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AI and Cost Sensitivity Simulators for Healthcare

Huttin CC*
Aix Marseille university, France and ENDEPUSresearch (USA)

***Corresponding author:** Christine C Huttin, emeritus Prof, Aix Marseille university, France and ENDEPUSresearch (USA); Email: christine.huttin@univ-amu.fr, huttinc@gmail.com and chyxinfo@endepusresearchinc.com

Short Communication
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Abstract

This short communication follows a lecture at EWG-MCDA 97th meeting in Athens in April 2024. It examines the possible use of advanced forms of AI- based information system to implement in health systems ,decision policy aiding tools such as the Cost sensitivity simulators proposed by Emeritus Prof C Huttin, using both explicit and implicit economic information on cost of care for critical decision points in clinical pathways.

Keywords: Cost Sharing Research; Artificial Intelligence; Healthcare; Cost Simulator; Disease Economic Model

Abbreviations: AI: Artificial Intelligence; IT: Information Technology.

AI and Services for Health Policy Analytics

The fast development of AI especially in medicine and health care will transform the services provided in the field of decision tools or policy aiding making processes.

This short communication aims to discuss a few issues based on my experience on projects where statistical economic models and their predictive econometrics on several chronic conditions helped also to train future models used in AI, especially with the identification of key parameters.

The prototypes and milestones developed under the academic enterprise called EndepUSresearch has led to series of analytical datasets extracted from administrative health care surveys and comparisons of various approaches to obtain reliable estimates and predictors of utilizations of medical services under different insurance and cost sharing mechanisms.

This paper helps to position the development of an economic model on pharmaceuticals and life science especially after a project on physicians' choice models in collaboration with Prof Jerry Hausman from MIT and IQSS data services from Harvard University on the period 2017-2020.

The interruption due to Covid 19 pandemics created a disruption of the development of additional series of user cases that could be useful to validate preliminary results of the original study using the analytical dataset on diabetes type II. However, this first project is useful since it has set up a framework for interfaces between the team involved for the econometric model and the way to train data models with the key parameters identified in previous series of disease econometric models.

Case Study on Interactions between Disease Economic Modeling and Training in Machine

Learning for Cost Sharing Research

Information processing on cost of care information has usually been performed by medical billing companies or internal resource departments of Healthcare organizations. The development of machine learning tools and AI applications in healthcare also affects the economic

information processed for billing and other types of explicit and implicit financial information (e.g., from transcripts of conversation of care between providers and patients).

The decision tools proposed by Prof Huttin with her academic enterprise EndepUSresearch (e.g. Reversed conjoint or other choice models, Huttin, [1-3]) may benefit of AI advances especially to generate the type of unstructured data on cost of care used as proxy measures of value judgments of providers of care and patients within Human centered AI [4].

At Ispor conference 2021, the C-K design theory and its recent development in policy aiding analytics was used for representation of economic information for choice models in medical markets. The Concept space © is represented by economic concepts such as patient affordability (using economic narratives during conversation of care). The Knowledge space (K) may include prices of products and services, discretionary discount practices, insurance categories and cost sharing profiles. This approach could help to generate measures, complementary to billing information with data elements in conversation of care (e.g., from verbal language between providers and patients). IT platforms or portals will allow evolving designs to assemble in a timely way, according to clinical pathways and disease stage, sets of measures for the Concept of fairness in access to care and patient affordability. It is especially timely in the move towards precision medicine and AI in medical biotechnology [5].

This approach may benefit of machine learning algorithms, since it helps to address limitations of the decision tools such as cost sensitivity simulators proposed in Prof Huttin (2002,2017,2021) on the following parameters:

- Timing for generation of relevant cost information
- Cost of care information (types of additional information useful for critical decision points)
- Attention of providers and patients

Conclusion

The deployment of AI-Based system for healthcare organizations and health systems may facilitate the expansion of academic experiments such as the Discrete Choice Experiments on drug choices [1] on other cases (procedures, vaccines, devices, etc.). Design theories such as C-K theory may be useful for strategic planning, with newest forms of AIs, for Advanced Value Frameworks, facing the diversity of technological innovation. For the cost sensitivity simulators relying on economic and clinical narratives, AI technologies may help to implement economically, wording on economics in multiple languages. Assistive AI based information system may address more rapidly cognitive overflows and other sources of biases, for earlier detection of lack of compliance or adherence due to financial restraints [6,7].

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