A Value Framework Based on Multiple Criteria Decision Analysis for New Health Technologies Assessment under Universal Healthcare Coverage System in Taiwan

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INTRODUCTION

Introducing costly new drugs with high uncertainty in treatment efficacy, particularly for oncology and rare diseases, highlights the importance of comprehensive value assessment beyond traditional value domains (e.g., effectiveness, economic evaluation, budget impact).

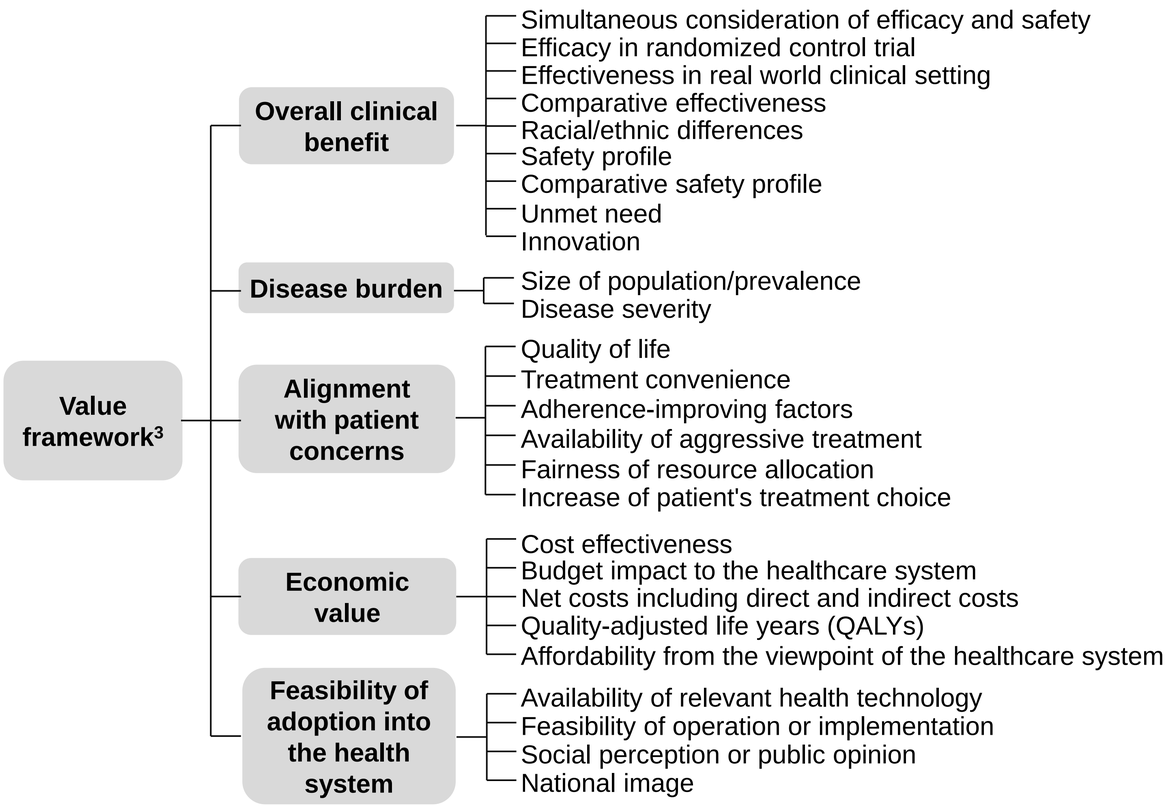
Multiple criteria decision analysis (MCDA), a systematic approach for supporting decision-making, enables multiple stakeholders to systematically consider all value attributes of new drugs, thereby facilitating transparent, consistent, and legitimate decision-making.[1,2]

This study aims to develop a value framework incorporating MCDA for new treatments under a universal healthcare coverage system in Taiwan.

METHODS

	Phase1 Value framework	Phase 2: Criteria weighting	Phase 3: Pilot study
Aims	Identification and definition of value domains and corresponding indicators	Elicitation of weights for value domains	Application of developed value framework to new oncology drugs
Methods	Literature review, online survey using questionnaire, expert meeting	Point allocation method, direct rating, SMARTER	Calculate total weighted value scores for pemigatinib, tepotinib, dinutuximab, and tisagenlecleucel
Stakeholders	Academic experts, policy-makers, physicians, pharmacists, representatives of pharmaceutical companies, and patient groups	Academic experts, policy-makers, representatives of pharmaceutical companies, and patient groups	Academic experts, representatives of pharmaceutical companies, policy-makers, healthcare providers, and patient groups

Phase 1: Value framework



Phase 2: Criteria weighting

A two-part survey was separately done for three drug types, namely new oncology, new orphan, and other new drugs, by a convenience sample of 86 stakeholders, including academic experts (n=26), representatives of pharmaceutical companies (52), policy-makers (9), and patients (8).

- ***Part 1 of questionnaire - domain assessment***
  Respondents were asked to allocate a total of 100 points across the five value domains in proportion to their relative importance, with a higher score denoting a greater level of importance and relevance in the assessment of drug value.
- ***Part 2 of questionnaire – indicator assessment***
  Respondents provided their agreement on the importance of each indicator for the assessment of a given domain using a five-point Likert scale (0: “disagree,” 1: “neutral,” 2: “somewhat agree,” 3: “agree,” 4: “strongly agree”).

Based on the survey results, different weighting methods (i.e., point allocation, SMARTER, and direct rating)4,5 were used to estimate the weighting scores for value domains.

Phase 3: Criteria weighting

- Seven stakeholders were invited to rate the value of each drug in terms of the value domain specified in our value framework in a score range of 0 (referring to the worst performance) to 100 (indicating the best performance).
- The rating score of each value domain given by each stakeholder was multiplied by the corresponding weight derived from the point allocation method, and the weighted scores from all seven stakeholders were averaged to obtain the final weighted value score.

RESULTS

- **“Overall clinical benefit”** had the highest preference weight, irrespective of drug type, weighting method, and stakeholder type.
- **Figure 1** and **Figure 2** show the weighting scores obtained using point allocation method for each value domain stratified by drug type and stakeholder type, respectively.
- In the pilot study, tisagenlecleucel received the highest scores (means [95% CIs]: 71.6 [53.8, 89.3]), followed by tepotinib (70.4 [59.5, 81.3]), pemigatinib (69.4 [53.9, 84.9]), and dinutuximab (68.1 [49.1, 87.0]).

Figure 1. Weighting score estimates (95% confidence intervals) of individual value domains stratified by drug type (i.e., new oncology, new orphan and other new drugs) obtained using point allocation method.

	Estimates (95% CIs)
New oncology drugs	
Overall clinical benefit	32.5 (30.4, 34.6)
Disease burden	18.3 (16.8, 19.7)
Alignment with patient concerns	18.5 (16.2, 20.6)
Economic value	18.2 (16.6, 19.7)
Feasibility of adoption into the health system	12.5 (11.2, 13.7)
New orphan drugs	
Overall clinical benefit	30.6 (28.1, 33.1)
Disease burden	15.9 (14.1, 17.6)
Alignment with patient concerns	21.1 (19.1, 23.0)
Economic value	17.5 (15.6, 19.2)
Feasibility of adoption into the health system	14.9 (13.3, 16.4)
Other new drugs	
Overall clinical benefit	30.6 (28.7, 32.6)
Disease burden	18.8 (17.5, 20.2)
Alignment with patient concerns	18.3 (16.6, 19.9)
Economic value	20.7 (18.7, 22.7)
Feasibility of adoption into the health system	11.6 (10.5, 12.7)

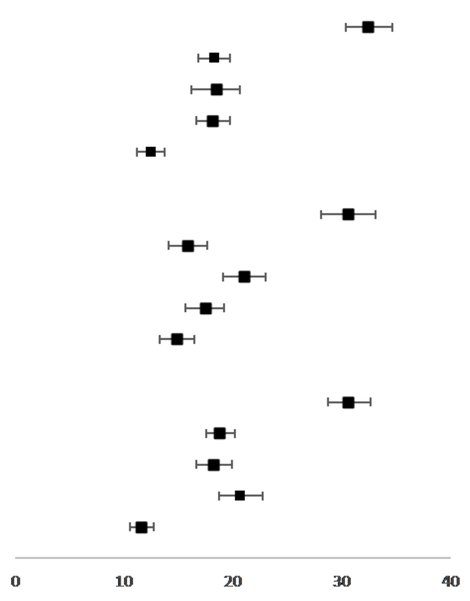
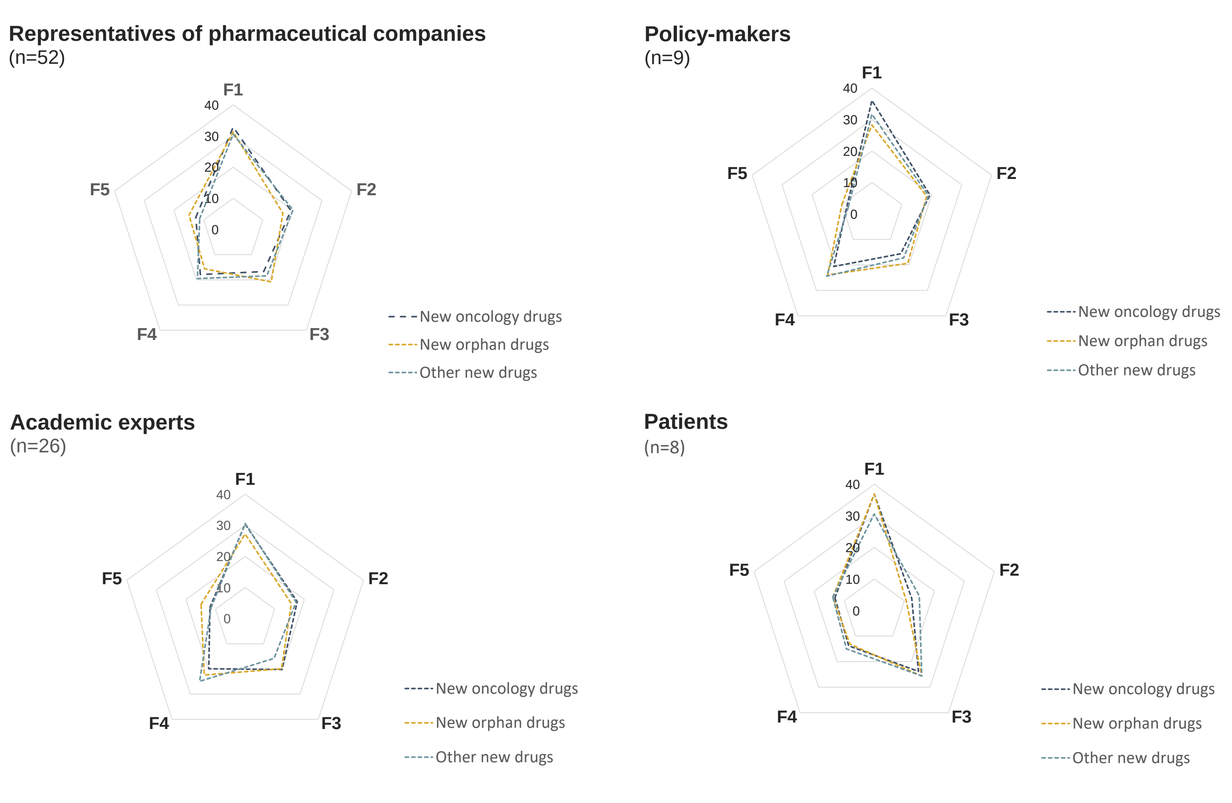


Figure 2. Weighting score estimates stratified by stakeholder type and drug type obtained using point allocation method.



Notes: F1 indicates Overall clinical benefit; F2, Disease burden, F3, Alignment with patient concerns, F4, Economic value, F5, Feasibility of adoption into the health system.

CONCLUSION

A country-specific value framework based on MCDA for new drugs was developed in an Asian setting under universal healthcare coverage. It allows multiple stakeholders to appraise all drug value attributes systematically and provides a structured process for adapting and refining value assessments.

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Disclosure

All authors have no conflicts of interest to disclose.

Abbreviations: CIs, confidence interval; MCDA, multiple criteria decision analysis (MCDA); SMARTER, Simple MultiAttribute Rating Technique Exploiting Ranks

Digital poster & Supplementary data