IFEDH: Solving Health System Problems Using Modelling and Simulation

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ABSTRACT

Health Technology Assessment (HTA) provides information for decision-makers in the health care system. The consortium IFEDH (Innovative Framework for Evidence-based Decision Support in Healthcare) was formed in order to design a new strategy for the integration of modelling and simulation into the HTA process within limited resources whilst staying open to emerging new technologies. This aim resulted in a framework that consists of a standardized workflow, tasks, methods and good practices. Beginning with formalization of the underlying problem and identification of research questions, the process is followed by data acquisition and modelling and finally ends by generating results for decision support. Visualization and documentation are crucial tasks that support the whole process. Additionally, standards for modelling were defined and new general modelling concepts were developed. All these developments serve as a basis for fast, credible, evidence-based decision support for comparing various technologies in the health system.

Keywords: Health Care System, Health Technology Assessment (HTA) Process, Innovative Framework for Evidence-based Decision Support in Healthcare (IFEDH), Modelling, Simulation

INTRODUCTION

Health technology is one of the fastest growing industries and is relevant for all levels of the population. Strategic decisions influence the healthcare system for upcoming decades, as resources are often interlinked and decisions will have long-term effects. Using modelling and simulation as a tool for decision support is best practice to put decisions on a sound and objective basis. This work is often referred to as Health Technology Assessment (=HTA). These considerations provoked a desire to standardize the role of modelling in the whole decision process.
process and to integrate more sophisticated methods of modelling and simulation in the field of HTA.

The IFEDH project consists of 10 partner institutions from fields in HTA, statistics, modelling, visualization and data management which form an interdisciplinary research group. IFEDH (= Innovative Framework for Evidence-based Decision Support in Healthcare) refers to a set of newly developed methods to support decision making processes in the health system with a focus on Austria.

After a survey of the state of the art and the current situation, processes in the health system were analysed. In the proceeding steps, methods for modelling and simulation, data handling, documentation and visualization were developed. Another task was to find ways to combine these methods, to manage interdisciplinary projects and to integrate results and answers in HTA processes for efficient and credible decision support.

Developed methods were tested in small proof-of-concept projects, which allowed gaining practical feedback, developing concrete strategies and models for specific tasks and resulted in a few publications.

- Different modelling techniques of infectious diseases (Zauner et al., 2010)
- Herd immunity effects in population groups using agent-based modelling methods (Miksch et al., 2010)
- IFEDH member research on serotype behaviour modelling for infectious diseases and vaccination strategies (Zauner et al., 2011)

STATE OF THE ART

The IFEDH research project began with an evaluation of the status quo, which consisted of three tasks:

1. Documentation of standards in modelling and simulation in the field of health technology and health system evaluation
2. Documentation of standards in HTA that describes the standard procedures as well as the methods used and their limitations. Expert opinions and a structured questionnaire are used in order to establish the state of the art in Austria and neighbouring countries.
3. Documentation on problems that have been identified in earlier projects conducted by project partners using modelling and simulation in the health system. For each problem, it includes applied solutions and a discussion on a general application of the strategy.

This first step provided the basis for the formulation and realization of the second step, the definition of demand profiles for modelling and simulation in HTA.

The definition of a mutual language is key to the success of this interdisciplinary project, bringing together, as it does, partners from different fields who have to work together and understand each other. Both the development process and the resultant service are dependent on the ability to successfully so. Hence, a glossary was compiled on the basis of international definitions and formulations used by the individual project partners. To guarantee the glossary’s constant currency, this document is defined as an open document type that is continually expanded by the partners throughout the entire project period. Inconclusive or “parallel” formulations are discussed by project participants from different domains and the consensus decisions are binding for all partners.

The compilation of requirements for the model structure and documentation of simulation outputs mark the final step of the first project phase. The essentials are determined in order to ensure an efficient modelling process in which the models subsequently do not have to be changed too frequently.

HEALTH SYSTEM PROCESSES

Knowledge of the health care system is essential for understanding background of HTA.
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