

Study on online tools of pharmacoeconomic model construction and value communication



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INTRODUCTION

- Traditional pharmacoeconomic models are confronted with considerable challenges, including complex construction, high costs, and limited reproducibility. Online platforms offer a promising solution by enhancing efficiency and improving the quality of model development through transparency, standardization, and automation.

- This study systematically reviewed online pharmacoeconomic tools (up to October 2024), comparing 4 health technology assessment (HTA) agency budget impact analysis (BIA) templates, 3 online BIA and 4 online Markov platforms, and 2 value communication platforms. Results indicate that BIA models, due to lower complexity, are well-positioned for earlier widespread adoption, while online models require further optimization in flexibility, dynamic adaptability, and alignment with payer needs to effectively support innovative drug market access. The findings underscore the transformative potential of online tools in balancing technical rigor with payer demands, offering a streamlined pathway for value-driven healthcare decision-making.

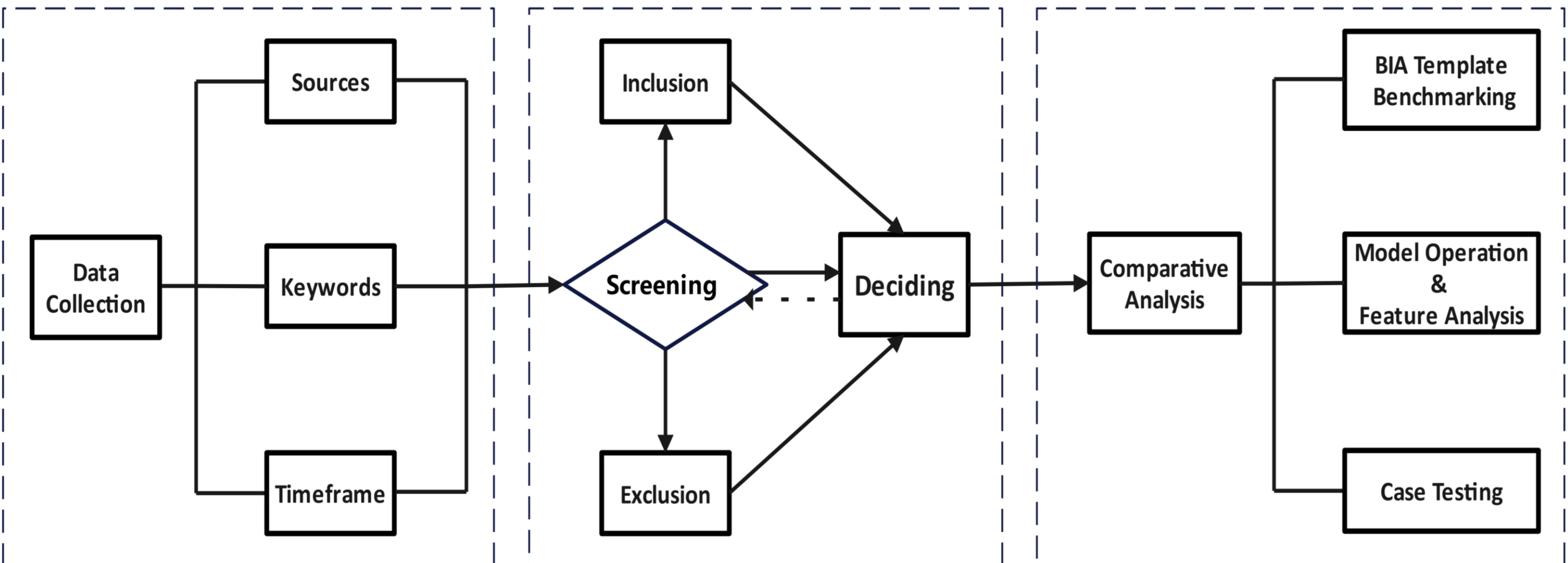
OBJECTIVES

- Traditional pharmacoeconomic model construction is often complex, costly, and hindered by challenges related to reproducibility. Online pharmacoeconomic platforms offer promising solutions by improving transparency, standardization, and automation in the model-building process, while enabling dynamic adaptability and enhanced efficiency. This study systematically reviews and compares existing online pharmacoeconomic templates and platforms to propose innovative frameworks for future model construction and value communication.

METHODS: TECHNICAL PATH

| Technological Path | |
|----------------------------|--|
| Data Collection | <ul style="list-style-type: none">Sources Academic databases, HTA agency websites and web browsersKeywords Pharmacoeconomics; Budget Impact Analysis; Cost-Effectiveness Analysis; Online templates; Online platformsTimeframe Up to October 15, 2024 |
| Screening & Categorization | <ul style="list-style-type: none">Inclusion BIA templates, BIA platforms, Markov platforms, value communication platformsExclusion Traditional Excel/R-based models, non-pharmacoeconomic toolsProcess Dual independent screening → Discrepancies resolved by third reviewer |
| Comparative Analysis | <ul style="list-style-type: none">BIA Template Benchmarking Target population, reimbursement ratio, market share, cost calculation, annual budget impact, sensitivity analysisModel Operation & Strengths and Weaknesses Analysis BIA and Markov model standardization steps, interactivity/dynamic capabilitiesCase Testing Operational testing of key platforms → Application potential and limitations |

FIGURE 1: TECHNOLOGY ROADMAP



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RESULT 1: PARAMETERS COMPARISON OF ONLINE BIA TEMPLATES BY INTERNATIONAL HTA AGENCIES

| HTA Agencies | General Information | Guidelines | Total Population Estimate | Epidemiology | Target Population | Market Share | Drug Costs | Additional Drug Costs/Savings | Other Costs/Savings | Uncertainty Analysis | Limitations Analysis | Annual Budget Impact | Summary |
|--------------|---------------------|------------|---------------------------|--------------|-------------------|--------------|------------|-------------------------------|---------------------|----------------------|----------------------|----------------------|---------|
| NICE | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| PBAC | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | |
| SMC | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| NCPE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ |

RESULT 2: PARAMETERS COMPARISON OF ONLINE BIA PLATFORMS BY THIRD-PARTY AGENCIES

| Agencies | Welcome Interface | Target Population | Reimbursement Rate | Market Share | Cost Calculation | Estimated Annual Budget Impact | Sensitivity Analysis | Summary | Output Format |
|-------------------------------|-------------------|-------------------|--------------------|--------------|------------------|--------------------------------|----------------------|---------|---------------|
| University of York | ✓ | ✓ | | ✓ | ✓ | | | ✓ | Excel |
| Zhongwei Public HTA Institute | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | Excel |
| Pharmerit | ✓ | ✓ | | ✓ | ✓ | ✓ | | | |

RESULT 3: FEATURES COMPARISON OF ONLINE BIA PLATFORMS

| Institutes | Strengths | Weaknesses |
|-------------------------------|--|---|
| University of York | [1] Offers a simple and user-friendly interface, ensuring ease of operation; [2] Epidemiologically grounded design | [1] Designed primarily for display templates; [2] Lack of sensitivity analysis capabilities, limiting detailed modeling; [3] Limited support for template extensibility, reducing adaptability for diverse applications |
| Pharmerit | [1] User-oriented design with semi-automated functionality | [1] Designed primarily for display templates; [2] Lack of sensitivity analysis and diagnostic parameters, reducing adaptability for diverse applications |
| Zhongwei Public HTA Institute | [1] Offers a simple and user-friendly interface, ensuring ease of operation; [2] Epidemiologically grounded design; [3] Integrated sensitivity analysis for enhanced evaluation capabilities; [4] Free of charge | [1] Function of result exporting is defective; [2] Non-transparent computational processes |

- HTA agencies, including NICE in England, PBAC in Australia, SMC in Scotland and NCPE in Ireland, alongside third-party organizations such as Pharmerit, Zhongwei Public HTA Institute only provide BIA templates based on epidemiological data rather than historical sales data.

RESULT 4: FEATURES COMPARISON OF ONLINE MARKOV MODELS

| Institutes | Strengths | Weaknesses |
|-------------------------------|---|---|
| Zhongwei Public HTA Institute | [1] No programming skills required; [2] Free of charge; [3] User-friendly interface designed for intuitive operation | [1] Limited sensitivity analysis functionality, restricting detailed evaluations; [2] Non-transparent computational processes |
| Avalere Health | [1] No programming skills required; [2] User-friendly interface designed for intuitive operation | [1] Limited model generalizability; [2] Insufficient support for semi-automation feature; [3] Charge for use |
| University of Oxford | [1] Education-centric orientation; | [1] Limited generalizability of modeling approaches; [2] Dependency on Excel tools with a lack of interactive interface functionality |
| Universidad de Granada | [1] No programming skills required; [2] User-friendly interface and operation; [3] Free of charge; [4] Mainly tailored for applications in oncology research and analysis; [5] Semi-automated modeling capability | [1] Limited support for multi-state modeling needs further development; [2] Non-transparent computational processes |

RESULT 5: FEATURES COMPARISON OF ONLINE PLATFORMS FOR PHARMACOECONOMIC VALUE INFORMATION

| Institutes | Strengths | Weaknesses |
|------------------------------|---|----------------|
| Certara Germany GmbH | [1] No programming skills required; [2] User-friendly interface; [3] Supports multi-team collaboration; [4] Enables personalized customization; [5] Includes model information encryption | Charge for use |
| Normin Health Consulting Ltd | [1] No programming skills required; [2] User-friendly interface; [3] Multi-dimensional value covering (safety, efficacy, etc); [4] Enables personalized customization; | Charge for use |

CONCLUSIONS

- Online pharmacoeconomic tools has been demonstrated to facilitate the streamlining of model construction and value communication processes, thereby reducing costs and enhancing work quality. However, the applicability of such tools may be constrained by complexities related to model design, specific diseases, therapeutic products, and comparators involved. Among these, online BIA platforms are likely to be the first to achieve broader adoption in the near future.

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