

# Health care system of the future modelled

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What will our health care system look like in the future? The MEDPRO project of the Austrian Science Fund FWF seeks to deliver answers to this pertinent question. The project is analysing the interrelationship between medical progress, health expenditure and population ageing. The findings are fed into a new computer model that simulates the economic consequences of changes in health care under various theoretical assumptions.

Predicting the future is hard. But that is exactly what a FWF project team is endeavouring to do – at least in one specific area: they are developing a realistic model which can simulate how medical progress, [health care spending](#) and the age structure of a population interact and how this shapes the development of health care and economic performance.

## Much debated, little understood

"The interrelationship between medical progress, [health expenditure](#) and [population ageing](#) have long been a focus of political and academic debate," comments project leader Michael Kuhn from the Vienna Institute of Demography, part of the Austrian Academy of Sciences. "So it is all the more astonishing that so little is actually known about crucial aspects of how the three factors influence each other. We are therefore studying this and creating computer models which enable predictions to be made about how the health care system may develop under various conditions." The initial focus is on identifying the dynamic relationships that influence the health care system in general. In particular, the team

will analyse the incentives that motivate players within the health care system to fulfil their respective functions. Building on this, they will analyse how these incentives are shaped by health policy.

## Knowledge & money

"Assume a newly developed therapy is made available, such as ion beam therapy for the treatment of cancer. This creates an additional incentive for people to use health care services," says Kuhn, explaining the work of his team with reference to a specific example. "The increased effectiveness of the health care system reduces the mortality of the population. This, in turn, has various macro- and micro-[economic consequences](#), which is what we are calculating." In fact, Kuhn's team has simulated such a scenario to produce one of its first case studies. They were able to identify a number of clear impacts on the economy. For instance, it seems that new forms of therapy make people spend more money on health care – at the expense of their spending on consumer goods. The extent of this shift in the use of household income depends crucially on the price changes associated with the medical innovation. Furthermore, the findings show that people are typically more willing to save for purchasing more effective health care in old age.

## Complex generational framework

Findings such as these illustrate the complex relationships that exist between individual utilisation of health care services and the economy as a whole. Another challenge involved with simulations of this type comes with the fact that health care decisions vary greatly over the life course. Thus, the age structure of the population is a crucial factor in realistically simulating future scenarios. As Kuhn explains: "That is why we base our model calculations on overlapping generations. A very

realistic assumption, given that every society is composed of several generations living together side by side." Their age structure, on the other hand, depends on the extent to which society makes use of health care services and what range of medical innovations is available – which makes the interaction between the factors Kuhn and his team are studying increasingly complex.

## In demand

One of the team's key objectives is to identify the demand for health care services that exists in every generation and at every stage in a person's life. By considering overlapping generations, the scientists are able to calculate the total demand for health care services within an economy. The demand for [health care](#) feeds into a demand for medical innovation that is served by a research sector, the whole system being subject to health policies. Thanks to the progress made in the MEDPRO project, the outcomes resulting from this interaction can now be calculated, depending on the particular circumstances. For different scenarios of a growing or a shrinking population and for different policy variables, including e.g. health insurance, the patent system or hospital regulation, the computer model will supply decision makers with important insights into the consequences of their policies.

Provided by Austrian Academy of Sciences

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