



Existing Whole Disease Models (WDMs)

How many?

Disease areas?

Quality?

Applications?

A systematic review of whole disease models and pathway models for any disease areas



Dr Huajie Jin (Lily)

Senior Lecturer in Health Economics, King's College London

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huajie.jin@kcl.ac.uk

Operational Definition

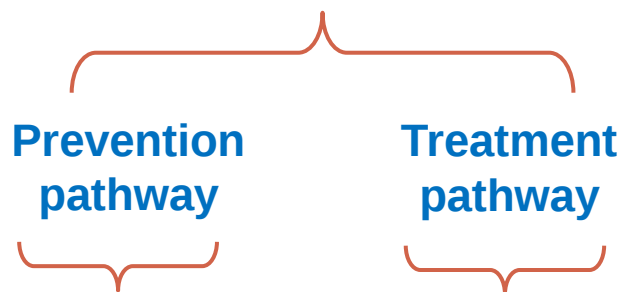
WDM

A model which evaluates **multiple** (≥ 3) decision points ¹ for

- people at risk who may, or may not, go on to develop a given disease

AND

- people with the given disease



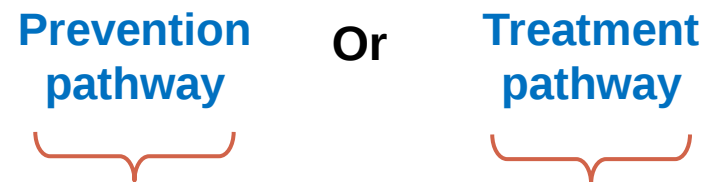
Pathway model

A model which evaluates **multiple** (≥ 3) decision points ¹ for

- people at risk who may, or may not, go on to develop a given disease

OR

- people with the given disease



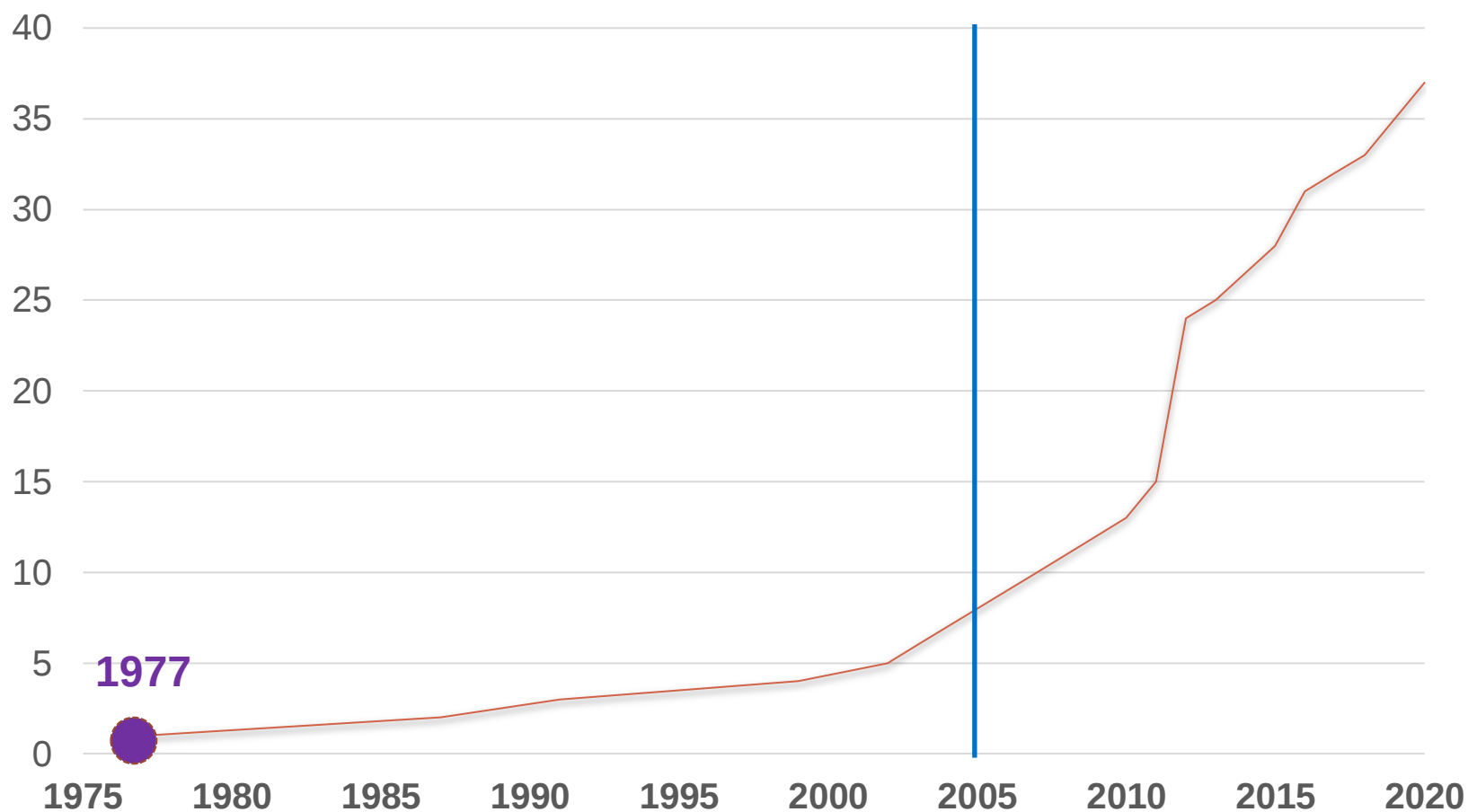
Note

1. A model was assessed as meeting the criteria of a WDM/pathway model either by demonstration or based on authors' reporting.

37 WDMs

36 *pathway models*

Fig 1. Total number of WDMs by year



Characteristics of WDMs

92%



3%



84%

Serious limitations*

- 1) Inadequate model structure
- 2) Failure to consider adverse events of interventions
- 3) Lack of probabilistic sensitivity analysis (PSA)

* Assessed by the NICE appraisal checklist for economic evaluations.

Top 5 Disease areas

1



Heart disease (27%)

2



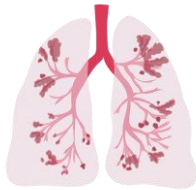
Cancer (15%)

3



AIDS (10%)

4



COPD (7%)

5

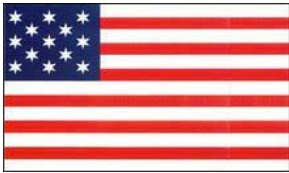


Metabolic disease (7%)

Case study 1 – Coronary Heart Disease (CHD) policy model

(Weinstein et al. 1987)

Used for 33 years



Adapted to



Argentina, Canada, China, and Mexico.



- 1. Cost-effectiveness analysis**
- 2. Inform clinical guidelines**
- 3. Evaluate health policies**



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Case study 2 – United Kingdom Prospective Diabetes Study (UKPDS) model

(Clarke et al. 2004; Hayes et al. 2013)

Used for **18** years



30 years of follow-up



1. Cost-effectiveness analysis
2. Inform clinical guidelines
3. Predict life expectancy
4. Inform the design of clinical trials

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Key Points for Decision Makers

- 1) There has been an **increase in the number of WDMs since 2005**.
- 2) The main disease areas covered by existing WDMs are **heart disease, cancer, AIDS, COPD, and metabolic disease**.
- 3) The majority of WDMs were of **poor quality** which means they may **require significant modification** before they can be re-used.
- 4) With routine maintenance and regular updates, a WDM can be **re-used for many years** to consider other decision problems or to incorporate new evidence.

Do you agree with the following statement?

In the long-term, the benefits of using WDMs are likely to outweigh the initial investment of time and money.

- **Agree:**  (*thumbsup*)
- **Disagree:**  (*thumbsdown*)
- **Unsure:**  (*confused*)

Reference



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