Socially responsible and fair AI in Healthcare Applications in New Zealand

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My Background

- I am a Research Fellow at the Division of Health, University of Waikato.
- Worked as a Lecturer at Manukau Institute of Technology and as a Financial and
- Systems Manager at the Community Support Medical Centre, Dunedin.
- Expert Panel Member - AI and Healthcare, The Office of the Prime Minister's
- Chief Science Advisor.

- PhD in AI for Healthcare (University of Waikato, 2022)
- MSc in Computer Science (University of Waikato, 2018)
- MSc in Applied Mathematics (University of Auckland, 2007)

- Mother of 11-year-old twin-boys
- Originally from Sri Lanka

Ongoing Research Projects

- Equitable cancer outcomes in lung cancer patients, and diabetes and cardiovascular disease management.
- Health Research Council (HRC) funded project: A collaboration to develop an Aotearoa AI evaluation framework, with researchers and stakeholders across NZ.
- Predicting Severity in Acute Pancreatitis: Machine learning based multiclass approach, with University of Auckland Medical School.
- AI to analyse and reduce healthcare harm in New Zealand General Practice (NZ-GP), with University of Otago Medical School.

Governmental Panel on AI and Healthcare

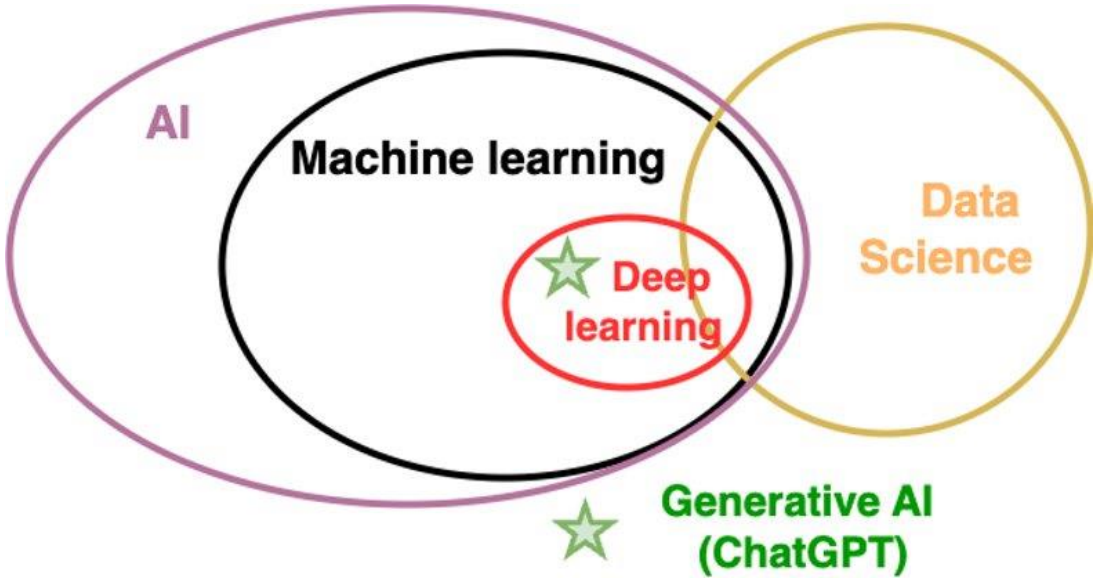
- **Effective implementation of AI in healthcare** require strong leadership, AI supportive system settings, adaption to our specific context, and cross-sector relationships.
- Short (1-2 years) and long-term **goals**.
- Makes 22 **recommendations**, captured under eight broad themes: mapping the landscape, maintaining the human element of care, enabling adoption, establishing confidence and trust, tackling inequity, Te ao Māori, data and systems, exploring opportunities.
- **Ethical principles**: 17 principles to cover the use of predictive and generative AI in NZ.

Examples of Recommendation

- **National data platform to improve healthcare.**
  - The ongoing digitisation of our health system
  - Development of the national data platform
  - National data governance and data access protocols
  - The adoption of the previously developed Algorithm Hub
  - Development of a post-implementation review checklist to assess outcomesof newly implemented AI technology

- **Reducing administration** using AI to address workforce shortage.
  - Automate high-volume repetitive tasks
  - Patient messaging and communication in multiple languages
  - Assist in prioritising resources when hospitals are overwhelmed

Artificial Intelligence



- AI is predicted to influence almost all aspects of our lives over the next 5–10 years.
- Using AI widely will result in the estimated healthcare costs being reduced by 5%to 10% in the next five years.

AI Applications in Various Domains of Medicine

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Domain	Country	Outcome
Diagnosis	Global	AI applied to digital chest radiographs to identify **tuberculosis cases** and drug-resistant tuberculosis cases.
Mortality and morbidity risk assessment	Thailand	Quantify the risk of **dengue fever severity**.
Disease outbreak prediction & surveillance	Global	Characterise and predict the transmission patterns of **Zika virus**.
Health policy and planning	South Africa	Predict **length of stay** among health-care workers in underserved communities.
Pandemic planning and response	Global	Tracking, screening, contact tracing and clinical management of **COVID-19**.

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AI and Trust

- The organisation deploying and operating the AI must be:
  - Transparent
  - Responsible
  - Accountable

- The AI system and its data and output must be verifiable.
  - Explainability
  - Interpretability
  - Fairness
  - Dependability
  - Auditability

Bias in AI

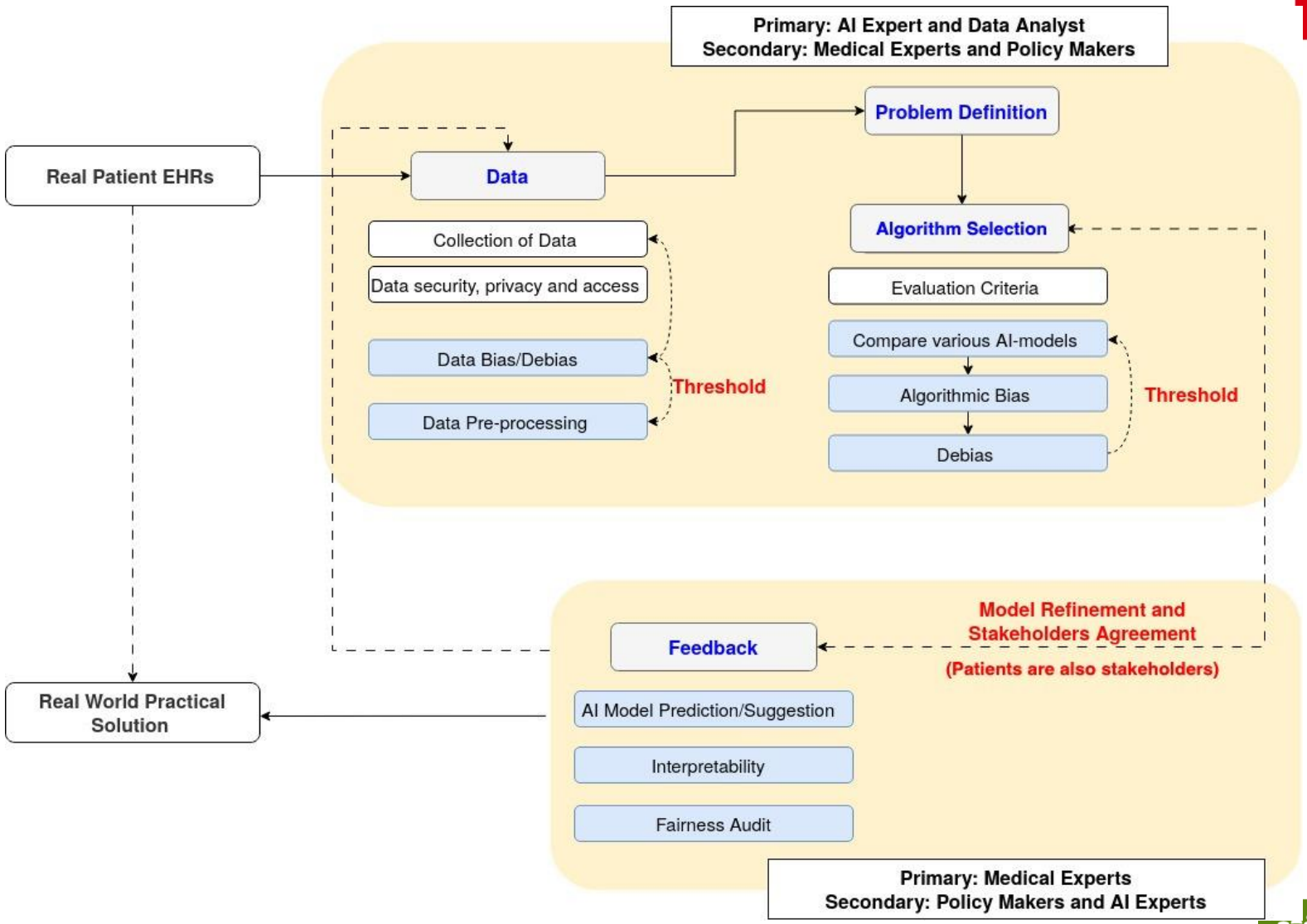
- Introducing and using AI comes with biases and disparities, resulting in concerns about equity.
- AI models can make “unfair” decisions skewed toward a particular group of people.
- Current bias-related research predominantly focuses on American demographics (white vs black) and binary gender (male vs female) classifications.

Using AI in Healthcare

- Need for continual monitoring and update to ensure the long-term reliability and effectiveness of AI-based clinical algorithms.

- To ensure patient care and safety, using AI in clinical settings to aid clinical decisions and risk predictions requires Continuous quality improvement (CQI)

Framework (one possible option)



- Four Stages:
  - Data
  - Problem definition
  - Algorithm selection
  - Feedback

- Experts' level of involvement at each stage.
- Input from policymakers.
- Patients are viewed as stakeholders.

- New Zealand indigenous population Māori, their data and consultation.

Closing Remarks

- **Issues that needs to be considered, include:**
  - Professional liability
  - Labour market implications: Skills and expertise required of healthcare providers will change.
  - Ethical considerations
  - Privacy concerns
  - Regulatory compliance
  - Provider–patient relationship: Empathy skills of healthcare providers have been shown to positively influence patient outcomes.

- **Why is it a good idea?**
  - AI to the rescue
  - Productivity
  - Workload
  - Performance

Questions?

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