



# **ARTIFICIAL INTELLIGENCE IN HEALTHCARE: BRIDGING THE GAP BETWEEN DEVELOPMENT AND IMPLEMENTATION**

Presenter: Hashim Kareemi

UBC VIRTUAL HEALTH GRAND ROUNDS – JULY 29, 2025



# FACULTY/PRESENTER DISCLOSURE

Faculty: Hashim Kareemi

Relationships with financial sponsors:

- Any direct financial relationships including receipt of honoraria:
  - CIHR (Canada Graduate Scholarship – Master's)
  - VAEPA Research Award
  - Consultant with UBC Digital Emergency Medicine
- Memberships on advisory boards or speakers' bureau: None
- Patents for drugs or devices: None
- Other: financial relationships/investments: None

All content was developed independent of financial relationships listed above.

None of the funding groups listed had any direct influence on the content of this work.



## LEARNING OBJECTIVES

1. Define “Artificial Intelligence” and “Machine Learning” and their potential role in addressing healthcare-related issues.
2. Review the current landscape of clinical AI tools and the gap between development and implementation.
3. Discuss reasons why the development-implementation gap exists in healthcare.
4. Propose solutions for bridging development to implementation of clinical AI tools, with a focus on British Columbia.



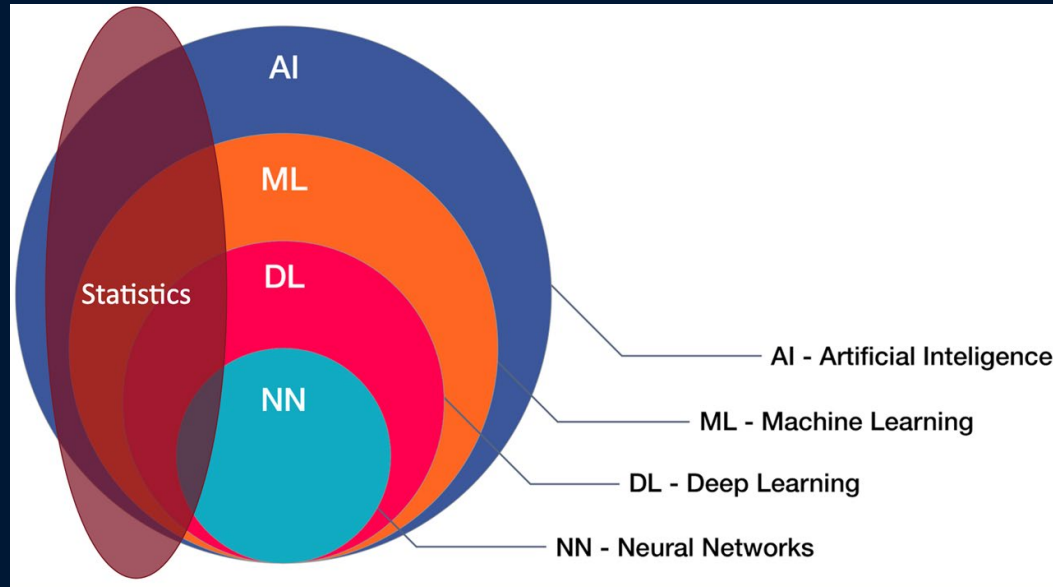


# 1. DEFINING ARTIFICIAL INTELLIGENCE

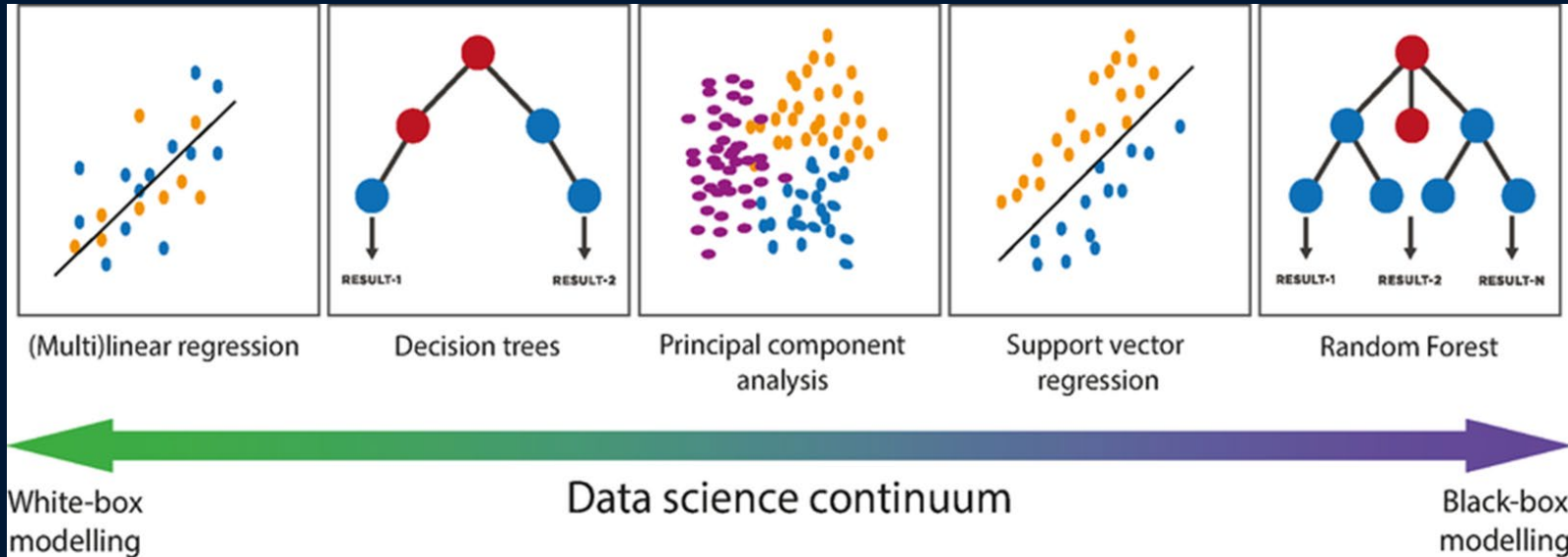


# AN OVERVIEW OF ARTIFICIAL INTELLIGENCE

- Artificial Intelligence (AI)
  - Machine Learning (ML)



# MACHINE LEARNING VS. STATISTICS



# “GENERATIVE AI” AND NATURAL LANGUAGE PROCESSING




# HEALTHCARE IN CRISIS





# ARTIFICIAL INTELLIGENCE AS A HEALTHCARE SOLUTION

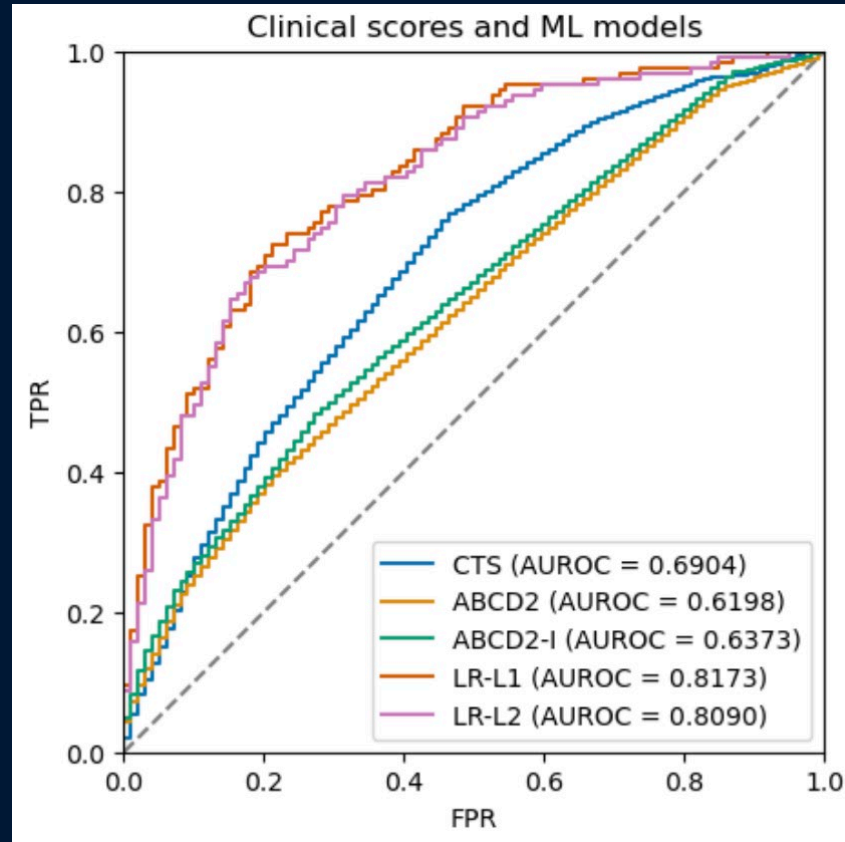
## Machine Learning Versus Usual Care for Diagnostic and Prognostic Prediction in the Emergency Department: A Systematic Review

Hashim Kareemi MD , Christian Vaillancourt MD, MSc, Hans Rosenberg MD, Karine Fournier MSI, Krishan Yadav MD, MSc



Outcome	Machine Learning (AUROC)	Usual Care (AUROC)
In-Hospital Mortality	0.74–0.94	0.69–0.81
Critical Care Outcomes	0.80-0.91	0.68-0.88
Hospitalization	0.80-0.83	0.64-0.82

# MACHINE LEARNING FOR STROKE PREDICTION



## 2. LANDSCAPE OF AI TOOLS IN HEALTHCARE

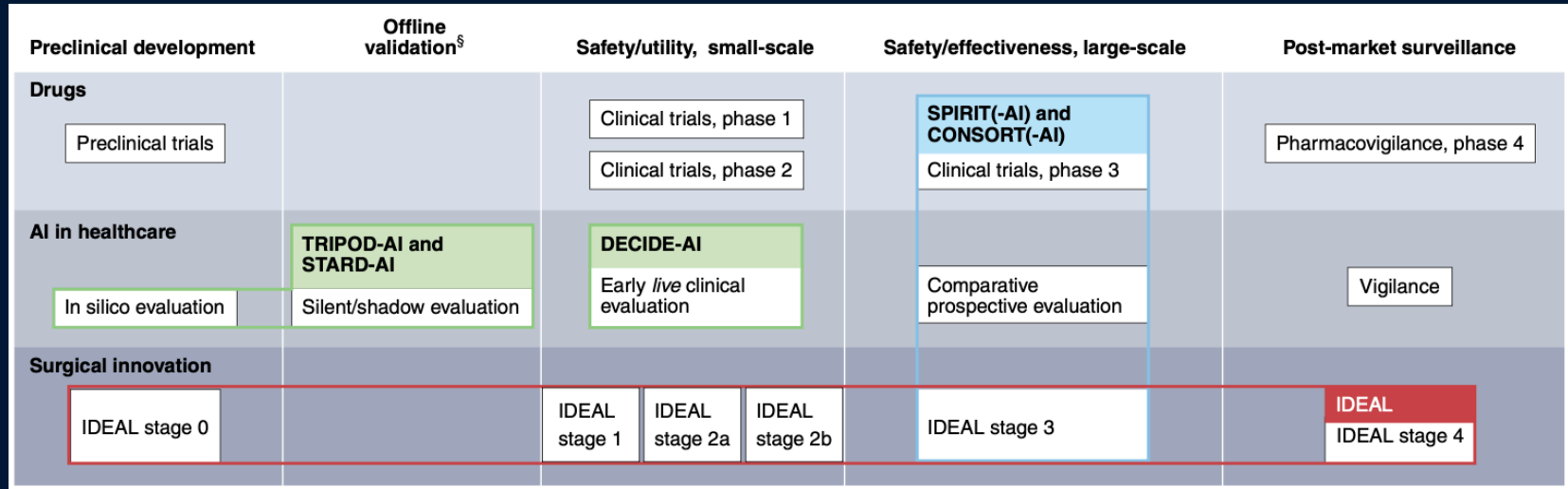


## CLINICIANS WANT AI TOOLS – WHERE ARE THEY?





# DECIDE-AI DEVELOPMENT PATHWAY



# RESULTS OF SCOPING REVIEW

Figure 2. Number of Included Studies by Publication Year since 2010.

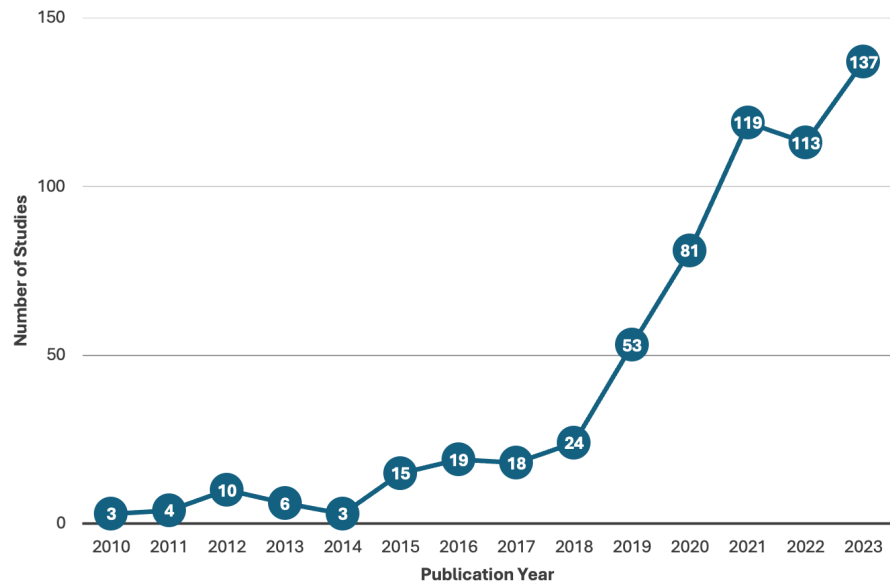
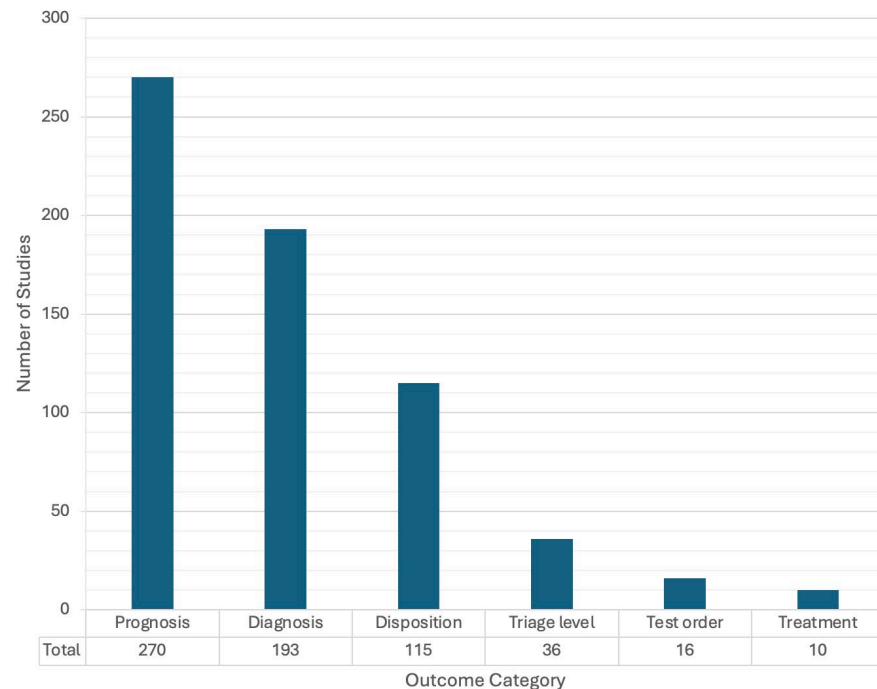
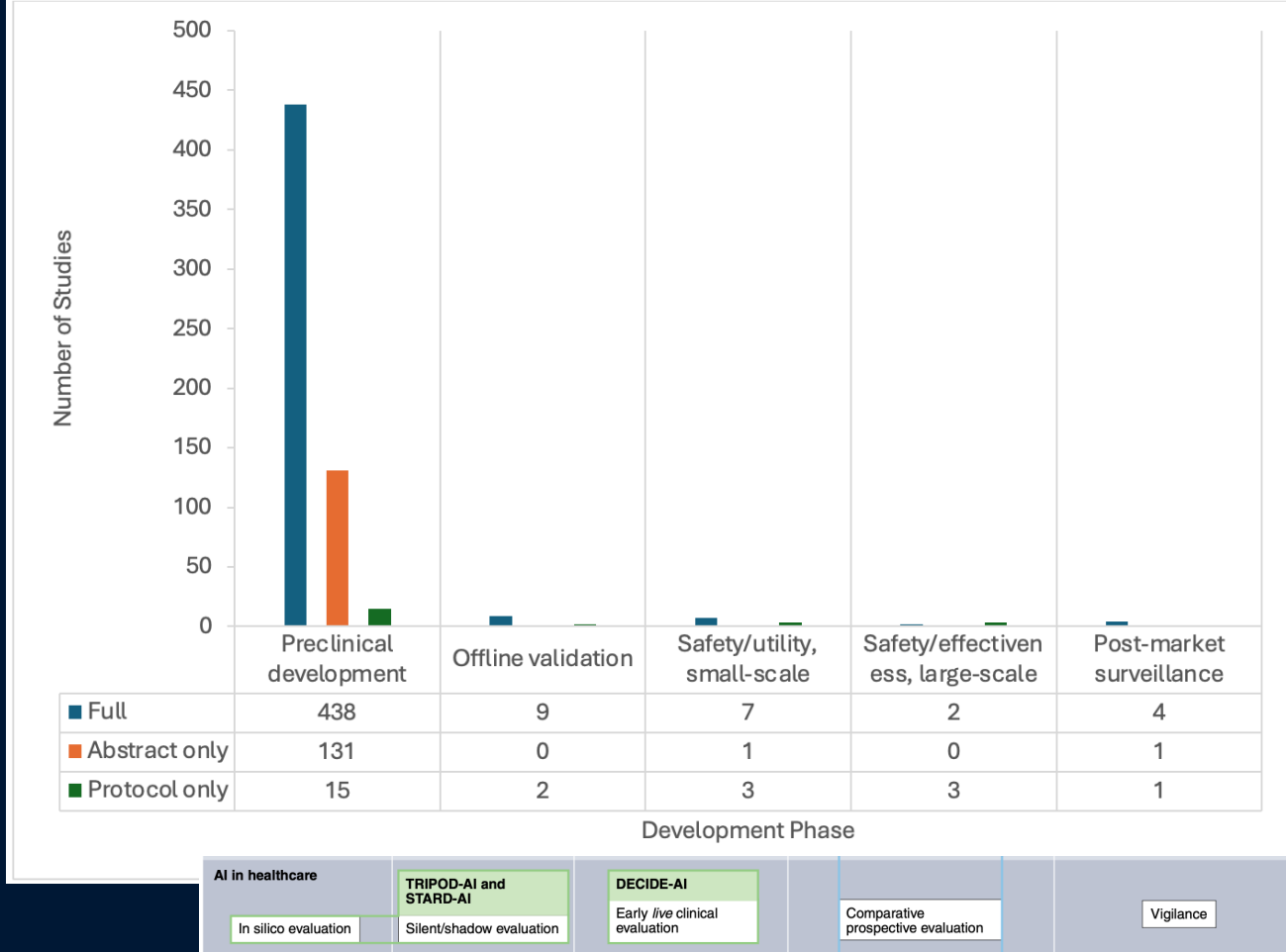


Figure 3. Categorization of Outcomes in the Included Studies.



# THE AI CHASM

**Figure 4. Phases of Development of the Included Studies, as Defined by the DECIDE-AI Guidelines, Stratified by Publication Stage.**



### 3. UNDERSTANDING THE AI CHASM



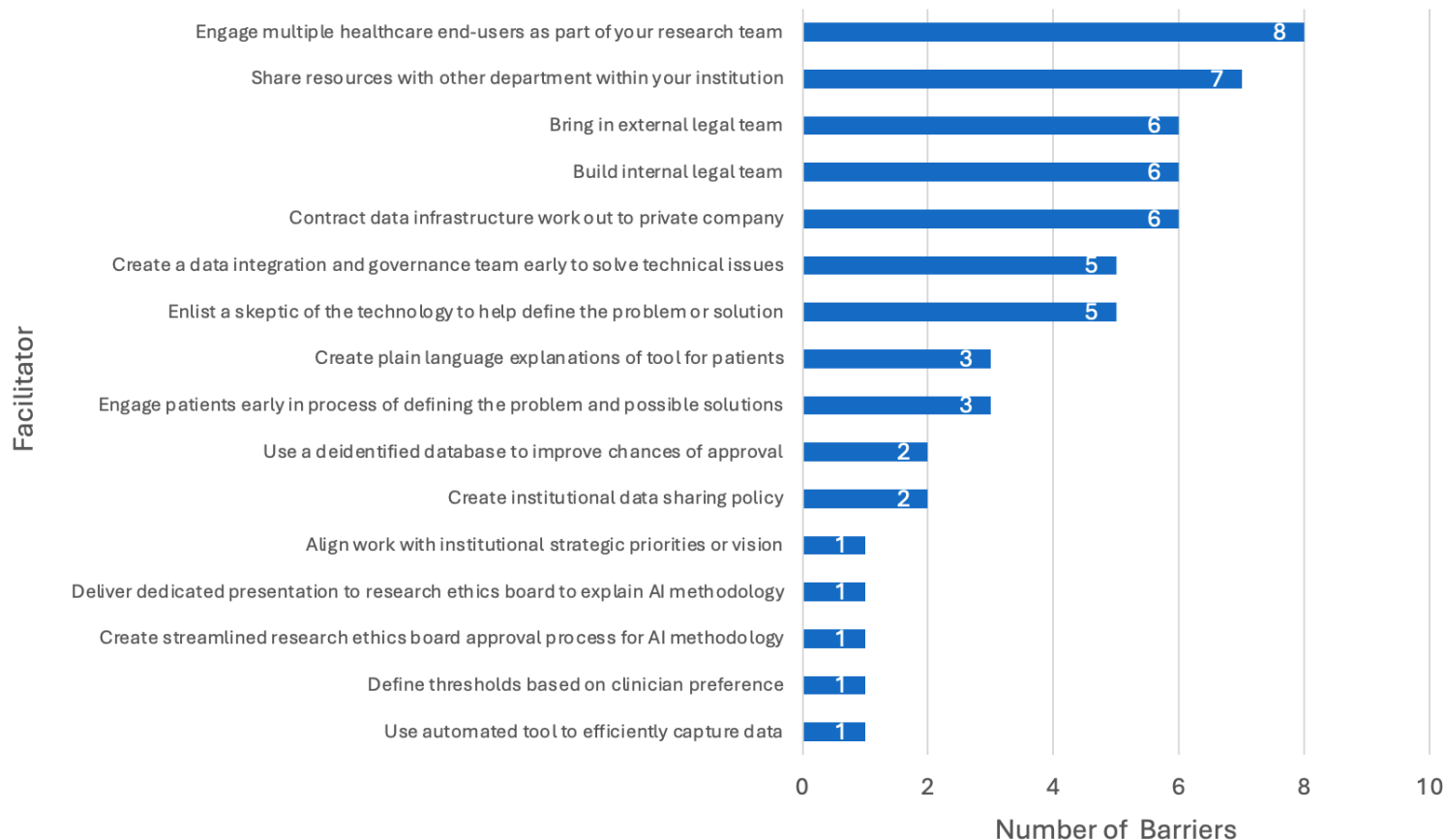


# TALKING TO EXPERTS





# POSSIBLE FACILITATORS



# UNDERSTANDING THE AI CHASM





## 4. BRIDGING DEVELOPMENT TO IMPLEMENTATION



# IMPLEMENTATION SCIENCE



# SFU-UBC IMPLEMENTATION SCIENCE TRAINING INITIATIVE



## REPORTING GUIDELINES FOR AI DEVELOPMENT

**TRIPOD+AI statement: updated guidance for reporting clinical prediction models that use regression or machine learning methods**

**Reporting guideline for the early stage clinical evaluation of decision support systems driven by artificial intelligence:  
DECIDE-AI**





# METHODOLOGICAL STANDARDS FOR AI DEVELOPMENT

## Direction

1. The proposed AI-CDS should address a clinical problem that has been identified as important to clinicians and patients.
2. The output of the AI-CDS should provide clinical utility in terms of the content and timing of the prediction or recommendation provided.
3. AI-CDS development should involve a multidisciplinary team including clinical experts and end-users (e.g. physicians, nurses), research and data scientists (e.g. methodologists, statisticians, computer scientists, engineers) and, when possible, individuals with lived experiences (e.g. patients, family members, caregivers).

## Data

4. Data used to develop the AI-CDS should be representative of the target population. Health inequity and bias should be acknowledged to exist to some degree in all data sets and should be mitigated where possible throughout AI-CDS development.
5. The outcome of interest being predicted by the AI-CDS should use a valid reference standard or definition, where relevant.
6. Data used to develop and evaluate the AI-CDS should be of sufficient quantity to ensure precise predictions and minimize overfitting.

## Development

- 7. Development and evaluation (including internal and external validation) of AI-CDS should follow and be reported according to best practices as outlined in the TRIPOD+AI statement.
- 8. AI-CDS should be evaluated using data from new clinical settings prior to implementation in that setting to ensure comparable performance is maintained.
- 9. Implementation of the AI-CDS should be considered early during development, and address factors such as existing clinical workflows, information technology infrastructure, and organizational readiness.

## Doctrine

10. Development and evaluation of AI-CDS must follow local institutional research ethics and/or quality improvement practices including strict adherence to data privacy regulations.
11. Data used for development and evaluation of AI-CDS should be made anonymous and available for sharing and cross-training between different centres, where possible.

# STREAMLINING APPROVAL PROCESSES: UBC WOMEN'S AND CHILDREN'S AI CHECKLIST



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## RESEARCH ETHICS ARTIFICIAL INTELLIGENCE / MACHINE LEARNING APPLICATION SUBMISSION CHECKLIST

# CREATING PARTNERSHIPS FOR POLICY: AITECCC

UBC 2025/26 Grants for  
Catalyzing Research Clusters (GCRC)



## Artificial Intelligence and Technology- Enhanced Emergency Care Collaboration Centre (ATECCC)

*Congratulations to  
Dr. Kendall Ho and the UBC  
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(DigEM) team!*

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Christie Newton  
John Mah  
Helen Novak Lauscher  
Gregory Li  
Shannon Berg  
Craig Mitton



THE UNIVERSITY  
OF BRITISH COLUMBIA  
Digital Emergency Medicine  
Department of Emergency Medicine  
Faculty of Medicine

<https://digem.med.ubc.ca>

CREATING COMMUNITY: AI HUB



# VCH-VCHRI AI Hub





# CONCLUSIONS





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