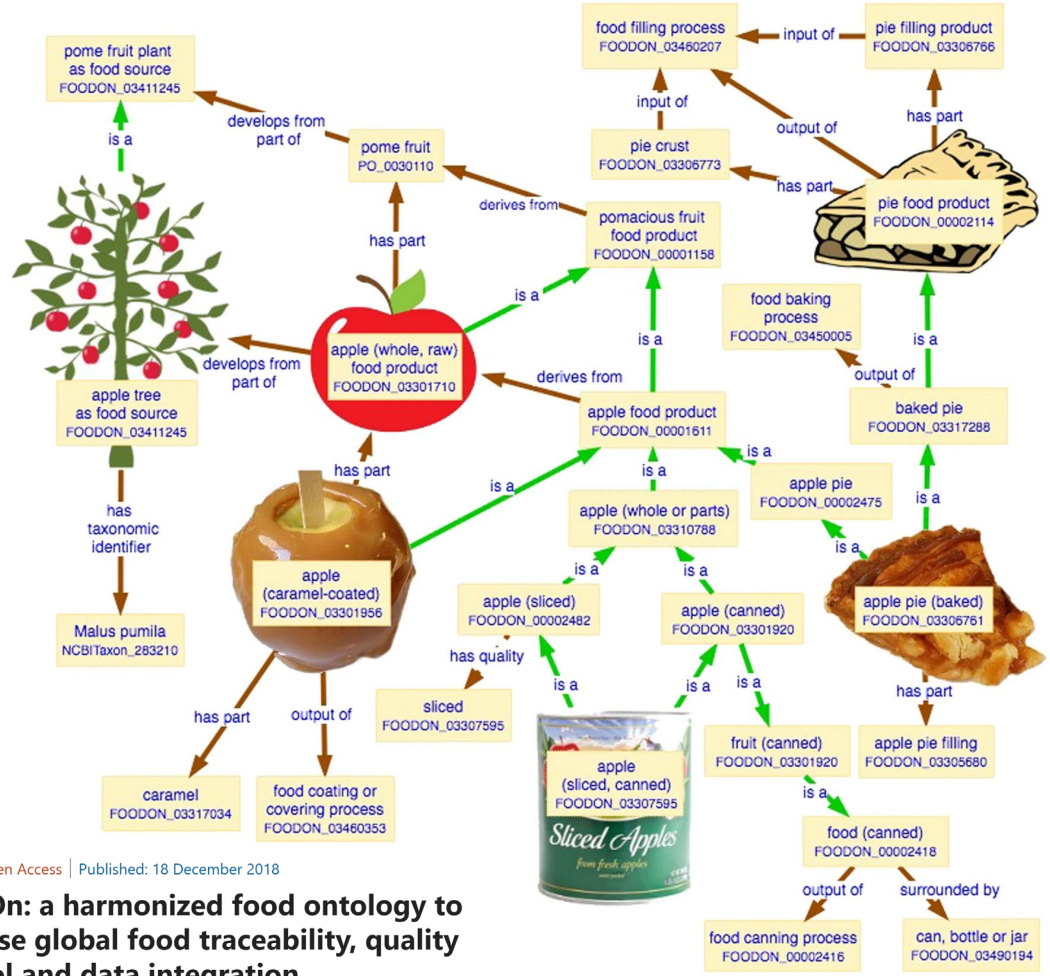
Scientific Experts

DistillerSR





Article | Open Access | Published: 18 December 2018

FoodOn: a harmonized food ontology to increase global food traceability, quality control and data integration

Damion M. Dooley, Emma J. Griffiths, Gurinder S. Gosal, Pier L. Buttigieg, Robert Hoehndorf, Matthew C. Lange, Lynn M. Schriml, Fiona S. L. Brinkman & William W. L. Hsiao

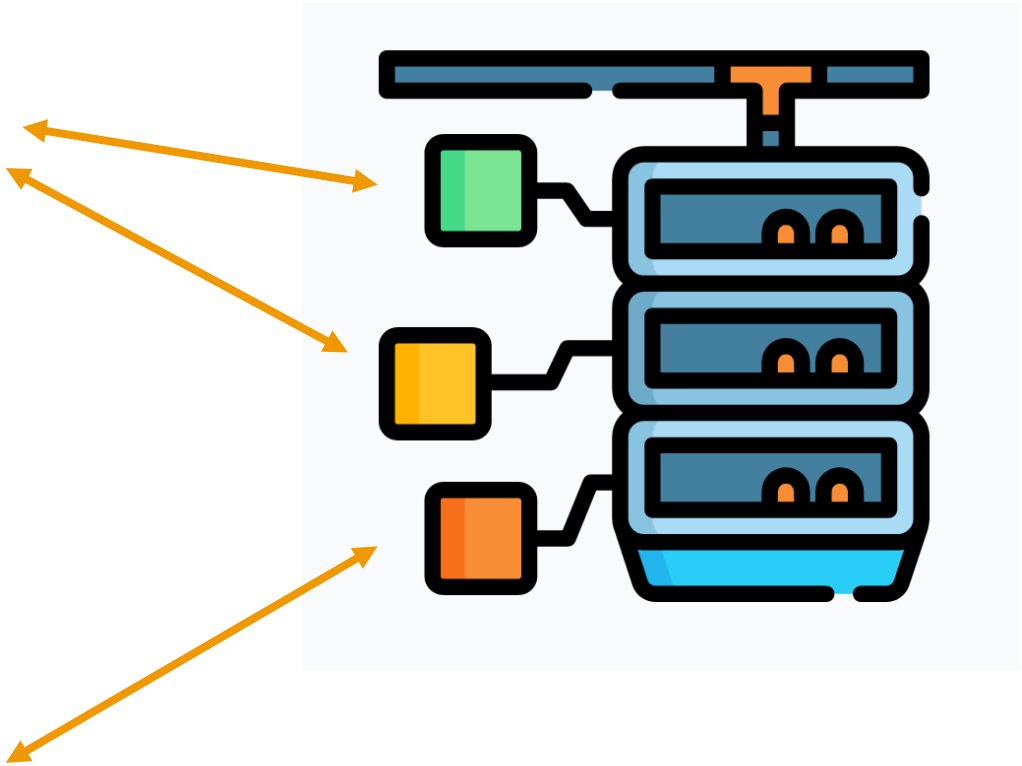
npj Science of Food **2**, Article number: 23 (2018) | Cite this article

9267 Accesses | **22** Citations | **33** Altmetric | Metrics

Tools

Open File Format for Search Strategy and Beyond

	Mandatory									Desirable									Optional		
Tool	Status of software	Customer support	Multiple user support	Reference importing	Reference allocation	In-/excluding references	Distinct TiAb/Full-text phases	Discrepancy resolving	Exporting results	Free to use	Randomizing order of references	Keyword highlighting	Multiple user roles	Project auditing	Non-Latin character support	Show project progress	Attaching comments	Attaching PDFs	Reference labelling	Flow diagram creation	Machine learning /automation
CADIMA	0	+1	+1	-1	-1	0	0		0			-1	0			0					
Covidence	0	+1	+1	0	0	0	0		+1			0	-1			0					
DistillerSR	0	+1	+1	0	0	0	+1		+1			0	+2			0					
Endnote	0	+1	-1	0	-1	-2	-1		+1			-2	-1			-2					
Endnote – Bramer Method	0	0	0	0	-1	-1	-1		+1			-2	0			-2					
EPPI-Reviewer	0	+1	+1	0	+1	0	+1		+1			0	0			0					
EROS	-1	+1	+1	-1	0	0	0		0			-1	+1			-1					
HAWC	0	+1	-1	0	-1	0	-1		0			-1	+1								
Microsoft Excel	0	+1	-1	-1	-2	-2	-1		+1			-2	-1			-1					
Excel – Vonville method	0	0	0	-1	-1	0	0		+1			-2	0			-2					
Microsoft Word	0	+1	-1	-2	-2	-2	-1		0			-2	-1			-2					
Rayyan	0	+1	+1	0	0	0	-1		+1			0	+1			0					
RevMan	0	0	-1	-1	-2	-1	-1		-1			-2	-1			-2					
SyRF	0	+1	+1	-1	-1	0	-1		-1			-1	0			-2					
SysRev.com	0	+1	+1	-1	0	0	-1		0			-1	0			0					
SWIFT Active Screener	0	+1	+1	0	0	+1	+1		-1			0	0			0					



Software Tools for Literature Screening in Systematic Reviews in Biomedical Research

Stevie van der Mierden[1], Katya Tsaioun[2], André Bleich[1,#] and Cathalijn H. C. Leenaars[1,3,#]

[1]Institute for Laboratory Animal Science, Hannover Medical School, Hannover, Germany; [2]Evidence-based Toxicology Collaboration at Johns Hopkins Bloomberg School of Public Health (EBTC), Baltimore, MD, USA; [3]Faculty of Veterinary Sciences, Utrecht University, Utrecht, The Netherlands

A Glimpse on Next Steps

Next Steps: more on Systematic Reviews

- Question Formulation and Protocol Development
- Searching for Studies
- Selecting Studies for Inclusion
- Collecting Data from included studies
- Appraisal Individual Studies
- Synthesizing Data
- Interpreting result and drawing conclusions in light of the identified uncertainties
- Presenting data and results

Next Steps: Timeline

	2020	2021	2022	2023	2024
Abstract Screening					
Data Extraction					
Critical Appraisal					
Generation of Final Report					
Encompassing Tool					

Next Steps: A New Approach

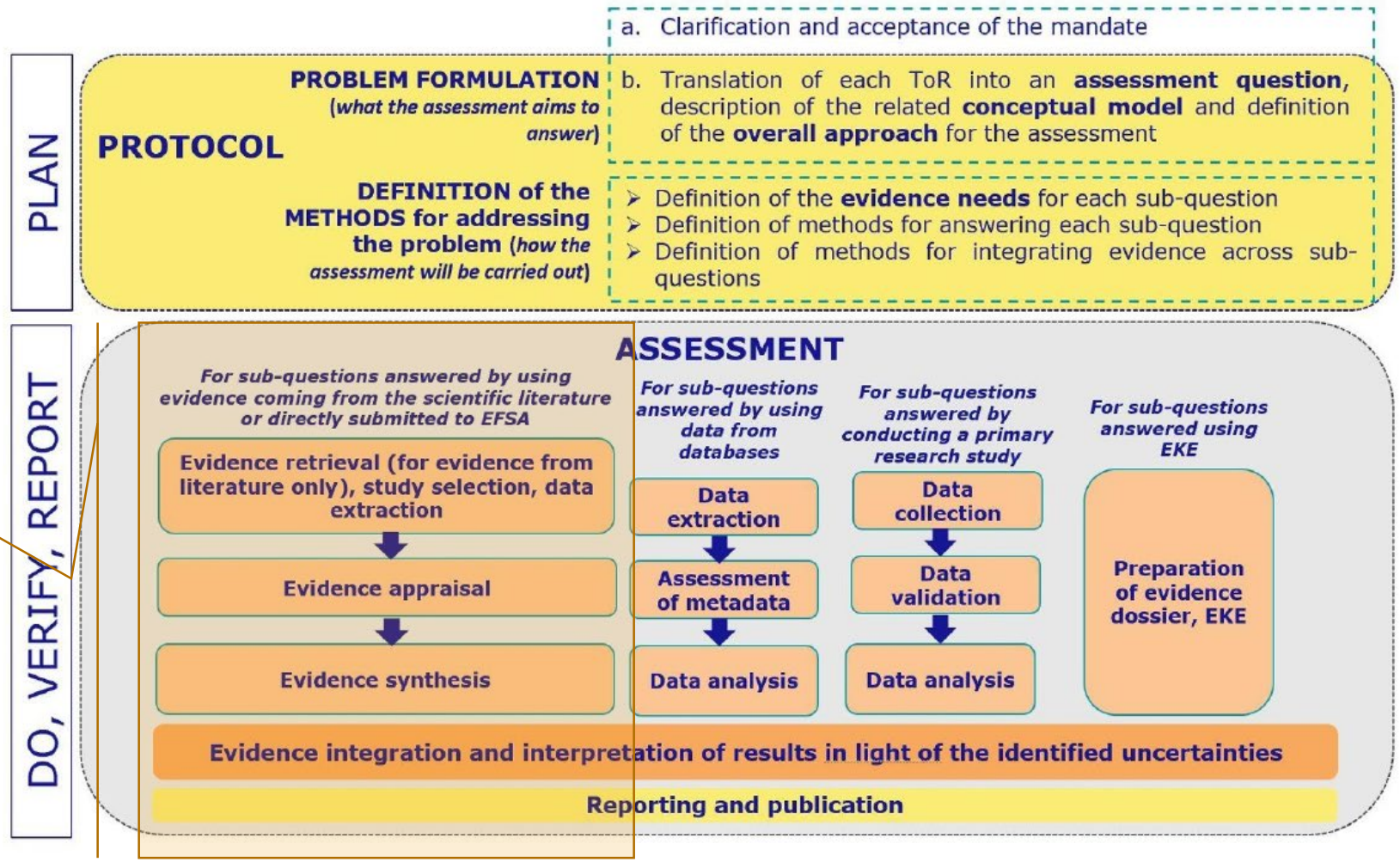
- Question Formulation and Protocol Development
- Searching for Studies
- Selecting Studies for Inclusion
- Collecting Data from included studies
- Appraisal Individual Studies
- Synthesizing Data
- Interpreting result and drawing conclusions in light of the identified uncertainties
- Presenting data and results

- Question Formulation and Protocol Development
- Searching for Studies
- Collecting Data from all studies
- Selecting Studies for Inclusion
- Appraisal Individual Studies
- Synthesizing Data
- Interpreting result and drawing conclusions in light of the identified uncertainties
- Presenting data and results

New evidence

Next Steps: Evidence Management

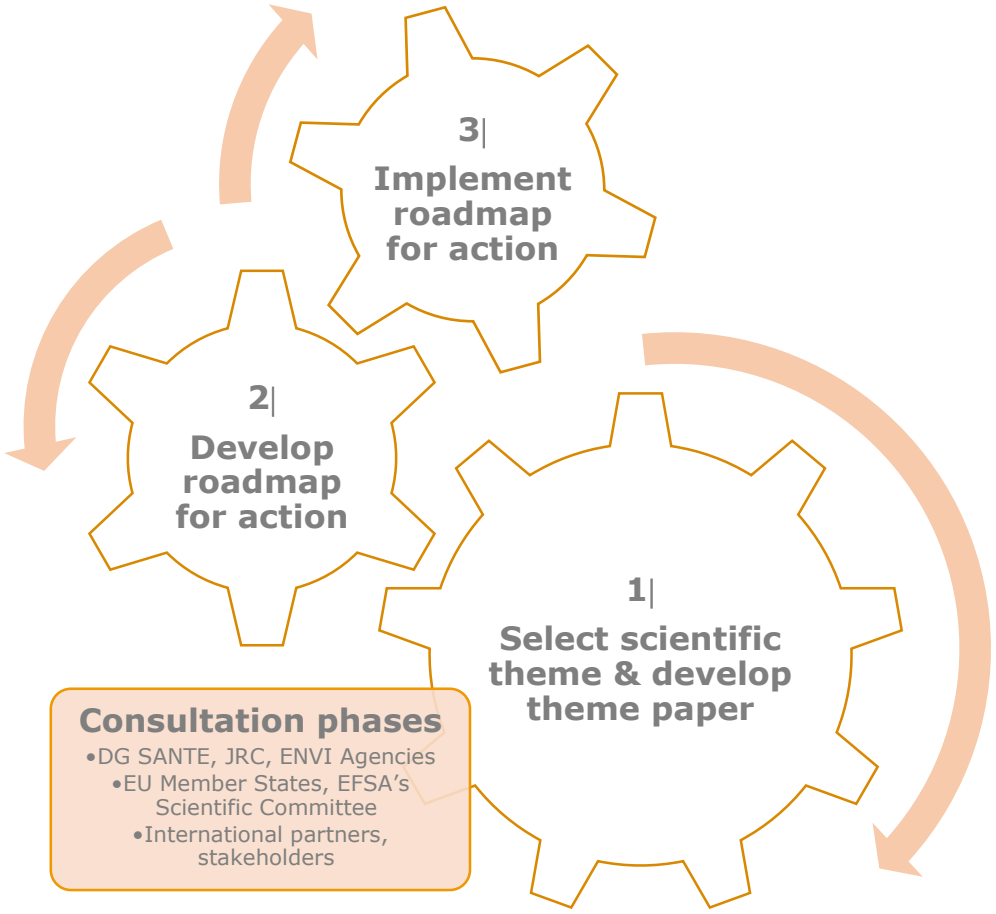
Systematic Reviews



EFSA's 2020 SPIDO theme paper | AI

Artificial intelligence for evidence management in risk assessment

- **Vision:** by 2027 EFSA to achieve
  - i) an increase in the accessibility and the breadth of the body of evidence,
  - ii) enhancing the trustworthiness in the risk assessment process, and
  - iii) apply human centric artificial intelligence in close co-existence with the human expertise
- **Roadmap for action**: draft aimed for Oct 2021
- **Implementation**: Dec 2021 onwards



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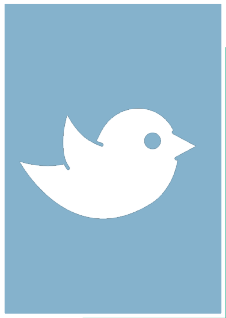

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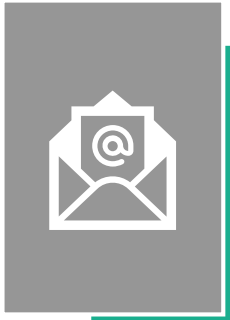

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