

Advancing Cancer HEOR with a Decentralized, Transparent, and Interactive Open Source Model Platform

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Background & Objectives

The Challenge

Novel cancer therapeutics drive ongoing debate around rising healthcare expenditures in the US, underscoring the need for reproducible health economic models to support fair pricing and patient access. Most cancer HEOR models are developed in isolation, inconsistently documented, and rarely shared, limiting transparency, reuse, and cumulative scientific value.

Our Objective

We designed and developed a decentralized, open-source platform (HModEx®) that enables:

- Secure sharing of cancer health economic models
- Standardized validation using CADTH criteria
- Model reuse with proper attribution and licensing
- Aligned incentives for model developers

Methods

Platform Development

NIH-funded, web-based platform featuring:

- Ontology-driven search (NCIt hierarchical expansion)
- User and model management system
- Structured model upload with documentation
- CADTH-aligned validation workflows
- Licensing mechanisms for attribution and reuse

Usability Evaluation

A functional prototype was iteratively refined through usability testing with a panel of international domain experts (n=11).

Evaluation used the System Usability Scale (SUS) with structured task-based testing.

Success Criteria

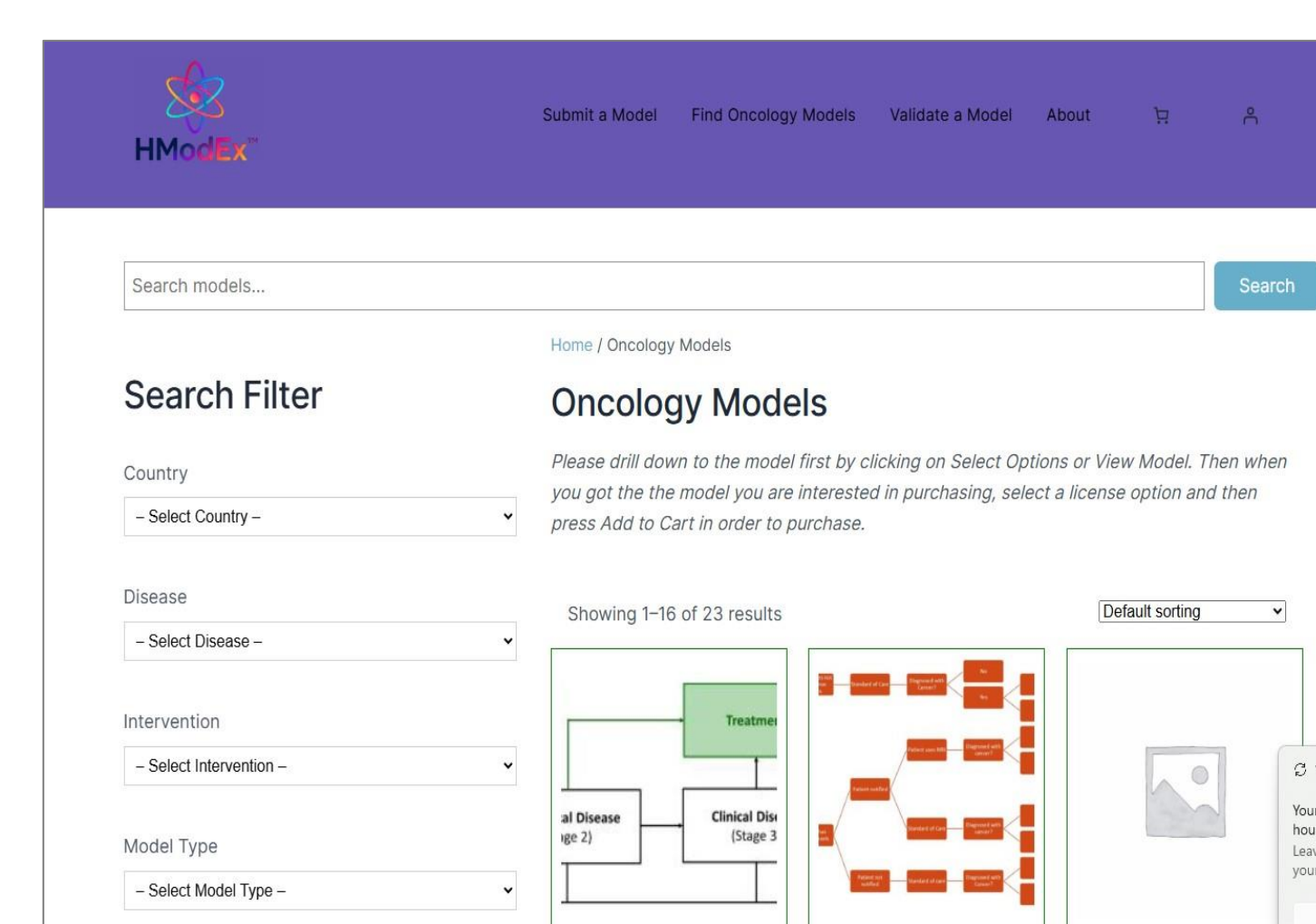
Two predefined benchmarks were established to evaluate platform usability:

- Task Completion define as participants must successfully complete at least 80% of all assigned tasks.
- SUS Benchmark define as Mean System Usability Scale score must meet or exceed the industry benchmark of 68

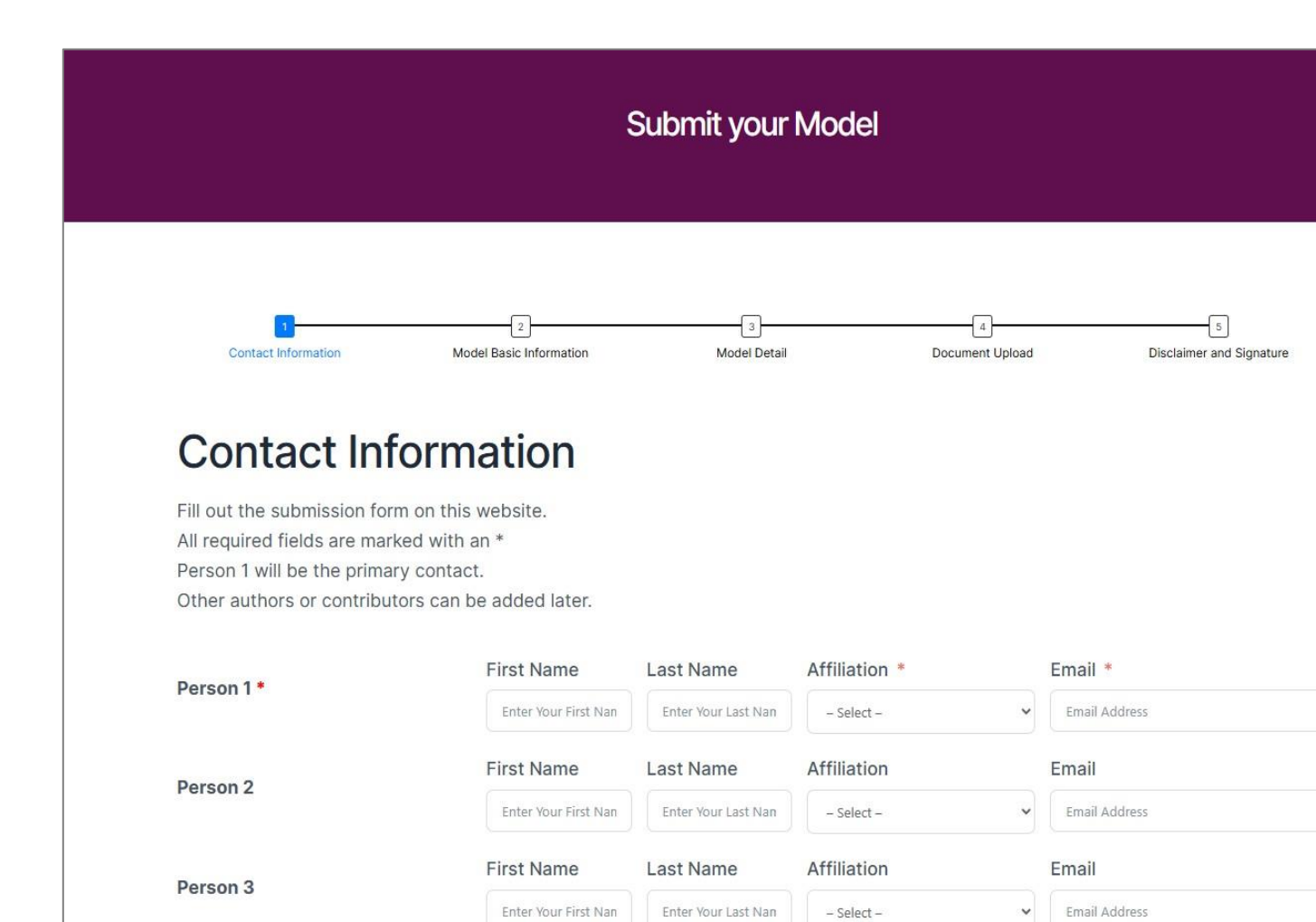
Results

- 100% / Task Completion: All 11 expert panelists completed every assigned task successfully, exceeding the $\geq 80\%$ benchmark.
- SUS ≥ 68 / Usability Benchmark Met: System Usability Scale scores exceeded the established threshold, indicating good overall usability of the platform.

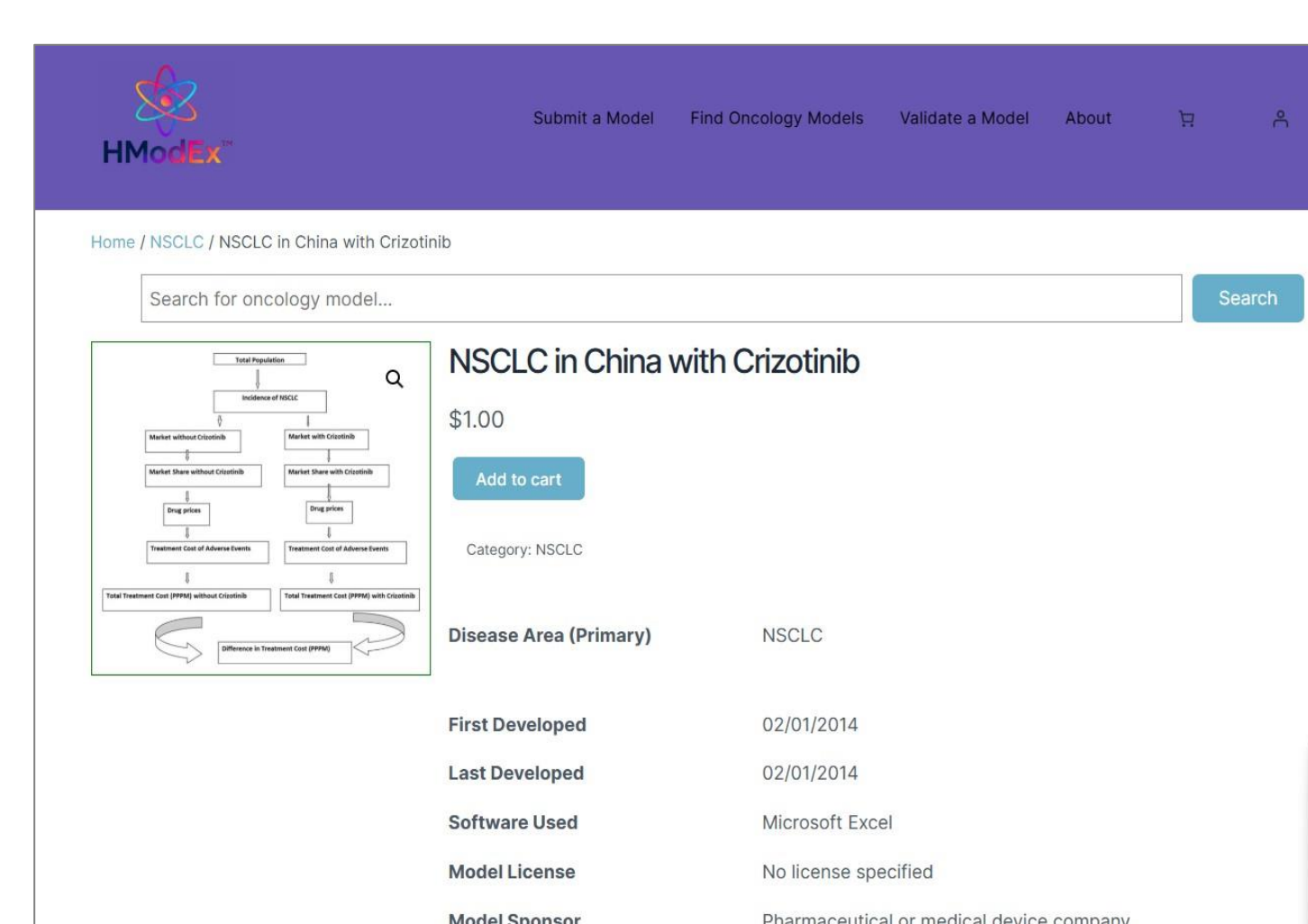
Platform Key Features



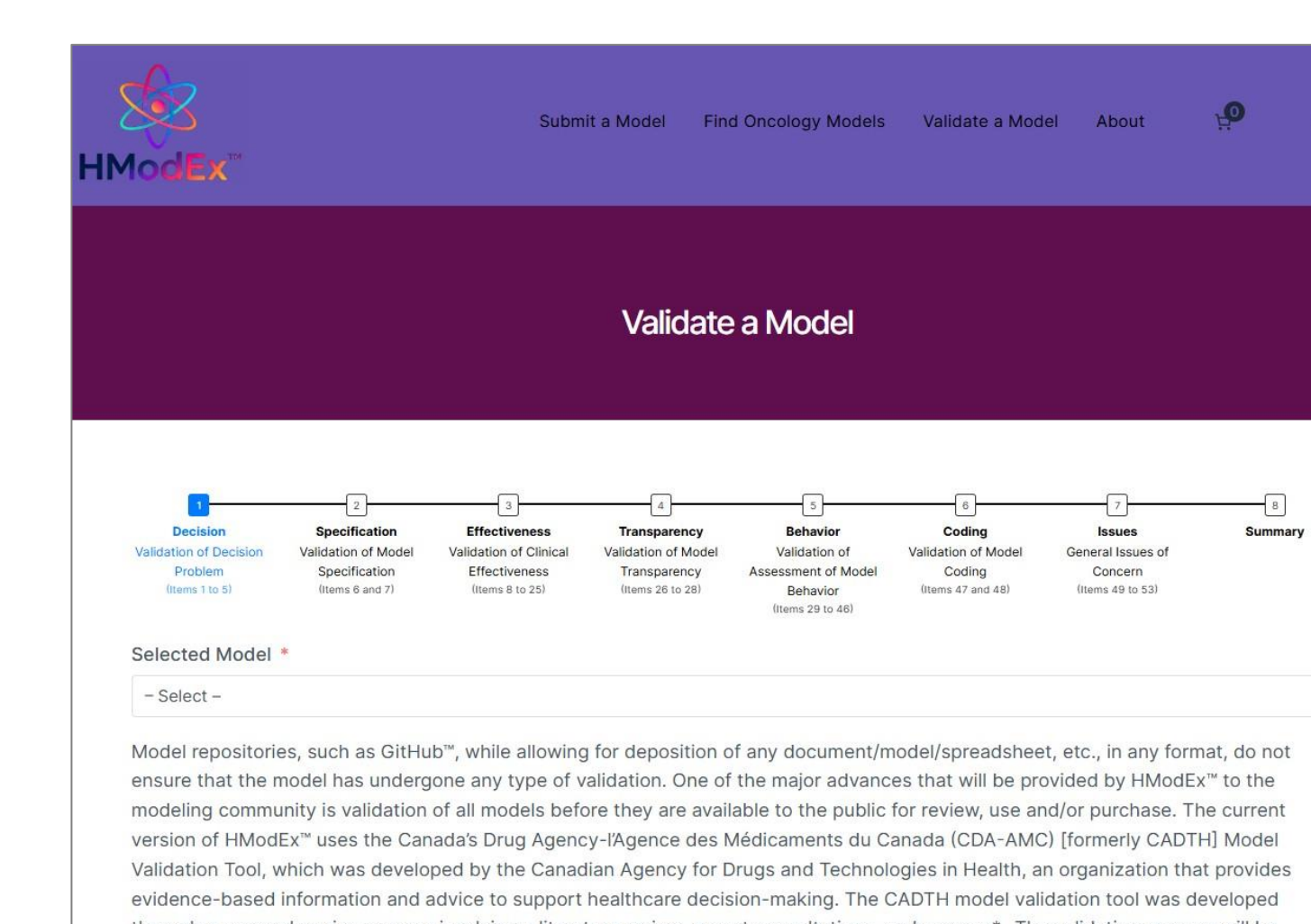
Find Oncology Models
Ontology-driven search with NCIt expansion



Submit a Model
5-step structured upload with metadata



Model Details & Licensing
Integrated licensing guidance for reuse



Validate a Model
CADTH-based 8-domain validation workflow

Key Innovations

- Integrated licensing guidance for model attribution and reuse
- Multi-file model upload with structured documentation
- Embedded CADTH-based validation support (53 items, 8 domains)
- Ontology-driven search using NCIt hierarchical expansion

Conclusions

This web-based platform demonstrated the feasibility of a scalable, incentive-aligned ecosystem for open source HEOR modeling. By combining standardized validation, transparent documentation, and licensing mechanisms, the platform:

- Supported reproducibility of health economic analyses
- Encouraged broader participation and model reuse
- Showed strong potential for improving transparency
- Reduced duplication and accelerated evidence generation

Expert reviewers identified strong potential for the platform to improve transparency, reduce duplication, and accelerate evidence generation in health economics.

Future Directions

- Expand interactive features for model exploration
- Scale evaluation efforts with broader user groups
- Incorporate additional data sources
- Broaden stakeholder engagement to support global HEOR decision-makers
- Integrate with existing model registries and data standards
- Refine hybrid licensing and freemium/premium payment models

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