National Collaborating Centre
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School of Nursing | McMaster University

Learning on the Job: Using Artificial Intelligence and Natural Language Processing to Support Rapid Review Methods

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The National Collaborating Centre for Methods and Tools

- Facilitates and scales evidence-informed decision making in public health organizations

- Provides high-quality resources, real-world training and practical mentorship that respond to the evolving needs of public health

- Advances stronger public health, driven by the best-available evidence, to improve the health and well-being of every person living in Canada

Background

NCCMT Rapid Evidence Service: responds to the needs of public health decision-makers by answering priority questions using rapid review methods

Challenge: identifying and synthesizing large amount of literature within short timelines

Opportunity: integration of Artificial Intelligence (AI) to automate processes and support rapid reviews

Aims

Describe the NCCMT processes used to leverage existing AI features available in Distiller SR's systematic review software to expedite the rapid review relevance screening timelines for a variety of public health topics.

Nutrition and Cancer Prevention

Transmission in post-secondary settings

Severe COVID-19 risk factors in children ages 0-5

Transmission in daycares and schools

Changes to public health surveillance

Methods

- **Four** AI features available in DistillerSR have been integrated into the NCCMT's rapid review screening methods:

1 DAISY re-rank

2 Re-rank report

3 AI screening

4 Check for screening errors

Results: DAISY Re-Rank

DAISY rank re-orders references to put the most relevant references first.

1 Screen a balanced set
(i.e., equal # includes vs. excludes)

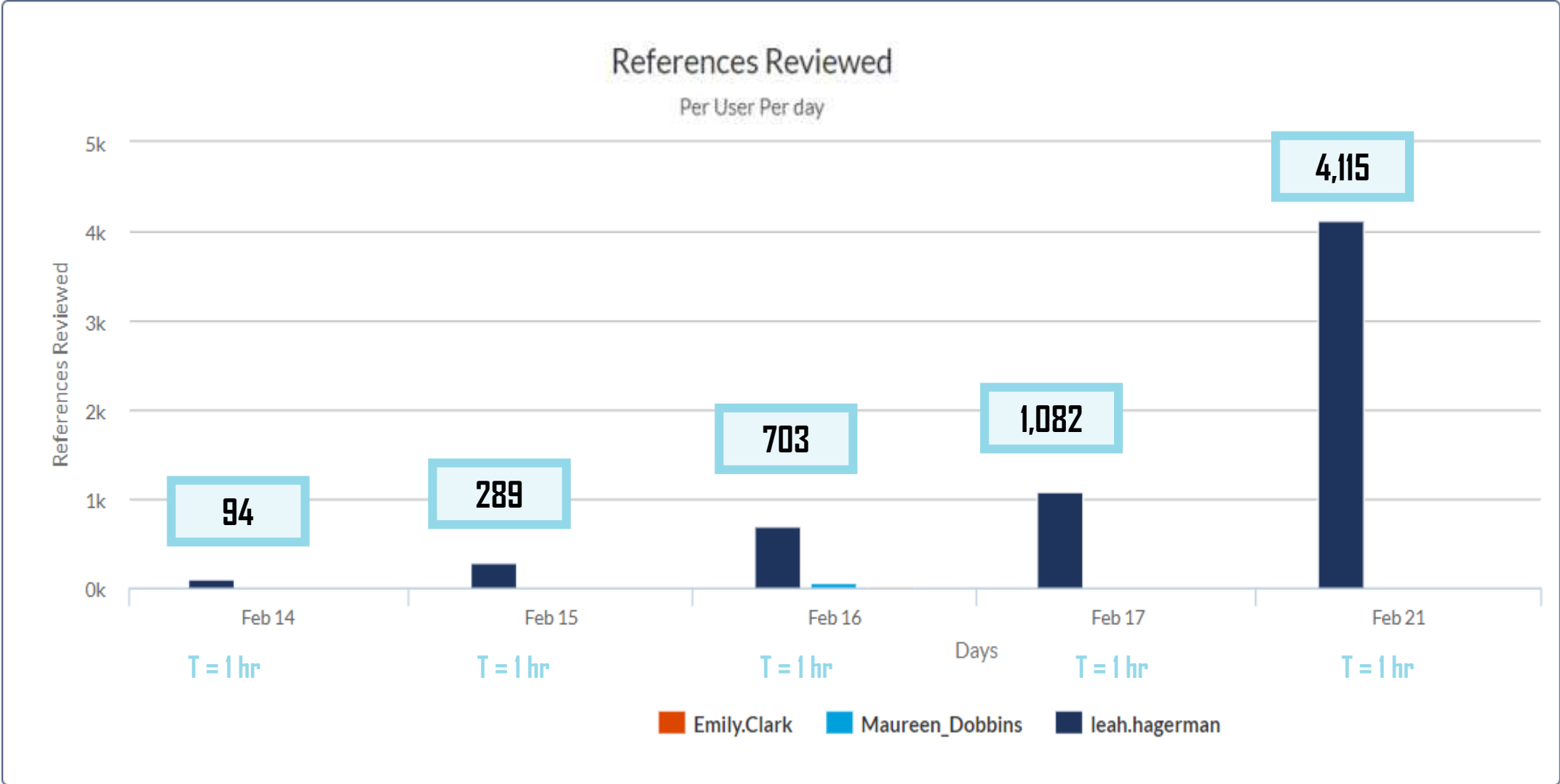**2** Re-order references based on Natural Language Processing suggestions

3 Screen as normal

More screening = More AI training = Better study ordering

Results: DAISY Re-Rank

References Reviewed
Per User Per day

Results: Re-Rank Report

The re-rank report provides an estimate of how many includes you will have, based on previous screening decisions.
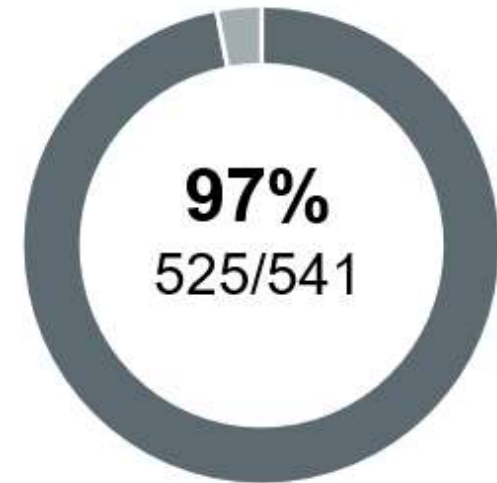
11,325 references total

↓

6,605 reviewed (58% of total)

↓

525 included

↓

Re-rank report predicts this is 97% of all included studies

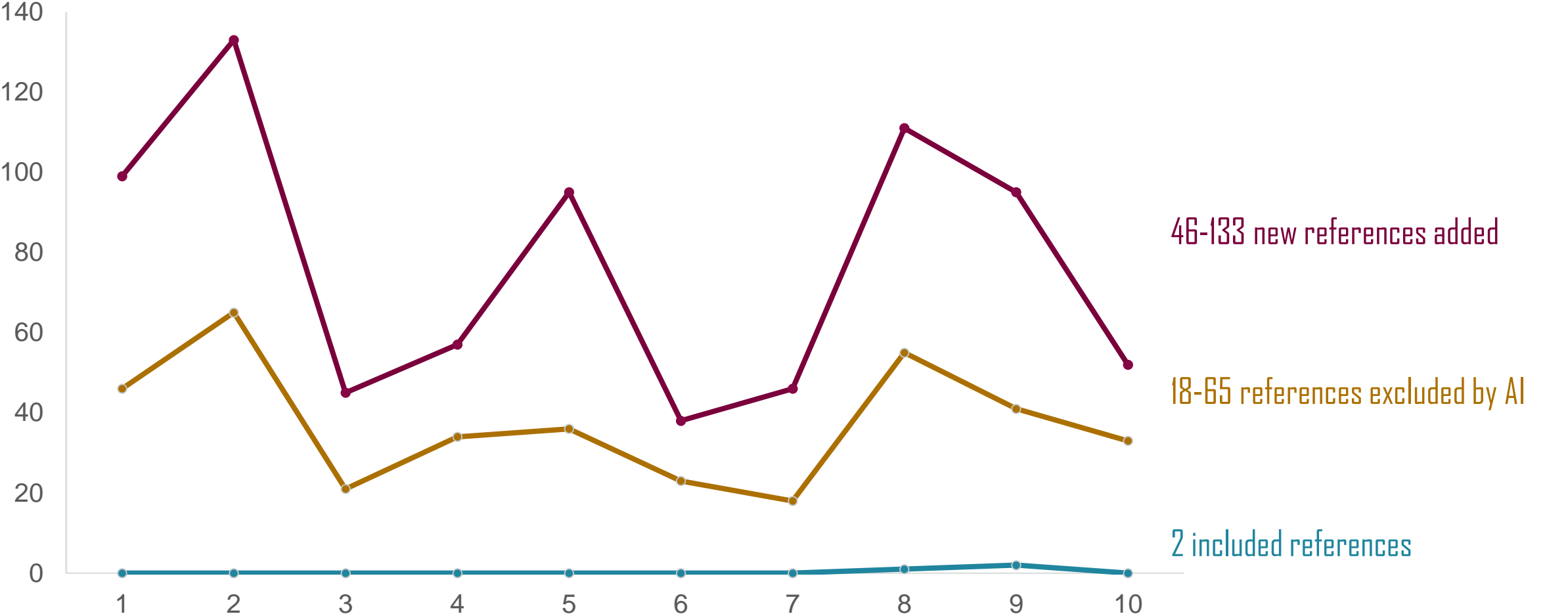PREDICTED RELEVANT REFERENCES

97%
525/541

Found 6 new Includes after screening 898 references in the most recent screening chunks. The current inclusion rate is 6 Includes for 892 Excludes, or 0.0067.
Predicted undiscovered Includes: Current Inclusion Rate (0.0067) * References Remaining (4,720) * 0.5 = 16

Results: AI Screening

AI screening does the screening for you (after you've trained it).

46-133 new references added

18-65 references excluded by AI

2 included references

Results: Check for screening errors

Check for screening errors identifies any references that may have been falsely excluded.

Benefits:
- Staff to double check their own screening
- Senior team members to double check the screening of junior staff
- Validate AI screening

Can easily adjust the response to make sure studies incorrectly excluded continue to full text screening

Limits and Conclusions

Limits:

1 Limited time to validate AI through multiple rounds of testing

2 Re-training AI for each new rapid review

Conclusions:

1 Saves time

2 Allows for efficient and effective use of resources

3 Allows for human input and validation

Thank You!

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