

PART III

**FROM THEORY TO PRACTICE: USING MEDICAL
ECONOMICS TO IMPROVE GLOBAL HEALTH**

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MEDICAL ECONOMICS: AN APPLIED INTERDISCIPLINARY SCIENCE THAT LOOKS AT EVIDENCE, CONSIDERS COMPLEXITY AND IMPLEMENTS WHAT WORKS

In the first part of the book, we described health, healthcare and the healthcare system. In the second part, we introduced health economic theory, which is usually based on neoclassical economic theory, and discussed whether this is the appropriate theoretical framework for thinking about health. In this chapter, we introduce the concept of medical economics. We move from mainstream *health economics*, with its overwhelming focus on economic thinking and methods, to the integrated approach of *medical economics*, which marries different thoughts, concepts and theories from both the medical and the economic perspective.

In essence, the dominant neoclassical school of economics builds on a collection of self-interested individuals in a world devoid of history, politics, institutions or power, apart from the market power of monopolies and the coercive power of governments. All analysis begins with the assumption that economic decisions reflect individual preferences and free choice. Competitive markets are seen as the natural form of economic organization and one to which all societies should aspire, independent of their socioeconomic structure and history. In such competitive markets, free individuals can work or reject work, buy or decline to buy and, by definition, exploitation is impossible. Taking up a low-paid job is an individual's decision; indeed, she may choose a better-paying job or no job at all. "Consumer behaviour" is analysed without mention of advertising pressures and all companies are merely firms, irrespective of their size and corporate power.

The vast majority of health economics textbooks are written by economists (only a handful include a medically qualified person as (co-)author, e.g. Bhattacharya *et al.* 2013) and usually start with the core assumptions of individualism and free choice, do not address issues of structural power and the impact of socioeconomic class and pre-existing medical conditions, and separate economic questions from social and political ones – reflected in the terminological move from "political economy" to "economics".

In this chapter we propose a specific way of applying economic thinking, which we call *medical economics* because it imitates (to an extent) the way medicine analyses its subjects. Medical economics is an interdisciplinary and integrated approach in which

medicine and health sciences, political science, philosophy, quantitative and qualitative analytical tools of the social sciences and economic thinking intertwine and provide inputs from different specialties and forms of inquiry. Medical economics is a practical and applied science and is closely linked with health policy, generating data and conceiving and implementing health reform. Finally, medical economics accepts health and healthcare as highly complex phenomena that require non-linear and flexible mindsets. Qualitative analysis and case studies are some of the elements used to deal with the complexity involved.

15.1 Applying the logic of medicine in medical economics

Many people, when first confronted with health economics, reflexively respond that medicine is special or different, and that people's pain and suffering should not be subjugated by the quest for (more) profit. They feel that there is an inherent conflict between medicine and economics and that the ethics of care should not be tainted by money or the profit motive.

Such a reflex, although noble in origin, falls short of coming to grips with a number of important facts. Healthcare constitutes a major part of a country's economic system; it consumes anywhere between 2.5 and 17 per cent of GDP, employs a significant part of the workforce and the total money involved might run to billions of dollars. Doctors, nurses and other health professionals have to make a living; although certainly motivated by an intrinsic desire to help, there is also the need to generate a reasonable income and, for the owner of a private practice, to pay off loans for investments (such as for medical equipment) and to pay for staff and running costs.

Two Irish public health physicians, Petr Skrabanek and James McCormick, argued that the purpose of their (1989) book was to induce "septicaemia" in its readers. They defined septicaemia as "an uncommon generalized disorder of low infectivity", from which a "[m]edical school education is likely to confer life-long immunity". Economics might be an effective measure to prevent such immunity.

Challenges beset any form of government intervention in healthcare; bureaucratic inertia, institutional interests, lack of incentive to provide good services and corruption all need to be addressed. People often have high expectations and demands when they need care, not all which can be met. The questions of to what extent healthcare services should be free at point of service – paid for by society – and what level of direct OOP payments by patients themselves is acceptable must also be answered.

Economics has a lot to offer when thinking about these challenges and, in fact, everyone involved in thinking about and planning for healthcare should at least have a basic understanding of some theoretical concepts and empirical findings of economics. Medical economics follows (to an extent) the way medicine analyses its subjects. Medical

Table 15.1 The general structure of medicine based on anatomy, physiology and pathophysiology

<i>Topography</i>	<i>Microscopic anatomy</i>	<i>Physiology</i>	<i>Pathology/ pathophysiology</i>	<i>Disease entity/ diagnosis</i>	<i>Therapy</i>
1. Head					
1.1 Brain	Different types of brain cell	Neurological functions (in different areas of the brain)	Stroke, injury...	Dementia (Alzheimer's disease, ...), palsy, ...	
...					
2. Internal organs					
2.1 Heart					
...					
2... Pancreas	Langerhans' cells	Produce insuline	Destruction of cells leads to loss in insulin; blood glucose rises...	Diabetes Type I	Diet, insulin (pump)...
...	...				
...					

thinking starts with the anatomy of the body, moves on to physiology, then to pathology and pathophysiology and then to clinical diagnoses and treatments. It is basically a tree structure (shown as a table in Table 15.1).

Starting in the sixteenth century with Andreas Vesal, moving on with Leuwenhook and the microscope and then to physiology, pathology, microbiology and specific therapies, medicine worked its way from left to right of the table. Although macroscopic anatomy was known in Egyptian times, microscopes were invented much later. Hans Langerhans described the pancreatic islands that produce insulin in 1869. The first therapy was introduced 1922 by Frederic Banting and Charles Best.

So, Table 15.1 explains how Type I diabetes therapy was developed. First, medics studied the pancreas anatomically. Then they better understood specific cells. Then they noticed that, in Type I diabetes, insulin is missing. Finally, they produced insulin for their patients. This approach might also be applied when looking at the structure of the health economy itself (see Table 15.2).

The health economy consists of industries in the same way that the body consists of organs. Industries can be further divided into branches. If we take the ambulatory care sector as an example, a part of it is ophthalmology. Without going into detail, ophthalmology can be further broken down into the different diseases that need cure, the service providers (ophthalmologists, opticians, nurses, etc.), and the sources of funding (direct payments, national health insurance, supplementary private insurance, external funding). Understanding how this specific “market” works is challenging and involves considering health-seeking behaviour, the number of available providers (market entry)

Table 15.2 Applying the logic of medicine to the economics of healthcare

<i>Industries</i>	<i>Branches</i>	<i>Physiology</i>	<i>Pathology/ pathophysiology</i>	<i>Disease</i>	<i>Therapy</i>
...					
x. Health					
x.1 Hospitals					
...					
x. 2 Ambulatory care	Ophthalmology	The way the eye services work	Disorders of service provision	Supplier- induced demand	A mix of improved professional attitude, astute reimbursement, patient involvement and quality management
x.3
...					

and the way prices are set and addressing questions related to quality, complaints and conflict resolution.

In the German market, the number of eye doctors available to treat patients covered with the statutory health insurance is defined by the *Kassenärztliche Vereinigung* (Association of Statutory Health Insurance Physicians). So far, there has never been a disease- or demand-based analysis of the needs of the population; nor has there been a review of the supply of services (both ambulatory and hospital care). It is not clear whether there is an over- or under-supply of ophthalmologic services or whether the services meet the needs and demands of the patients. The reasons for this omission are threefold: first, planning instruments that would take real demand into account are missing and data are not easily accessible. The data that exist are mainly administrative and controlled by sickness funds, and knowledge about optimal treatment paths lies with scientific societies in the field of medicine, which are less interested in public health and planning issues. Second, providers do not like radical changes in planning because, for example, certain hospitals may become obsolete in the process. In fact, providers show little interest in undertaking such analyses. Third, as discussed in Section 2.1, there is the challenge of defining need and demand. There clearly is a need for identifying and treating children with strabismus (a squint or cross-eyes) early in life, which should therefore be met by some form of planned service. There are also a number of people who wish to have a lens correction because they do not like wearing glasses, and such demands may best be responded to by market forces.

The point is that a concept such as “principal–agent theory” (see Section 10.2) may be very useful but it does not teach us much about real markets. What is needed in addition is a description of national (healthcare) markets in much greater detail than is currently

available in economic textbooks. This, we believe, would be a fruitful endeavour for economic science and would provide a solid factual basis for further research and policy recommendations.

15.2 The interdisciplinary nature of medical economics and the uses of economic thinking

In an interdisciplinary environment, it is important to insist on the precision of the basics, especially when technical vocabulary is widely used, such as terms like cost, utility, quality, public good or market.

A decision to change the way healthcare is provided and financed should be informed by the available evidence and accompanied by the generation of more evidence on whether change will lead, or has led, to improvements. “It is curious,” the late British health economist, Alan Maynard stated in 1990, “that the debates about the design of healthcare systems worldwide are dominated by assertions and almost religious beliefs to the exclusion of construction of hypotheses and their testing by careful collection of data” (*The Telegraph* 2018).

Such thinking is similar to the idea of “evidence-based medicine”, which David Sackett, one of its most prominent exponents, describes as “the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients” (Sackett *et al.* 1996: 71). The idea is based on identifying, disseminating and, most importantly, applying research that is properly conducted and clinically relevant. This was (and, in parts, still is) a revolutionary approach in a profession that emerged from a tradition of handing down practice, respecting clinical experience and seldom questioning superiors on the grounds upon which a clinical decision is made.

Jeffery Pfeffer and Robert Sutton (2006: 63) promoted the idea of “evidence-based management” about 10 years ago, as they saw similarities between clinical and management decision-making: “The same behavior [of doctors] holds true for managers looking to cure their organizational ills. Indeed, we would argue, managers are actually much more ignorant than doctors about which prescriptions are reliable – and they’re less eager to find out.”

“Evidence-based health policy” might be an appropriate term to describe how certain changes in the way healthcare is organized and financed would affect the health status, responses to need and health expenditures of the population. Health economics is an important field of academic inquiry and reflecting on its theoretical foundations may help in the development of concepts and application of instruments for evidence-based policy and management. As in other areas of politics, medical economics would be useful were there a need to assess the costs involved in any new health policy. These costs should not only be those borne by government; rather, all relevant costs should be

included that are affected by such a policy. In addition, any such studies should adhere to defined standards of scientific quality and should ideally be systematically initiated and coordinated, for example by a “chief evaluation officer”. A major benefit might be that positive evaluations would support the continuation of a programme even in the case of political changes. An example could be the transition from one reimbursement scheme to another, for example from per diems to DRGs in paying hospitals. This could be an excellent opportunity to deploy the well-developed methods of empirical research and econometrics to evaluate the effects of such a defined policy change.

Transforming concepts into policy

The basic concepts applied to designing health delivery and financing are well-established, and much useful advice has been produced by international organizations, funding agencies, academia and NGOs to help in conceptual thinking, defining benchmarks and outlining experiences elsewhere that can assist in developing and implementing a particular country’s health policy.

The challenge lies in finding a solution that is tailored to the history, technical capacity and needs of that country. The concept of “path dependency” (see Section 7.1) is useful here, as it describes the norms and behaviours formed by cultural, social and historical developments that influence which policies will be successful and which might have a higher chance of failure. According to Cumming (2015: 287):

The 1990s reforms demonstrate, however, how an emphasis on internationally developed health economics theories to design a health system can lead to major problems, especially where local context, values, costs of change, and political factors are not adequately considered. These reforms cost New Zealand significant sums of money, distracted the sector’s attention away from key issues, and have been shown to be detrimental to health outcomes. The reforms have left a legacy of a major aversion to significant organizational reform in the New Zealand health sector that is still evident today.

This statement shows how important it is for each country to find its own specific mode of delivering and financing healthcare with a system that strives for quality, equity and efficiency. Furthermore, in health policy debates, participants often point to the predominance of a certain problem (lack of drugs, insufficient manpower, outdated IT structures, etc.) assuming that, if a particular problem were to be solved, then the healthcare system would have made a great step forward. There are two problems with this “single issue” thinking. The first is that it neglects the interdependencies between the different parts of a healthcare system: certain measures (such as a single-purchaser system) can counter-balance certain issues (such as the price of drugs) but at the same time lead to problems

of responsiveness, if no in-built mechanism exists to mitigate this. The second is that it creates almost insurmountable hurdles by defining the “one and only” problem, which usually appears to be completely insolvable. Focusing on one problem only obfuscates possible solutions and astute step-by-step approaches.

Political economy may be of use here by identifying those profiting from any existing arrangement and those who might win if rules were to be changed. For example, let us assume that a particular country’s national social health insurer is allowed 12 per cent of contributions and 3 per cent of investment earnings as an administrative cost. Thus, there is a powerful incentive for the organization to attract members and collect revenues – perfectly in line with national goals. However, unspent revenues will go into investments and earn interest – and 3 per cent of this money will be included in the administration ratio for an insurer, which clearly provides an incentive to not spend money on benefits.

The advantages of rigorous analysis: the health economics of old age

When weighing goods and discussing costs and benefits, health economics can add value to the debate. Health economics demands rigorous and clear arguments regarding the criteria that guide programming and investment decisions, and it might also point out irrational behaviour because it indicates flawed thinking, such as in the case of the health economics of old age. A simple descriptive statistic about the cost of care in relation to age shows a steep increase of those costs in the elderly population, as depicted in Figure 15.1.

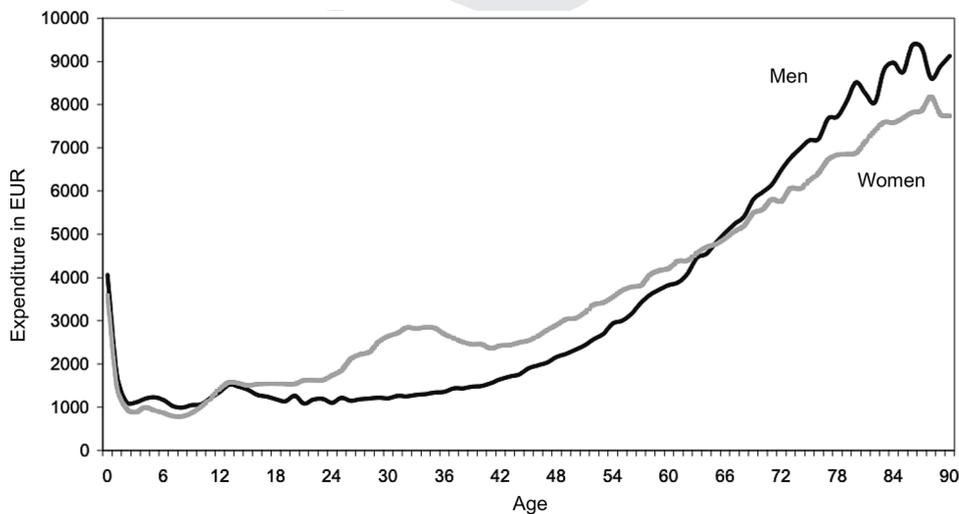


Figure 15.1 Standardized healthcare spending by age

Source: Based on Wissenschaftliches Institut der PKV (Scientific Institute of Private Health Insurance), www.wip-pkv.de/fileadmin/DATEN/Veroeffentlichungen/Auswirkungen_des_Alters_auf_Gesundheitsausgaben.pdf

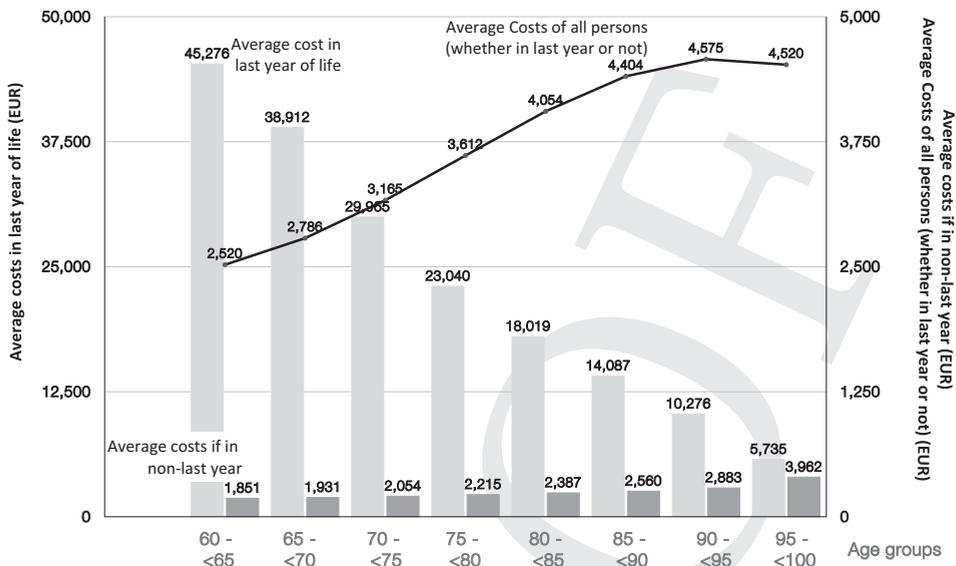


Figure 15.2 Annual healthcare spending per person in different age groups, in euros – differentiated by survivors and non-survivors
 Source: Based on Henke and Reimers (2006: 9)

However, higher spending for the elderly is mainly because a higher percentage of them die. Figure 15.2 differentiates between people who survived a respective year and those who died. For example, a 60-year-old who dies in the year of analysis incurs costs of €45,000; if he survives, costs are only €2,000 (on average). So, it is not age as such that drives costs – rather, dying is expensive. As society gets older, costs increase due to the cost of dying. People die only once.

In their seminal paper on the relationship between age and health expenditures, Zweifel *et al.* (1999) convincingly argued that the seemingly disproportionate consumption of healthcare by older people is due to the fact that older people die more often and, as the cost of care shoots up in the last months before death, these costs distort the simple descriptive statistic. This is known as the “red herring hypothesis”; that is, hospital expenditures are driven by the occurrence of mortal illnesses (or the remaining time to death, hence sometimes called the “time-to-death hypothesis”) and not by patients’ age itself.

The useful challenges of economic thinking

Healthcare cannot simply be managed by assigning property rights and leaving the rest to the market. The high level of uncertainty, the uneven distribution of “health” to individuals,

and the strong notion of a human right to health places healthcare in the realm of political discourse and government action. All too often, public health advocates make the rather blissful assumption that public health is a public good that only governments can efficiently provide. Such an assumption is difficult to maintain in the face of the work of public choice theorists and economic practitioners indicating that rent-seeking behaviour, corruption and bureaucratic inertia plague healthcare on a massive scale.

Rent-seeking (see also Section 3.2) refers to an effort to secure a regular income without delivering a corresponding value. As mentioned above, any mandatory scheme without the possibility of an opt-out bears a high risk of rent-seeking behaviour. Mançur Olson worked on rent-seeking by organized groups. He postulated that, over time, all political systems succumb to sclerosis and fall under the control of organized special-interest groups and their rent-seeking activities. Given that any national health financing scheme needs to be mandatory, there is an inherent risk of rent-seeking. One solution might be to set up a number of competing health insurers.

The idea of selfless, hard-working administrators and politicians, always with the good of the people in mind, is clearly idealized. Of course, there are such people, and any society is fortunate to have them, but a significant proportion of administrators and politicians are clearly not selfless and interested in the good of the people. We have come to accept as “inevitable” that services such as water supply or sewerage systems are key functions of government. Making the government responsible is a useful way of providing these goods in good quality at reasonable prices, but that does not mean they should not be open to scrutiny or that markets might play a greater (or smaller) role.

This leads to the issue of corruption. As stated above, corruption in the health sector reflects a general problem of governance and public sector accountability. The health sector appears to be particularly vulnerable to corruption due to the high degree of information asymmetry, an inelastic demand for services, the high degree of discretion given to providers in choosing services, and generally low productivity in public systems with little or no competition or external accountability.

Institutions, despite their many laudable and necessary roles, might be responsible for widening societal inequalities. A common response to failing government institutions is to either add more rules and regulations or create another institution. The cost of compliance with such rules and regulations, of following the minute details of filling out yet more forms, itemizing reimbursement claims or seeking approval carries the risk of using significant amounts of providers’ time, which then cannot be spent with the patient. The key to keeping such developments in check is a solid database coupled with a good understanding of the role of institutions in improving or sometimes worsening equality and the effective and efficient delivery of adequate health services.

It is not clear whether market solutions might work better, but it is certainly worthwhile studying in more detail where market elements, astutely used, might improve the provision, financing and quality of healthcare. This leads to the question of ownership

and governance. In addition to public institutions and private market entities, there are advocates of what is often called the “third way”. This third way denotes those entities built on voluntary, non-market cooperation between individuals; a typical example is a housing cooperative. In fact, the German social health insurers were initially designed as (and still are) “cooperatives under special state protection”.

Voting with your feet and being able to make choices, in principle, should offer a better understanding of what people want. To take the question of how much money should be spent on healthcare, there are no normative values available that are based on sound research. WHO has come up with a figure of 5 per cent of GDP and the famous Abuja Declaration (see Section 5.1) argued that at least 15 per cent of government spending should be on healthcare. While not denying the effort and well-meaning and diligent thinking behind these figures, there is no compelling data that support these (or any other) normative statements. A key pursuit of economics (in particular, public choice theory) is addressing the question of appropriate aggregation of individual preferences, which the market so wonderfully provides – if the market works.

Government intervention today is based on the notion of (human) rights – in contrast to earlier government interventions, which started from the duties of the individual. Surely, the notion of human rights is a major civilizing development and living in a society that denies no one some form of essential healthcare should make one proud. The question is, however, how far should such “essential” care go and to what extent should society demand something in return? The question of responsibility for one’s own health reasserts itself here and, again, this brings us back to the more fundamental question of underlying value statements and assumptions.

To what extent can (and should) we expect people to take health (and healthcare) decisions into their own hands? Is it reasonable to assume that people are consciously trading off life years for other goods? This notion can be extended all the way to whether society should interfere with a person’s wish to end his life. None of these questions are easily answered, but what is clear is that they require a cautious and nuanced approach, balancing different interests and values.

Another key contribution of health economics lies in helping to define “value” in healthcare. The traditional symptom and disease- or pathology-oriented definition of what constitutes health and illness is increasingly complemented by patient-reported outcomes and health-related quality-of-life (based on experiences or preferences) in order to achieve a broader understanding of the value of healthcare.

Such a concept of value also goes beyond the individual and considers societal preferences when distributing healthcare because when “society pays, society decides”. Besides using outcomes for allocative decisions, outcomes may also be used to improve the management of healthcare by providing reliable and meaningful data for analysis, classifying patients, designing interventions, setting appropriate incentives and evaluating services.

A word of caution

Whereas economic thinking can be eye-opening, provide intellectual stimulus and also add substantial value to the healthcare system, the parsimonious approach inherent in *homo economicus* does not suffice. First, although parsimony may be good for explaining phenomena and enabling forecasting, it certainly does not provide a good yardstick for a normative discussion about how healthcare systems and health policy ought to be designed.

Second, numerous studies indicate that the assumption of rational utility-maximization actually does not explain well the outcomes of social interactions – using theories of other-regarding preferences (individual preferences that are concerned with the welfare of another person, such as a parent’s concern for her child) and bounded rationality provide better predictions of aggregate behaviour than does neoclassical reasoning. In addition, given that institutional rent-seeking and dysfunctional regulation are important aspects of most healthcare systems, one can assume that there are a significant number of unproductive positions in the system (include health economists here), profiting from it and hence being very biased in their approach to analysis and in discussions on reforming the system.

Finally, health economists (like any other scientists) should display humility and a willingness to be proven wrong. These two attitudes of modern western intellectual tradition, which go back to Socrates (who expressed humbleness) and Descartes (who contemplated being mistaken) and hence debate (or discourse) are essential and there is always the risk that an argument put forward is essentially flawed. The medical profession has experienced being wrong numerous times: The fact that 95 per cent of all researchers in a discipline subscribe to a certain theory does not prove that it is correct. After all, 200 years ago most physicians thought that the female brain was incapable of serious scientific study. History has clearly proven otherwise.

15.3 Health policy, data and health reform

Health and healthcare reform can be described as a permanent deliberation process within a society, a balancing of conflicting interests and a battle against inequality and the rent-seeking behaviour of well-organized interest groups. What role is there for science and theory in this?

Basing policies and possible implementation on available “scientific” evidence is an oft-made request. Although a laudable request and in principle clearly warranted, current scientific discussion has moved little beyond initial forays and first well-designed studies.

The scientific attitude toward unknown phenomena is based on systematic and controlled measurement, a transparent mode of experimenting and observing and a general

openness to being proven wrong (philosopher Karl Popper's paradigm – although evidence suggests that scientists would like to prove that they are actually right). Evidence-based medicine (EbM) has had a major impact on the way in which clinical medicine is conducted and taught and is a strategic form of coping with huge amounts of information while trying to minimize bias.

Transferring this approach to health policy meets some formidable hurdles: (1) there is a dearth of evidence on systematically assessing health policies; (2) generally, there is no direct political authority to instruct the major stakeholders in a healthcare system – as a doctor might tell a patient to take a certain medicine at a certain dose; (3) the complexity and broader budgetary perspective makes it difficult to isolate variables and assess causation; and (4) the existence of non-standardized policies does not allow for subjecting large numbers of people to standard interventions in a manner that supports measurement of effects.

Given these hurdles, it is not surprising that, to date, the status of evidence-based health policy is weak and even the most pressing and repeatedly posed questions can at best be only partially answered. Several systematic reviews have concluded that their evidentiary base is too weak to draw inferences, even in such hugely relevant areas as community-based health insurance, conditional cash transfers, user fees or performance-based payment schemes.

Overall, more research is needed into what works, what does not work and why, with respect to quality, outcomes, cost and equity. While ultimate goals are almost impossible to attribute to specific reforms, intermediate goals can be assessed more readily, but remain intermediate outcomes. Roemer (1991: 103) defines a healthcare system as the “combination of resources, organization, financing and management that culminate in the delivery of health services to the population” and identifies five major building blocks: (1) production of resources, (2) organization of programmes, (3) economic support mechanisms (i.e. sources of funds), (4) management methods, and (5) delivery of services. For the analysis of whole systems, WHO uses four principal “functions” (stewardship, resource creation, service delivery and financing) and three principal objectives (health, fair financial contribution and responsiveness to people's non-medical expectations). Roberts *et al.* (2004) identify five “control knobs” for health reform: financing, payment, organization, regulation and persuasion.

As these different conceptual approaches indicate, the goals of healthcare systems can be quite different. Economic efficiency is a non-normative term and economists need normative goals (that emanate from society) in working towards efficiency.

In many instances, using the market as an allocation mechanism in healthcare is not feasible, and other mechanisms need to be found to achieve allocative efficiency. The major challenge from an economic point of view is defining and measuring the non-market allocation of goods and services. The outcome of a market transaction, if it occurs in a balanced and non-coercive manner, is by definition optimal, thus there is little need from a policy perspective to measure results. If, however, the market is not functioning well and is replaced

(or at least complemented) by state intervention, there will be a need to measure the result of such interference. In the case of healthcare, the parameters could be derived from an understanding of what a healthcare system is supposed to provide: better health, financial protection and responsiveness to the needs and demands of the population served.

Timely and accurate data is also crucial for ensuring that systems of social protection are operating correctly and are adequately resourced. It is very important to make sure that everyone who should be covered by a specific programme benefits from it, and that no one who should not be covered receives such benefits. This is the challenge of targeting. Thus, high quality operational data and good management information systems are vital. In an ideal world, one would like to see real-time data and at the level of the individual household, appropriately condensed to key indicators, which would then be displayed via a dashboard (a type of graphical user interface which often provides at-a-glance views of key performance indicators) to policy-makers, administrators and civil society alike. This, however, is not possible (for both technical and data privacy reasons). As such systems evolve, they can incorporate elements of modern operational analytics – fraud detection or tailoring of specific market interventions to the most appropriate groups.

Health (financing) institutions at the national level are always large and complex and handle significant budgets. Thus, monitoring of the flow of funds and its uses is essential. Today's culture of measuring, benchmarking and evidencing will not end when it comes to developing a new mode of healthcare financing. This is a powerful approach to steer activities and gain political support, but also to terminate activities detrimental to intended goals. A mix of qualitative and quantitative approaches needs to be found that captures the most important aspects when implementing any fundamental change in financing healthcare. Some possible monitoring indicators are listed below. Monitoring needs to be "lived" in the sense that, in the case of parameters going beyond certain thresholds, mechanisms should be in place to counteract this situation. It would be useful to develop a common understanding of which indicators to use, how to measure them and how to react to unforeseen changes. In addition, the extent to which such evaluation can make use of existing instruments such as a health management information system, household studies, sentinel surveys and integrated disease surveillance, as well as the information systems of vertical disease programmes, needs to be explored:

Coverage. Who is covered by which type of scheme, the geographic or socioeconomic distribution and coverage of specific groups (children, mothers, etc.).

Access. Geographical access (e.g. percentage of the population living close to a health institution), utilization by socioeconomic status, outputs and health indicators.

Affordability and financial burden. National health accounts and financial flows, total public healthcare expenditure, total OOP payments and catastrophic expenditures.

Governance. Structures – processes – outcomes, geographic and administrative comparisons and the role of incentives and pay-for-performance.

As mentioned in Chapter 11, the Global Burden of Disease (GBD) project developed the DALY (disability-adjusted life year) to quantify the burden of premature mortality and disability by age, sex and region. The GBD project aims to provide a coherent and comprehensive set of indicators to measure public health conditions, which may then be used to hold policy-makers to account. The success of this enterprise, backed by influential funders and medical journals, stems from its emancipatory thrust, and the widely perceived need to measure. The impetus stems from Lord Kelvin's widely quoted dictum: "If you cannot measure it, you cannot improve it."¹

There is a clear case for developing such comprehensive global data as a global public good to be provided for discussion and decision-making. However, health metrics are also always a political matter and thus require transparency and legitimate leadership and governance. One concern has been voiced about the imputation methods and the way that estimates are generated. Given the paucity of solid data in many parts of the world, these techniques are crucial in deriving data. Another criticism is the risk of crowding out national health information capacity by providing externally generated data seemingly much faster and better than that generated in-country. Beyond these technical aspects, a more fundamental anthropological and philosophical debate concerns the "western" mode of describing and categorizing the world, including the health of its inhabitants – and the inherent power that comes with knowledge. Finally, any metrics based on the creation of categories should essentially be considered a contingent matter of knowledge.

During the early months of the Covid-19 pandemic, data about the spread of the disease came from the Johns Hopkins University in Baltimore. Whereas there is nothing inherently wrong with tasking a single institution with collecting and disseminating data in order to adhere to uniform standards and improve cross-validity and overall quality, such a single source approach exemplifies the concerns discussed above.

Social progress needs good data. Given the power of data, any such endeavour needs to take into account broad governance, national needs and anthropological, social and philosophical views.

Health reform

Health policy is under constant pressure to evolve in response to demographic, economic, social, medical-technical and political changes. However, if action is taken and

1. Actually, the full quotation is, "I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science, whatever the matter may be", in his lecture entitled "Electrical Units of Measurement", 3 May 1883, probably going back to the nineteenth-century French economist and mathematician Antoine-Augustin Cournot.

reforms initiated, they are usually met with fierce resistance. Health policy is a difficult, conflict-ridden and emotional political issue – and, at the same time, a highly technical field involving a high level of complexity and sometimes strongly divergent interests of multiple actors.

Despite all this, there is still potential for blockading: health policy remains a field with many powerful interests and (sectoral) care structures. It is of interest to note that, unlike in other policy areas, European Union (EU) regulation does not significantly contribute to health policy, as social security systems are still organized on a national level. The nearly universal constant reform efforts in the field of health are thus not necessarily the expression of policy failures. On the contrary, they reflect both the ongoing pressure to adapt to new developments and the structural peculiarities of the field. Political economist Uwe Reinhardt nicely summarized the unattainable ideal of a comprehensive and “final” reform when he stated: “There will always be health reform and the last one has failed” (2019: 2). Interests of the stakeholders in the healthcare sector are almost by definition different and occasionally outright contradictory, so it is not possible to find a complete solution. Any new regulation redistributes income and power – so progress is slow and will inevitably meet resistance. A major conceptual discussion that always needs to take place is the balancing between a radical shift – a “big bang” – and a more evolutionary “working at the margins” approach to healthcare and health financing goals.

It cannot be over-emphasized that healthcare reform is as much a social and institutional undertaking as it is a technical one. Although experience shows that, in many instances, the relevant responsible authorities are willing and able to initiate far-reaching reform, changes in the financing and delivery of healthcare need to strike a fine balance between technical and managerial push for change and due deliberations and consultations with the general public and healthcare providers.

15.4 Managing complexity

Medical economics is based on an understanding of systemic thinking in a highly complex system: each element is linked to everything else so, for example, when thinking about financing health, the issues of provider payment, quality, access and performance measurement need to be taken into account as they will inevitably be affected by the mode of financing and vice versa. The conclusions of systemic thinking are often somewhat general: try to keep as many aspects as possible in mind, focus on relationships and the local context, be open to the unexpected (non-linearity), work with a lot of feedback loops, assume self-learning of a system and adjust as you go along. Essentially, such thinking requires a shift from teleological analysis with mono-causality, continuous improvement and moving towards a well-defined goal to an understanding of emergence, with its inherent multi-causality, permanent change and development in multiple directions.

This change in thinking needs to be accompanied by fact-based, non-prejudicial analysis: things are per se not worse or better, they are just the way they are.

Complexity and emerging phenomena are dynamic, fuelled by globalization and exponentially exploding knowledge, and lead to more options and generally more freedom. However, they might also cause significant stress and insecurity from more questions, more discontinuity and less (feeling of) control.

Indeed, complexity economics evolved from the insight that economics is essentially a complex adaptive system; it uses methods from complexity science to better understand and deal with economic issues. In contrast to behavioural economics (the proponents of which mostly accept standard neoclassical theory), complexity economics proposes a radically different approach by starting from different assumptions (non-linearity, for example), asking different questions (moving away from controlling and managing) and using different methods (e.g. network theory, mathematics of non-linear systems). Complexity economists stress the importance of the individual situation and emphasize that, essentially, no universally applicable recipes can be used in social and economic policy. Phenomena like demographic change, migration, globalization through digitalization and connectivity all substantially affect health and healthcare and require new paradigms.

The idea of paradigms and paradigm shifts is attributed to Thomas Kuhn (1962), who described scientific work within a prevailing framework of thinking (or paradigm) and a fundamental change in the basic concepts and experimental practices of a scientific discipline (paradigm shift). Paradigm shifts characterize a scientific revolution – the idea of evolution as trial and error coupled with natural selection rather than a goal-oriented improvement; for example, introducing germ theory instead of miasma causing infectious diseases. A similar approach was taken by Karl-Eduard Rothschuh in his *Konzepte der Medizin* (Concepts in Medicine) (1978), in which he differentiated between different forms of medical theory and approaches to healing, ranging from iatrotheology and humoral pathology to empiricism and iatrophysics. For their use in health policy, paradigms might be described as “accepting and understanding of phenomena in a holistic way as representatives of an appearing emergence which is giving drive to developments and understanding based on a structural logic on a meta-level” (Glazinski & Obermann 2016: 109–10, translated by the authors).

Complexity sits very uneasily with many people, and reducing it is managed through rituals, traditions and rules and, in addition in modern societies, by institutions and organizations. Often, complexity leads to dysfunctional resistance, for example by over-determined approaches, essentially doing more of the (non-functional) same, thus curtailing social interaction and flexibility. A more functional attitude would be to strive for orientation and take this as the foundation for action based on understanding emerging paradigms and to extending the framework of mere perception to an understanding at the meta-level.

The distribution of medicines has been greatly influenced by a thirteenth-century edict of the German Emperor Friedrich II, in which he stipulates that doctors should prescribe medicines but producing them should be left to apothecaries. While this might have made sense about 800 years ago, things have changed; the role of today's pharmacist is dominated by administration and management and about 95 per cent of medicines distributed are produced industrially and pre-packaged. Still, most high-income countries retain a traditional distribution network. This approach maintains high quality and fast distribution but is extremely expensive. In Germany, for example, the distribution of drugs alone (not including the drugs themselves) costs about €10 billion, accounting for about a quarter of total drug costs, which translates to about €125 per capita per year. Looking at the distribution of drugs from a paradigmatic perspective, the question of eligibility (who is supposed to receive a certain prescription-only drug), quality and fast access can be dealt with in an entirely different way. Electronic prescriptions, identity checks via electronic ID (and possibly face recognition) and delivery via drones have all become possible and hold the promise of faster and vastly more efficient delivery. Predictably, to protect their business, pharmacists are fiercely resistant to such developments, trotting out the usual line that maintaining the status quo is in the best interest of patients.

A useful five-step procedure to overcome paradigm resistance might be:

1. *Treat the facts as just facts.* Usually, a set of (mostly) indisputable facts can be assembled and agreed upon as the basis for discussion.
2. *Reflect on your own norms and behaviours.* Health policy (or indeed any other policy) is mostly based on a spontaneous perception of what is “good” and what is “bad”. Typical responses to an unorthodox proposal might be “this is unethical”, “you cannot do this” or “I know of a case where this would not have worked”. Asking why these responses are made is a useful approach.
3. *Stimulate creativity.* If there is consensus about the situation and the facts, and if spontaneous responses and defensive actions have been dealt with, it would be useful to initiate a creative process.
4. *Identify functional demands and scenarios.* The outcome of the creative process should be the identification of key functional demands and scenarios, that is, those that are relevant not only from a technical or practical perspective but also take into account perceived and felt needs.
5. *Generate solutions.* Finally, concrete applicable solutions need to be sought that can be put to the test.

Given the complexity of healthcare systems and their different environments, the quest for an all-encompassing scientific and evidence-based health policy is probably elusive. The way forward is likely to be a mix of innovative and rigorous evaluation methods and confining of those policies analysed to such specific topics that application seems feasible in different contexts.

Open discussion and exchange are pre-requisites for development and identifying useful concepts and approaches. A research agenda could be formulated that addresses the most pressing needs for better scientific evidence in a given country. As Keynes said: “Practical men who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back” (1936: 383).

Case studies about the politics of specific health treatments sometimes highlight the hugely complex fabric of politics, personal relationships, vested interests and the successful lobbying by activists that led to a fundamental decision on providing access to care. Such decisions were usually not made on the basis of evidence and careful analysis; they were made at a stroke, on impulse and as historical happenstances.

Ghana offers an interesting example. Against the background of rising healthcare costs and a high percentage of the population unable to access quality care, a comprehensive social health insurance scheme and unified purchaser were introduced in 2004, against the strong advice of donors and with a lack of clear evidence and analysis of outcomes. So far, the scheme has been successful, with high enrolment and utilization rates; however, substantial risks remain: there is an extensive benefit package, with no cost controls, many are exempt from contributing to it, proper actuarial analysis is lacking and gatekeeping is poor. Some external collaborators view this as a “hazardous experiment” due to inadequate funding, low technical capacity and problematic political accountability, whereas others applaud the bold political move.

The most useful response to complexity in policy-making is flexibility. New information should lead to a review of current thinking and, if deemed necessary, a change in plans or action. However, organizations are usually inflexible; in fact, organizations reduce complexity through the imposition of rules, regulations and standards – useful instruments when it comes to repetitive tasks. But the same standardization and routine procedures that are so effective in managing repetitive tasks are a severe hindrance in responding smoothly and quickly to a changing environment.

Qualitative methods and qualitative analysis might also help to avoid the fallacy of transferring business logic to systems thinking. Take the example of arguing for an improved definition and measurement of outcomes (“value”) and costs. Of course, being clear about outcomes and costs should be key in all private businesses; however, healthcare systems as a whole, their institutions and their incentives are usually not geared towards a rational analysis of outcomes (or value) and the costs associated with them. The logic of collecting funds, administering and dealing with healthcare providers determines what is measured and used. Measuring outcomes and costs are the dependent variable. The tail cannot wag the dog, so changing the measurement of outcomes and costs (as sensible and technically correct as it may be) will not work. First, one needs to understand the logic of the system and identify levers for change, and only then can technical solutions be rationally implemented.

The digitalization of medicine

The doctor–patient relationship is particular and special. In the best case, physical proximity, trust and confidentiality are combined with a high level of professional competence. For a long time in the history of medicine, the only way to achieve such a relationship was through direct communication. The occasional letter remained the exception, and telephone consultation never progressed beyond the status of supplementary care.

As in many areas of our lives, the internet has changed fundamental parameters here as well. While it was initially only used in the medical field for the transmission of images for diagnosis (as in dermatology, pathology or radiology), the technical possibility of direct virtual connection between doctor and patient has existed for about 15 years. Medicine, however, tends to be conservative and understandably cautious about the use of new technologies. For example, not until April 2017 was it even possible in Germany to bill a doctor–patient conversation via video consultation in SHI-accredited care. The Covid outbreak has been an exceptional booster for the use of digital healthcare.

Digital healthcare is a broad and encompassing term which includes categories such as mobile health (mHealth), health information technology (IT), wearable devices and telemedicine. As stated by the US Food and Drug Administration, “Digital health technologies use computing platforms, connectivity, software, and sensors for healthcare and related uses.”²

In principle, digital healthcare offers the prospect of more patient-focused, efficient, transparent, patient-empowering, high quality and accessible services. Digital healthcare (in the form of apps, sensors and fitness trackers) is often seen as an antidote to the problems arising from inactive lifestyles (for an excellent introduction, see OECD 2019).

Regardless of the continuing important discussion on aspects of digital healthcare, such as data security, the right to informational self-determination and protection of the special doctor–patient relationship, including medical confidentiality, there is a need for an intensive examination of digitalization. A socioeconomic area of life that constitutes a significant part of economic activity must face up to the issues of improved cooperation between the various sectors, institutions and disciplines and also deal with the measurement and improvement of quality and efficiency. Digitalization plays an important role here but this field in the healthcare sector receives significantly less investment (Calvino *et al.* 2018).

Although primarily aimed at insurers, the recommendations of a recent publication of the Geneva Association (Bhattacharya-Craven 2020) can also be considered at the societal level. These recommendations are that providers articulate a holistic digital health strategy; marshal the evidence before purchasing digital solutions; align payment incentives for digital health; prioritize trust through voluntary charters; recognize the organizational context and improve capacity; and create a digital healthcare

2. See www.fda.gov/medical-devices/digital-health-center-excellence/what-digital-health.

marketplace. The Geneva Association study, its methods and findings are good examples of a balanced theoretical and practical inquiry into a complex and rapidly evolving topic. The recommendations can thus only be guiding principles to be kept in mind when formulating a strategy to make use of digital health.

A “theory of everything”?

The physicists’ quest for a “theory of everything” to explain all their observations about the world is well-known. The equivalent in economics is the hunt for common causes for the worldwide macroeconomic trends of the past decades and the microeconomic understanding of improving welfare and individual well-being. Neoclassical economics is the leading economic theory of everything. We have shown above that neoclassical economics, despite its advantages, has a number of serious flaws and will not go very far when it comes to a normative debate about what constitutes a good life and, accordingly, how society should distribute goods via non-market mechanisms.

This leads to the question of whether there can ever be an economic theory of everything. Since there is only one reality, it seems obvious that there is only one true or correct theoretical explanation, approximation or analogy. Based on this idea, monism (i.e. finding the “right” theory) is the scientific-theoretical ideal in the search for the truth. However, a number of scientific-theoretical limits (such as the problem of induction and empirical reasoning, cognitive dissonances) do not allow a clear discrimination of theories or paradigms along the lines of truth and falsehood. We only have conjectures that must face reality through empirical verification (critical realism). Thus, it can be reasonably argued that all theories and paradigms that are not refuted (empirically or logically deductively falsified) have the right to exist. When thinking about future theoretical developments in the field, it might be useful to consider the history of medicine.

During the long reign of humoral pathology (from ancient Greece to the eighteenth century) there were, of course, successful treatments of disease – but this was due more to astute clinical observation and luck than to rigorous application of theory. Sometimes the theory was completely wrong, yet the treatment worked. Is the state of economic theory at a similar level at the moment: developing management theories without considering the fundamental nature of work and individual value derived from work seems rather forlorn. Arguing for more state intervention without a rigorous analysis of (public) institutions and their workings places the argument on a very weak footing. Developing ever more nuanced analysis of QALYs insufficient without a solid understanding of a country’s legal constitution. The inviolability of basic human rights and dignity in natural law-based constitutions such as Germany’s requires a careful multidisciplinary analysis of legal issues concerning the QALY concept, involving not only legal experts in the field as well as health economists but also a broad variety of societal and political stakeholders in order to find applicable criteria for rationing.

It might be useful to conduct more research on the different strands of economic thinking related to health and healthcare. Furthermore, using the analogy of dissecting the anatomy and experimentally understanding the physiology of a healthcare system might help in moving the boundaries of economic thinking further.

The (second) transformation of medicine

Paul Starr (1982) described the professional transformation of American medicine from essentially being the province of quacks to a scientifically-based, highly effective and prestigious profession that can command very high salaries. Similar developments (transformations) took place in Europe and later in many other parts of the world too. Scientific progress, the discovery of highly effective therapies and a functional regulatory framework led to an almost meteoric rise of the profession in the public perception. Income and social standing grew accordingly and the term “(demi-)god in white” was coined. Over the last two decades, however, this professional standing has been crumbling. The doctor has turned into a “provider” (amongst others), is mostly an employee and is caught between patient demands, professional ethics, administrative control and profit maximization. In other words, they have become just like other employees – but with a professional ethic. Political hostility towards professional independence and positive public recognition, coupled with the financialization of the medical sector and use of IT and artificial intelligence have accelerated this second transformation from a self-employed, self-regulated professional to an employee in a large organization. The medical profession will need to reconsider its future role in a data-driven artificial intelligence-led world and the financialization of the medicine of the future. Change is inevitable, transformation unavoidable and the sooner and more rigorously the profession proactively thinks about medical care 10, 20 or 30 years from now, the more it might be able to influence developments for the better.

Health and medical economics will play an important role in this transformation, and medical professionals are well advised to come to grips with the key theories and concepts of the discipline.

Further reading

Rothschuh (1978) is a fantastic, highly recommended book but is only available in German. Skrabanek and McCormick (1989) is a delightful reminder of how often most distinguished people got it all wrong – and this goes for any science. Starr (1982) is an older text, but still immensely readable; elementary reading, if one wants to understand the US healthcare system.

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