

Systematic Literature Review – *An Example*

Darsha Widana

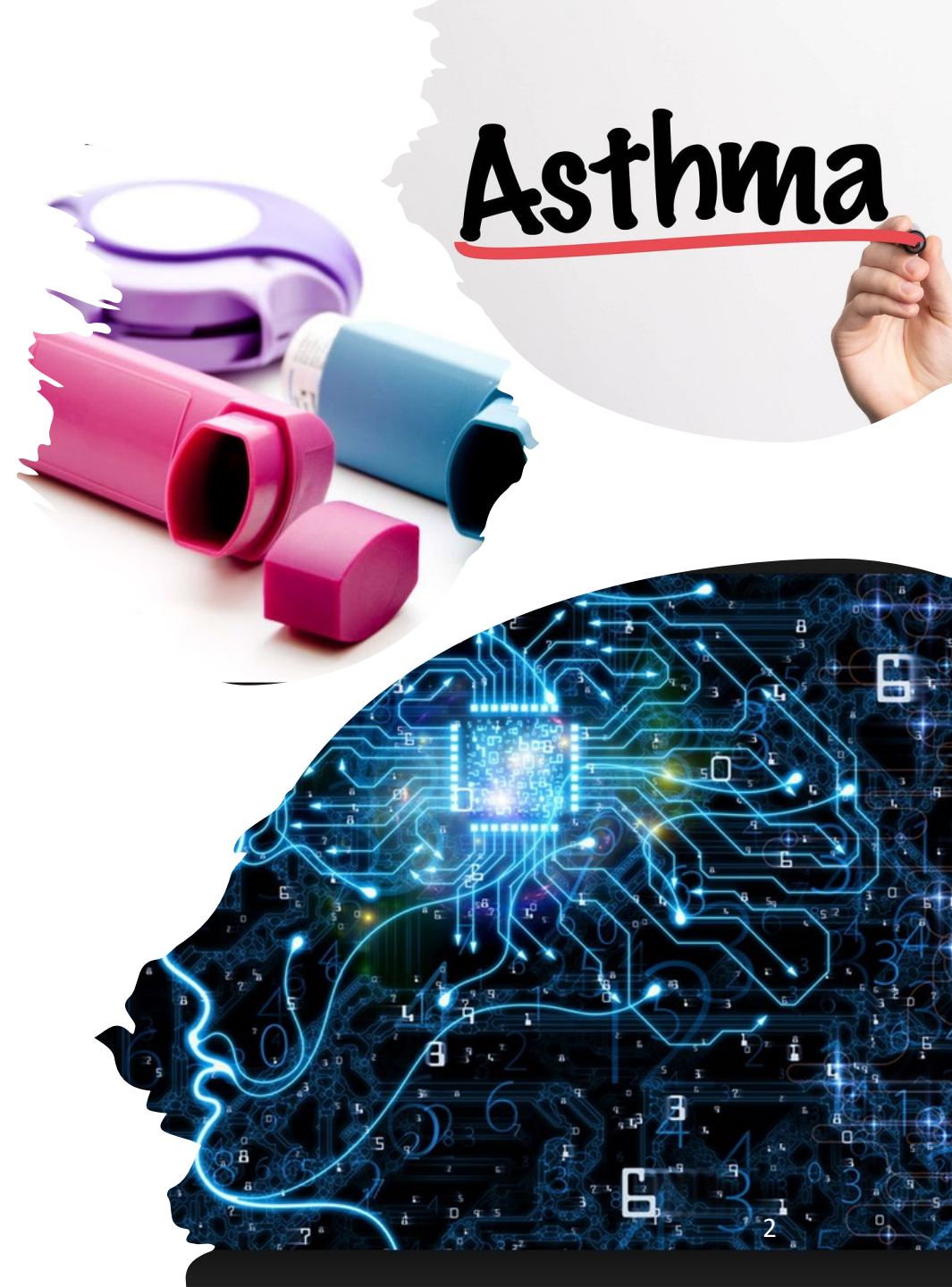
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Review Title

Investigating machine learning techniques for predicting risk of asthma exacerbations: A systematic review



PRISMA Methodology

PRISMA - **P**referred **R**eporting **I**tems for **S**ystematic Reviews and **M**eta-**A**nalyses

<http://www.prisma-statement.org/>



Planning

Formulating the review question

How do machine learning techniques perform in predicting the risk of asthma attacks?

Deciding the review criteria

- Search Strategy
- Main outcomes
- Risk of bias assessment



Planning ctd.

Developing a search strategy

Databases

Medline, Cochrane, Google Scholar, Embase, IEEE Xplore

Search Keywords

Asthma AND (attack OR exacerbat* OR control* OR symptom*) AND (detect* OR predict* OR diagnos* OR manag*) AND ("artificial intelligence" OR AI OR "machine learning" OR "deep learning" OR "neural network" OR computer-based OR "computer based" OR computer-assisted OR "computer assisted" OR "computer technology" OR technology)*



Planning ctd.

Developing the review protocol

Developing and registering the review protocol.

https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=402178

Literature Searching

Study Selection

Inclusion Criteria

- Primary studies of machine learning-based solutions for asthma risk prediction in adults and children
- Studies published from 2010 onwards.
- Available in English language



Literature Searching ctd.

Study Selection

Exclusion Criteria

- Studies that focus on the diagnosis/prediction of asthma itself (as a condition) rather than asthma exacerbations.
- Studies focusing on predicting asthma symptoms/control/severity level, number of ED visits, and Peak Exploratory Flow Rate (PEFR)
- Reviews, systematic reviews, editorials, letters, comments to the editor, book chapters, abstracts, conceptual papers, opinions, unavailable sources, protocols, commentary, and unpublished full-text documents.

Literature Searching ctd.

Searching databases



Trusted evidence.
Informed decisions.
Better health.

Access provided by: Auckland University of Technology

English

English

Sign In

Cochrane Reviews ▾

Trials ▾

Clinical Answers ▾

About ▾

Help ▾

About Cochrane ▶

Advanced Search

Search

Search manager

Medical terms (MeSH)

PICO search

Save search

View saved searches

Search help

Did you know you can now select fields from Search manager using the **S** button (next to the search box)?

Search manager lets you add unlimited search lines, view results per line and access the MeSH browser using the new **MeSH** button.

—	Title Abstract Keyword ▾	asthma
—	AND ▾	Title Abstract Keyword ▾ attack OR exacerbation OR control OR symptom
—	AND ▾	Title Abstract Keyword ▾ detect OR predict OR diagnose OR manage
—	AND ▾	Title Abstract Keyword ▾ "artificial intelligence" OR AI OR "machine learning" OR "deep learning" OR "neural network" OR "computer-based" OR "computer-assisted" OR "computer technology" OR "tec
—	NOT ▾	Title Abstract Keyword ▾ Telecommunication OR ICT OR "Information and Communication Technology" OR "guideline" OR e-learning OR education

with Cochrane Library publication date from Jan 2013 to Feb 2023, in Trials (Word variations have been searched)

Search limits

Send to search manager

Run search

Appraisal & Synthesis

<https://www.rayyan.ai/>

Inclusion decisions

Undecided

Maybe

Included

Excluded

Conflict

0

0

20

47

4

Decision by

Dr Amy Chan

Ms. Darsha Widana

Mr Farhaan Mirza

Minimum collaborator decisions

At least 1

At least 2

At least 3

71

71

15

Maximum collaborator decisions

At most 0

At most 1

At most 2

0

0

56

Search methods [\[Add new\]](#)

Uploaded References [\[articles.enw\]](#)

Uploaded References [\[articles.enw\]](#)

47

24

Keywords for include [\[Add new\]](#)

compared with

trial

5

3

2023-03-22: Investigating machine learning approaches for detecting and predicting asthma - A systematic review- FM

Blind OFF

Detect duplicates

Compute ratings

Export

Copy

New search

All reviews

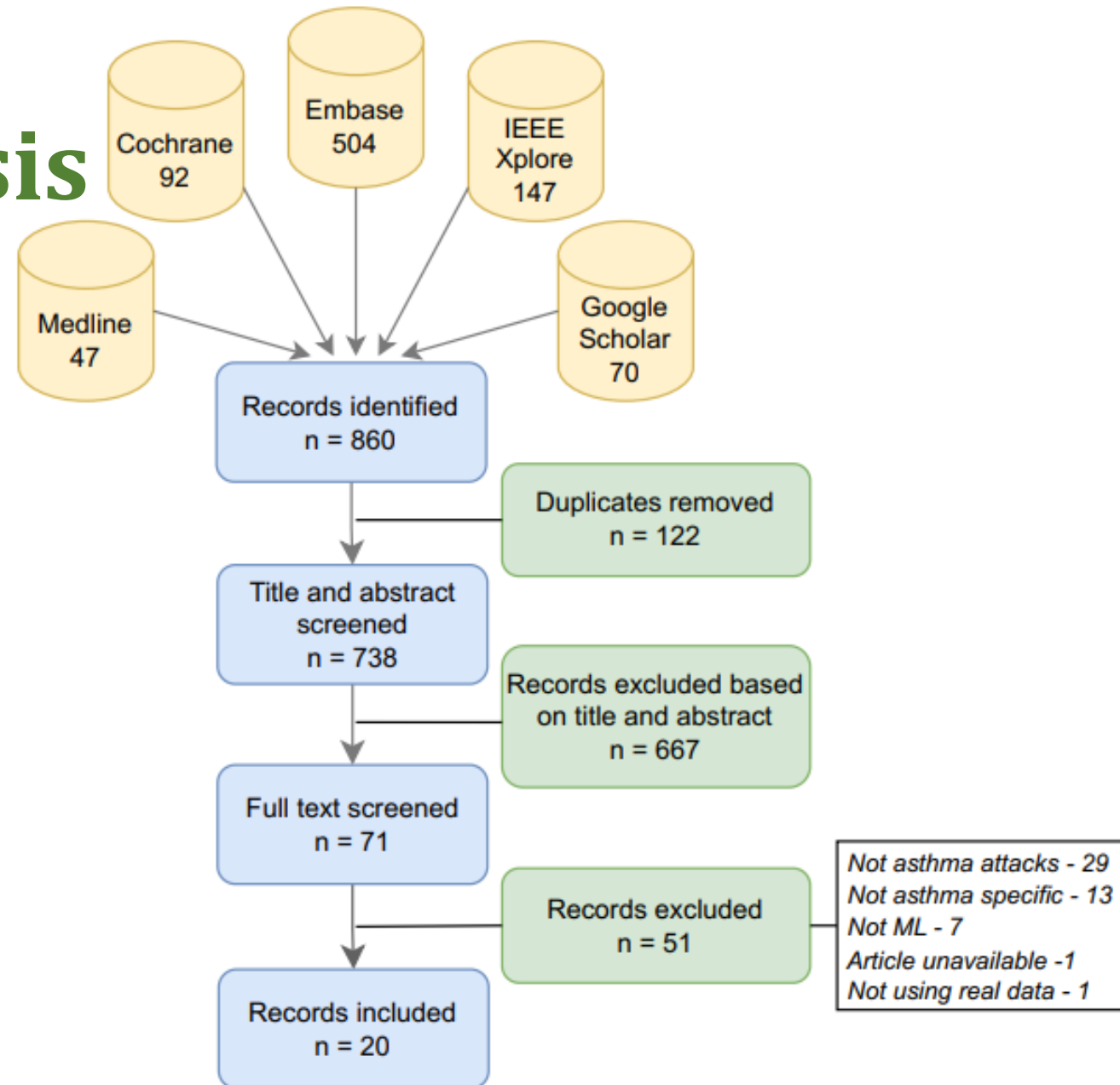
Showing 1 to 14 of 71 unique entries

Search:

Date			Title	Authors	Rating
2021-01-01		<div>Amy</div> <div>Darsha</div> <div>Farhaan</div>	Intelligent Asthma Self-management System for Personalised Weather-Based Healthcare...	Haque, Radiah; Ho, Sin-Ban...	
2020-01-01		<div>Amy</div> <div>Darsha</div> <div>Farhaan</div>	Automatically explaining machine learning prediction results on asthma hospital visits in ...	Luo, Gang; Johnson, Michael...	
2022-01-01		<div>Darsha</div> <div>Farhaan</div> <div>Asthma not attack</div>	Role Of Machine Learning and Random Forest in Accuracy Enhancement Durin...	Rani, Anchal; Sehrawat, Hak...	
2017-01-01		<div>Amy</div> <div>Darsha</div> <div>Farhaan</div> <div>Asthma not attack</div>	High-accuracy detection of airway obstruction in asthma using machine l...	Amaral, Jorge LM; Lopes, Ag...	
2021-01-01		<div>Amy</div> <div>Darsha</div> <div>Farhaan</div> <div>CDS no attack prediction</div>	Artificial intelligence-assisted clinical decision support for childhood...	Seol, HY; Shrestha, P; Muth,...	
2021-01-01		<div>Darsha</div> <div>Farhaan</div> <div>Not asthma specific</div>	Voice Analysis Framework for Asthma-COVID-19 Early Diagnosis and Predicti...	A. O. Popadina; A. -M. Salah...	
2016-01-01		<div>Darsha</div> <div>Farhaan</div>	Using CART for advanced prediction of asthma attacks based on telemonitoring data	J. Finkelstein; I. C. Jeong	
2014-01-01		<div>Amy</div> <div>Darsha</div> <div>Farhaan</div> <div>Asthma not attack</div>	Effective asthma disease prediction using naive Bayes — Neural network ...	S. Aneja; S. Lal	
2020-01-01		<div>Amy</div> <div>Darsha</div> <div>Farhaan</div> <div>Asthma not attack</div>	Predictive Analytics Model Based on Multiclass Classification for Asthma ...	W. Akbar; W. -P. Wu; M. Fah...	
2019-01-01		<div>Amy</div> <div>Darsha</div> <div>Farhaan</div> <div>Asthma not attack</div>	Machine Learning Classifiers for Asthma Disease Prediction: A Practical I...	W. AKBAR; W. -P. WU; M. FA...	
2018-01-01		<div>Darsha</div> <div>Farhaan</div> <div>Asthma not attack</div>	Personalized Prediction of Asthma Severity and Asthma Attack for a Personali...	Q. T. Do; A. K. Doig; T. C. S...	

Appraisal & Synthesis

PRISMA Flow Diagram



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Risk of bias assessment

CASP-Critical Appraisal Skills Programme

<https://casp-uk.net/casp-tools-checklists/>



Appraisal & Synthesis ctd.

Synthesised studies **based on the characteristics of the outcome** of the different machine learning models.

- Predicting the risk of asthma attacks as a classification
 - Predicting the risk of asthma attacks with a prediction window
 - Predicting risk of asthma attacks with a prediction window of less than a month
 - Predicting risk of asthma attacks with a prediction window of more than a month
 - Predicting the risk of asthma attacks without a prediction window
- Predicting the risk of asthma attacks as a probability

Report Findings

- Writing the review paper and publishing

Darsha Jayamini, W.K., Mirza, F., Asif Naeem, M. et al. Investigating Machine Learning Techniques for Predicting Risk of Asthma Exacerbations: A Systematic Review. J Med Syst 48, 49 (2024). <https://doi.org/10.1007/s10916-024-02061-3>



