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Global Academy of  
Agriculture and Food Systems

**IDI** Data-Driven  
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# Livestock evidence synthesis and AI

Dr Louise Donnison

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*“Decision-making and public debate are best served if policymakers have access to the best current evidence on an issue”*

The Royal Society 2018



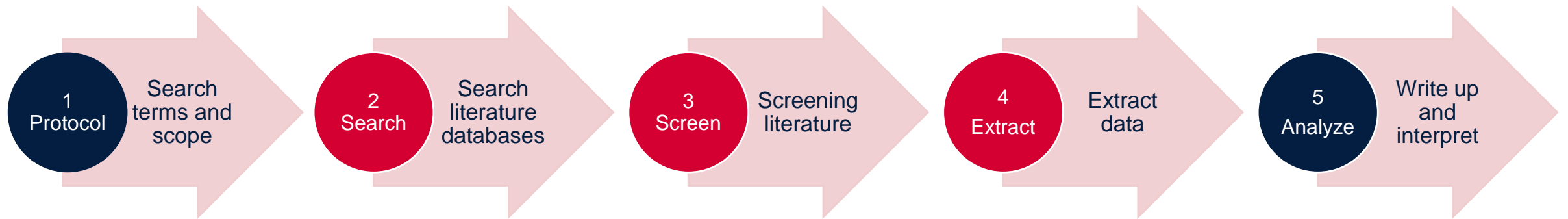
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# Evidence Synthesis

**Evidence synthesis** is the process of combining information from multiple studies investigating the same thing to provide a comprehensive view of all the evidence and not just a sample of studies.

**A good review** meets the needs of decision makers, is current and timely, readily and widely available.



Documenting each step ensures that the process can be **replicated** and **verified**, reducing **bias** and **subjectivity**.



# Systematic map of research evidence: livestock disease frequency in Ethiopia



Photo: Zerihun Sewunet (ILRI) ([source](#))



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# Food security and animal health

Ethiopia's livestock sector supports the livelihoods of millions of smallholder farmers.

Despite improvements in recent years, livestock productivity (milk and meat production) remains low due to critical constraints, including infectious diseases

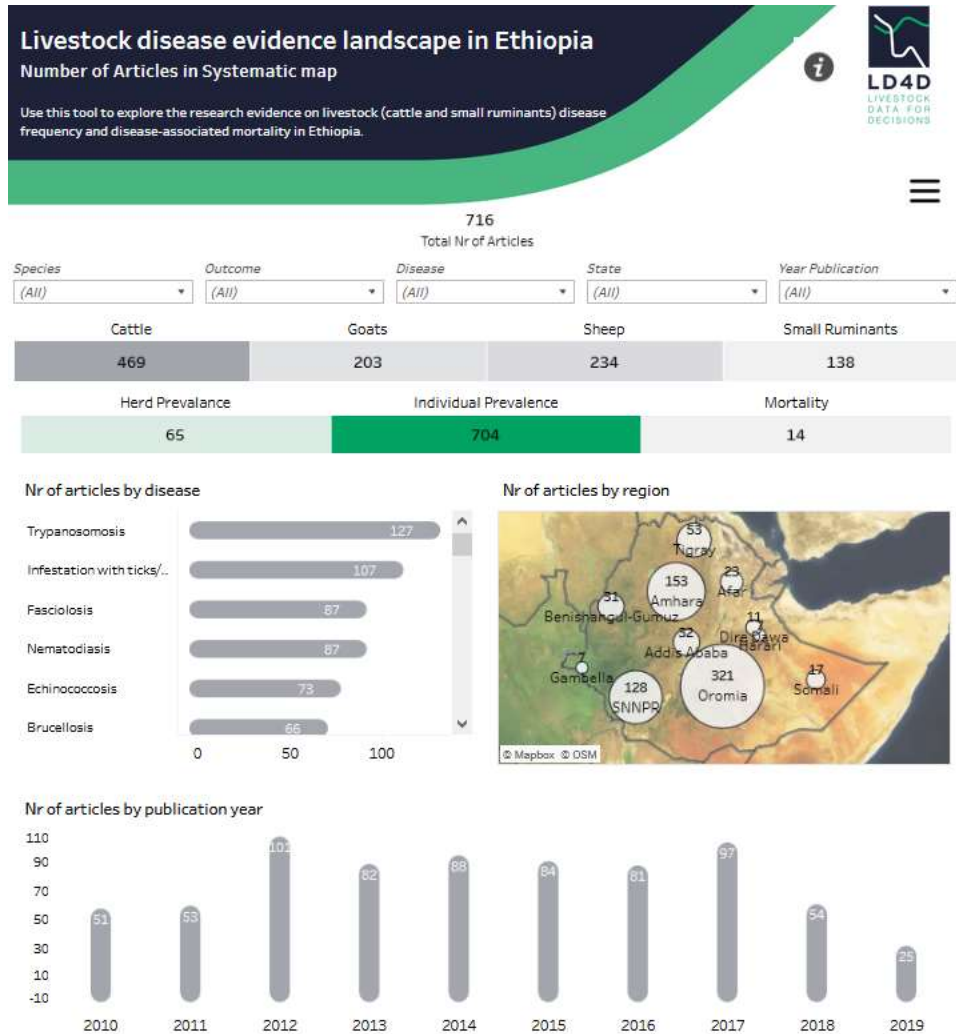
Collate and synthesize the published evidence on ruminant disease frequency in Ethiopia

- Searched multiple databases
- Screened over 60,000 articles
- Extracted data from 716 articles

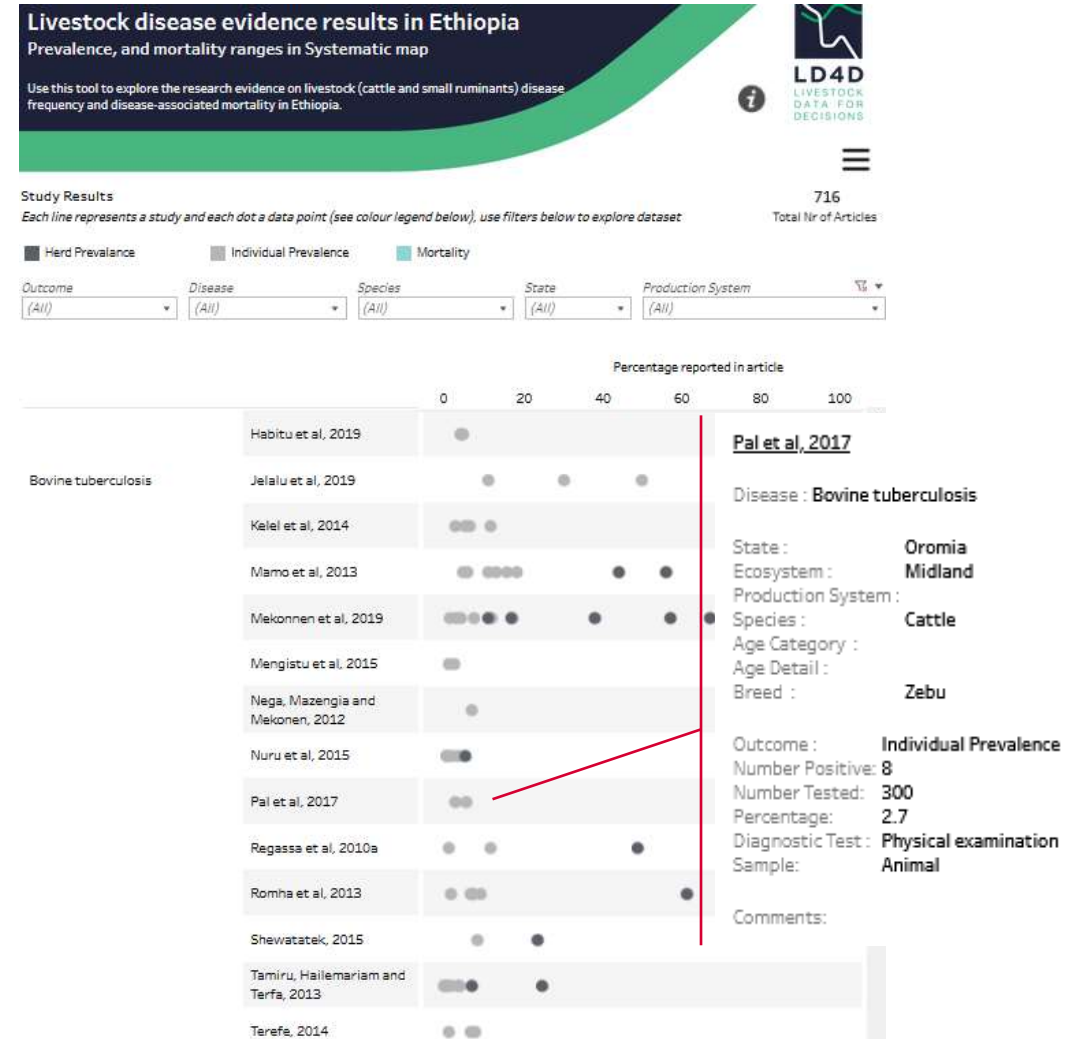
Policy makers have access to a comprehensive evidence base to inform decision making



# Are there evidence gaps?



# How variable is the evidence?

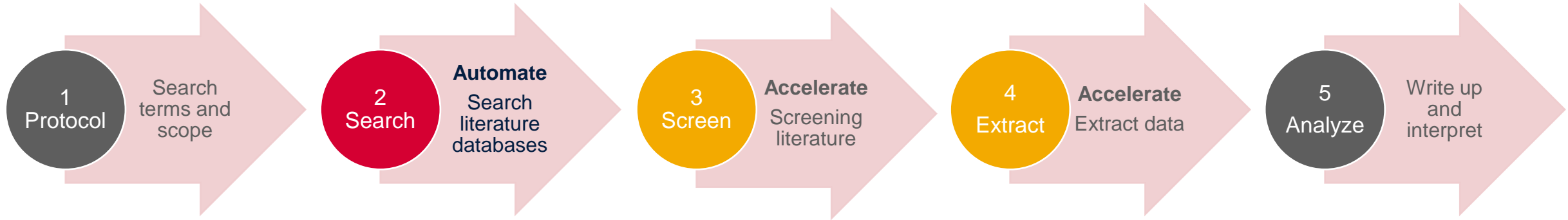


**6 to 18 months** on average to complete a systematic review

LitXpress an AI tool

EDINA





## Submit a new SEBI Task

Queries\*

```
(BVD OR "Bovine viral dia*" OR "Bovine virus dia*") AND Ethiopia
(IBR OR BHV OR BoHV OR "infectious bovine rhinotrach*" OR "herpesvirus bovine" OR "pustular vulvovaginitis" OR "bovine rhinotracheitis virus") AND Ethiopia*
Toxoplasma* AND Ethiopia*
Neospor* AND Ethiopia*
Chlamyd* AND Ethiopia* AND (cattle OR bovine OR beef OR cow OR bull OR calf OR heifer OR steer OR sheep OR lamb OR mutton OR "hogget" OR ovine OR goat OR caprine OR camel OR livestock OR ruminant)
(Bluetongue OR "Blue tongue") AND Ethiopia
(Coxiella OR "Q fever" OR Qfever) AND Ethiopia*
("Contagious bovine pleuro*" OR CBPP OR Mycoplasma) AND Ethiopia*
("Lumpy skin" OR LSD) AND Ethiopia*
("Contagious caprine pleuro*" OR CCPP OR Mycoplasma) AND Ethiopia*
("Foot and mouth disease" OR FMD*) AND Ethiopia*
("Anthrax" OR "Bacillus anthradis") AND Ethiopia*
```

Load sample queries

Load test queries

Label\*

PubMed\_Jan\_2024

Label for this search

Search Engine\*

PubMed

PubMed

Google Scholar

Web of Science

Classifier model

New classifier (11/16/2023, colin.gormley@ed.ac.uk)

Please select the desired classifier model

Maximum number of results\*

10000000

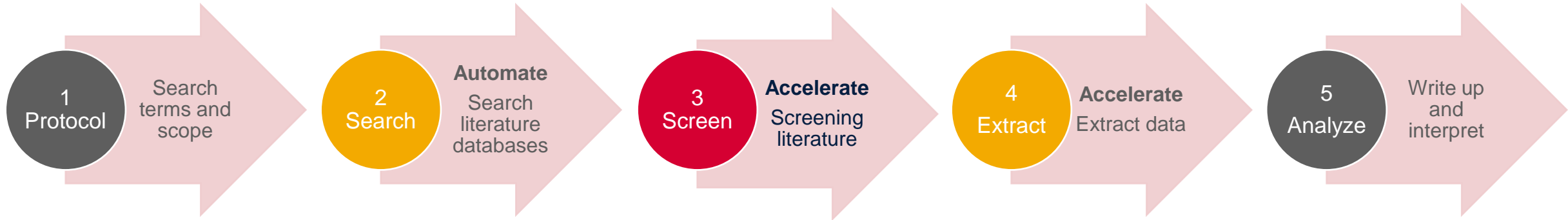
Maximum number of results returned from each query

End year\*

2024







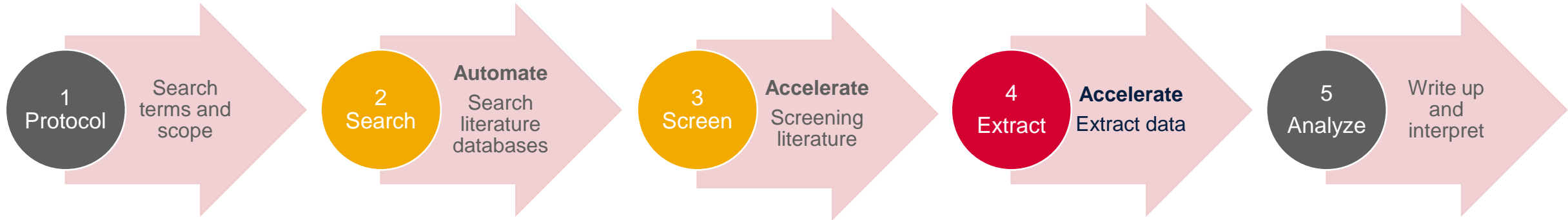
SEBI / Reviews / 2 / 4cf87fc8-bff0-4d3f-939b-505c833304e8

Status Settings Included Documents **70** Excluded Documents **73** Low Confidence Documents **622** Errors **399**

SEBI task is complete

File	Actions
duplicates.csv	
errors_report.html	
excluded_report.csv	
excluded_report.html	
included_report.html	





Brucell [Entity: DISEASE, Score: 0.992] ##osis [Entity: SAMPLE TYPE, Score: 0.347] is a highly contagious bacterial zoonotic disease that affects domestic animals. wildlife [Entity: SPECIES, Score: 0.999] ##. humans [Entity: SPECIES, Score: 0.722] and marine mammals [Entity: SPECIES, Score: 0.996] ##. A cross-sectional epidemiological [Entity: STUDY DESIGN, Score: 0.999] study [Entity: STUDY DESIGN, Score: 0.999] was carried out to determine the ser [Entity: SAMPLE TYPE, Score: 1.000] ##oprevalence and risk factors of bovine [Entity: SPECIES, Score: 1.000] brucell [Entity: DISEASE, Score: 0.982] ##osis [Entity: SAMPLE TYPE, Score: 0.443] in dairy and traditional cattle [Entity: SPECIES, Score: 1.000] herds in Ki [Entity: REGION, Score: 1.000] ##baha [Entity: REGION, Score: 0.764] district of Tanz [Entity: REGION, Score: 0.998] ##ania. Forty nine cattle [Entity: SPECIES, Score: 1.000] herds were selected by simple random [Entity: STUDY DESIGN, Score: 0.998] sampling [Entity: STUDY DESIGN, Score: 1.000] among traditional and commercial dairy herds. All sera [Entity: SAMPLE TYPE, Score: 1.000] samples were initially screened by Rose Bengal Plate Test ( [Entity: DIAGNOSTIC TEST, Score: 0.999] ##RBPT [Entity: DIAGNOSTIC TEST, Score: 0.831] ##) antigen and those found positive were re-tested and confirmed using Compe [Entity: DIAGNOSTIC TEST, Score: 0.998] ##titive Enzyme-Linked Immunosorbent Assay (c-EL [Entity: DIAGNOSTIC TEST, Score: 0.989] ##ISA) [Entity: DIAGNOSTIC TEST, Score: 0.954] test. A questionnaire was administered to cattle [Entity: SPECIES, Score: 1.000] farmers in order to identify risk factors associated with brucella [Entity: DISEASE, Score: 0.933] seropos [Entity: SAMPLE TYPE, Score: 0.933] ##itivity while a data collection sheet was used to capture bio-data for all individual animals that were sampled. The agreement between the RB [Entity: DIAGNOSTIC TEST, Score: 0.958]



# Conclusion and further information



- Evidence synthesis is a method to create unbiased evidence to inform decision making
  - However, it is time consuming
  - AI can speed up the process, but a human is needed to validate, review and interpret results.
  - Links for more information to the right
- <https://www.cochrane.org>
  - <https://www.thecampbellinstitute.org/>
  - <https://environmentalevidencejournal.biomedcentral.com/>
  - <https://livestockdata.org/>



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# Thank you

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