

IMPACT Model - Innovative, Motivational, and Collaborative Approach for Cost Optimization and Quality-Oriented Results in Health Insurance and Reimbursement Strategy

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ABSTRACT

The challenges in healthcare today—ranging from aging populations and workforce shortages to complex reimbursement systems and strained relationships between insurers and providers—highlight the urgent need for innovation. Traditional models like Diagnose-related-grouping (DRG) and fee-for-services (FFS) struggle with flexibility, regional adaptability, and aligning incentives without hidden costs. Meanwhile, the focus on healthy life expectancy as a key health indicator is shifting reimbursement priorities toward outcomes rather than service volume.

The IMPACT model offers a modern, analytics-driven solution to address these issues. It introduces a business model for health insurance funds that incorporates advanced reimbursement mechanisms and resource monitoring while fostering collaboration between insurers, providers, patients, and policymakers.

The model leverages modern data analytics and artificial intelligence to maximize health outcomes with limited resources, streamline workflows, enhance workforce satisfaction, and promote clarity in responsibilities. It enables better fraud detection, integrates financial expenditure with health outcomes, and facilitates the adoption of cutting-edge technologies while phasing out outdated practices.

By bridging gaps between stakeholders and aligning healthcare management with population needs and policy strategies, the IMPACT model ensures an equitable, efficient, and outcome-oriented healthcare system.

Keywords: Health Insurance; Data Analytics; Self-Cost Optimization; Population Health Focused Reimbursement

Abbreviations: DRG: Diagnose-Related-Grouping; FFS: Fee-for-Services; IMPACT: Innovative, Motivational, and Collaborative Approach for Cost Optimization and Quality-Oriented Results in Health Insurance and Reimbursement Strategy

Background

Healthcare funding, based on taxes derived from the working population's salaries, presents challenges in countries with aging populations and is further exacerbated by global and local socioeconomic crises. These issues contribute to the cumulative burden of unmet medical needs.

There is an urgent need to either innovate new healthcare funding mechanisms or reassess how resources are distributed. The fundamental human right to equal access to medical care, regardless of financial status, remains a cornerstone policy in many nations, including Estonia. As a result, purchasing expensive medical care is not a sustainable solution. Instead, we observe countries investing in public health as a means of maintaining the population and, ultimately, the nation itself.

Understanding the complexity of public health management is critical, particularly in nations where private insurance companies and private healthcare providers have long dominated the market. Ironically, countries where healthcare systems are still under development may possess certain advantages in addressing these challenges. Aging populations globally demand more medical attention as people grow older, irrespective of whether healthcare funding relies on the working population.

The demand for medical attention, the prevalence of chronic illnesses, and unmet healthcare needs, have consistently grown over recent years [1,2]. Unmet medical need has snowball effects for further increase the need for medical attention [3,4]. Regardless of vibrant increase during COVID-19, there is a declining interest in pursuing medical careers for the last 3 years (as seen by slight decrease of graduating students in medicine and social health compared to other students in University in Tartu [5]. Similar trends are seen globally [6]. An increasing number of healthcare workers are leaving the profession due to burnout or shifts in career aspirations [7-9] discussed more often in media [10-12]. Consequently, the ratio of medical professionals to the general population will decrease although this is not relevant in global statistics which lag many years [13]. All of these pose a significant challenge in a scenario where demand for medical services is rising, while financial and professional resources are shrinking.

Why talk about issues arising in providing healthcare in the context of health insurance? What can insurance companies do about it? Health insurance funds possess powerful tools that influence healthcare provision and are tasked with managing the allocation of financial resources. In systems like Estonia, where healthcare funding comes from employee social taxes, insurance contracts act as quality benchmarks for providers and shape the internal strategies of insurance funds. Essentially, the design and priorities of insurance policies determine what kind of care is delivered.

This places a significant responsibility on insurance companies—not just to balance expenditures but to fundamentally shape outcomes. If you pay for services, you get services; but if you invest in health, you achieve health. Insurance companies must bear this hidden responsibility and recognize their pivotal role in driving healthcare systems toward improved health outcomes.

Healthcare reimbursement methods, like the diagnosis-related grouping (DRG) system introduced in the 1990s, have undergone significant evolution to prevent resource overutilization among other benefits [14]. Despite the goal of cost control, the current funding methods still incentivize the provision of more healthcare services,

which, in turn, drive up the costs per treatment case. Additionally, both DRG and fee-for-service (FFS) reimbursement methods require continuous financial monitoring through comparisons between medical claims data and healthcare records. While automation can partially address this, the growing complexity of payment methods, diversity of providers, and advances in treatment methodologies demand more insurance inspectors. However, socioeconomic challenges discourage funding trends that would allow for indefinite growth in administrative staff. Modern AI and analytics offer innovative opportunities for automating the surveillance of medical claims and reimbursement.

In recent years, not only life expectancy but also healthy life expectancy has become a key indicator of population health. This has fueled discussions around adapting healthcare reimbursement mechanisms to focus more on outcomes and quality instead of service volumes.

Given the shortage of resources, focused and efficient insurance spending is critical for populations to afford access to healthcare. Insurance providers strive to enhance the efficiency of service delivery through several initiatives. These include monetary incentives for achieving specific health outcomes, collaborative workshops to streamline patient care pathways involving multiple providers, and logistical guidance for managing complex and time-sensitive health cases. These efforts require investment from both insurance funds and healthcare providers. Regardless of best intentions, healthcare and insurance systems often face blurred lines between their responsibilities. Such ambiguity leads to tension, duplication of efforts, desynchronized actions, and, consequently, strained relationships and a sense of losing control among stakeholders.

Thanks to advancements in data analytics, reimbursement frameworks serving multiple objectives can be utilized. Well-designed reimbursement systems optimize resources, accommodate scientific progress in medical care, motivate stakeholders, reduce human resource demands, and promote population health.

Driven by prior concerns (Table 1) and more than a decade of experience in various roles within healthcare, the IMPACT approach emerges as a visionary model. The IMPACT model structures the workflow within health insurance funds and between other stakeholders. IMPACT leverages medical data analytics and is built upon two core components:

1. A business model for health insurance funds encompassing new reimbursement mechanisms and resource monitoring.
2. The role of insurance funds in healthcare management in collaboration with providers, patients, and policymakers.

Table 1: Key Drivers Behind the IMPACT Model and Categorization of Concerns from the Perspective of Health Insurance Funds’ Capabilities.

Key Drivers Behind the IMPACT Model	Categorization of Concerns
Precious resources	
Resources in healthcare are incredibly valuable, yet increasingly strained: aging populations demand more care, fewer workers fund insurance, medicine is less appealing as a career, and heavy workloads drive staff away.	Modern analytics enables innovation in reimbursement models
Increasing complexity	
The complexity of payments, provider diversity, and treatment advances expose DRG and FFS models’ limits in flexibility, regional adaptability, and incorporating incentives without excessive hidden costs.	Modern analytics enables innovation in reimbursement models
Quality over quantity	
Healthy life expectancy has emerged as a key health indicator, driving shifts in healthcare reimbursement toward outcomes and quality over service volume.	Modern analytics enables innovation in reimbursement models
Blurred responsibilities and limited workforce	
Health insurance funds aim to improve service efficiency through incentives and collaboration but blur the lines of responsibilities and capabilities with healthcare providers, but	The role of insurance funds in healthcare management
...it demands more workers in insurance fund, but workforce capacity is limited.	Business plan of organization
...it creates chaos, making insurance specialists feel scattered, like in “Brownian motion.” This inefficiency reduces results, fueling burnout and job turnover.	Synchronizations in service-oriented organization
...it creates tension and strained relationships with hospitals, as the ambiguity leads to duplication of efforts and a sense of losing control	The role of insurance funds in healthcare management

Its integral components, which will require further discussions are oversight and reimbursement models. Both are primarily addressed through the application of modern data science methods. To achieve the best possible results, these approaches require high-quality, machine-readable clinical data to be readily available. Such data is essential for making informed funding decisions and supporting the operations of health insurance systems effectively.

IMPACT Approach

The Role of Insurance Funds in Healthcare Management in Collaboration with Providers, Patients, and Policymakers

Figure 1 illustrates the four main stakeholders in healthcare. It is important to note that health insurance, insured individuals, and service providers each carry their own internal responsibilities. Additionally, the arrows represent interparty responsibilities from the perspective of health insurance. These emphasize the primary roles that health insurance should focus on. The intersection points will be discussed further in the next chapter.

The health insurance fund also engages with a third party, which includes public communication responsibilities toward journalists and a legal obligation to provide health benefit data under confidentiality agreements. The health insurance fund collaborates with key entities such as health policymakers, specialty committees, and scientific groups. However, in the context of the IMPACT model, these collaborations have broader meanings. The model emphasizes consistently gathering input from:

- Science (e.g., different settings of international and local university collaborations) for timely knowledge of clinical and scientific developments, as well as applicable quality standards.
- Policymakers (e.g., public health scientists, international and local health policy advisors from the Ministry of Health)—to obtain well-calculated insights into major health issues that require reimbursement and facilitation.

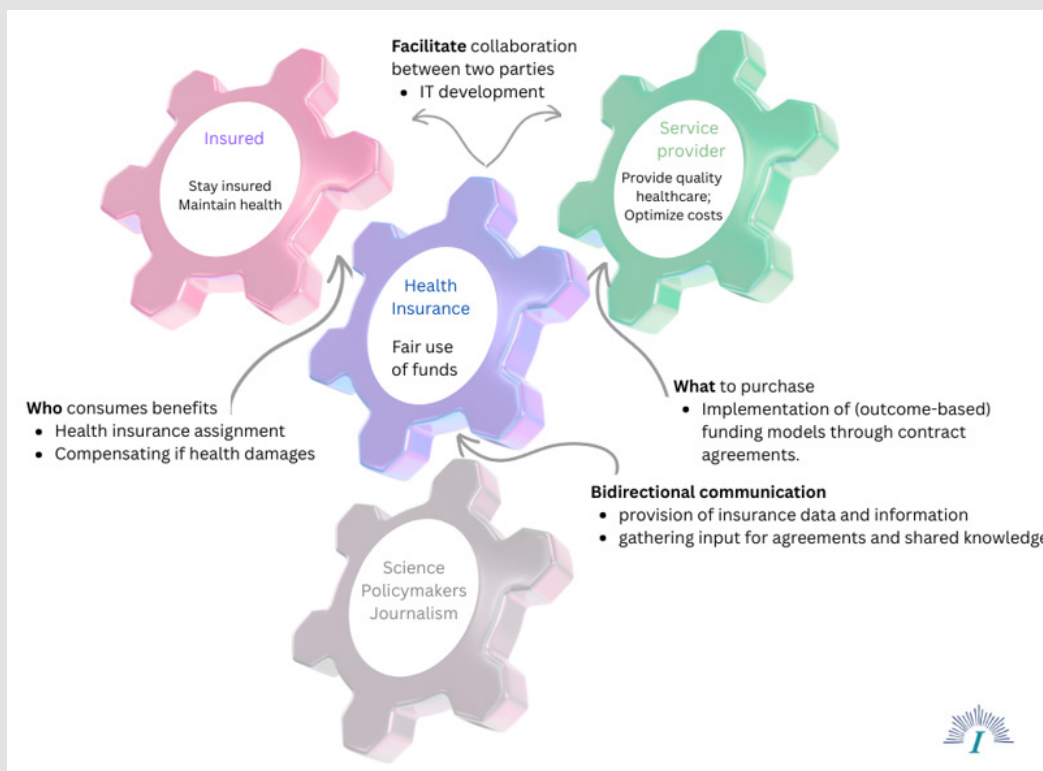


Figure 1: Four main stakeholders in healthcare.

Each has its inner responsibilities, and the interactions are provided in Health Insurance Fund perspectives. Gears have been chosen as symbols for 3 primary reasons. Firstly, they represent collaboration, where each stakeholder's role must remain within its boundaries to ensure their "gear sets all other gears in motion." Secondly, they reflect the risks of exceeding one's scope, where "getting your hands caught in the gears" not only harms you but also disrupts the synchronized functioning of the entire system. Lastly, the gears illustrate that the healthcare system is a unified whole, where each gear plays a crucial role.

A Business Model for Health Insurance Funds Encompassing New Reimbursement Mechanisms and Resource Monitoring

Important highlights (Figure 2):

- Health insurance has four major responsibilities:
 - Compensating treatment costs by purchasing healthcare services from qualified professionals.
 - Overseeing funds from both supervision and fraud detection perspectives.
 - Providing compensation for the health damage suffered by individuals insured.
 - Facilitating collaboration between service providers and patients by supervising and financing IT development.
- Duties toward insured people can mostly be designed as automated IT workflows.
- Any interaction with service providers, including IT developments, should be implemented and executed through contract agreements. This contrasts with current practices, where insurance specialists conduct workshops and intervene directly in areas best handled by service providers, who are the true experts (see introduction for more details).
- The key foundation of IMPACT concept is modern analytics, which enables constant monitoring of detailed clinical data (not just medical claims, as is common today). This advanced approach allows the development of highly tailored reimbursement models, built on comprehensive and multilayered input. Modern analytics makes this level of precision and adaptability feasible, forming the backbone of this entire approach. (Figure 2B). (A more detailed description of reimbursement models will be published soon.)
- Reimbursement models are closely tied to fund supervision. Modern fund supervision, particularly in detecting waste and fraud, relies entirely on data science. This means shifting from

today's service-by-service code controls to contract-based oversight driven by advanced analytics, offering a transformative approach to surveillance.

- In addition to reimbursement details, the contract should also consider the outcomes of supervision. For example, service providers who ensure quality should be prioritized over fraudulent partners.
- Optimized internal operations. Health insurance services should focus on answering their core responsibilities, aligning

internal workflows to be synchronized and goal oriented. This prevents duplication, unclear responsibilities, inefficiencies, and ultimately reduces staff burnout.

- Innovation and research support. Supporting modern clinical practices and research development, preferably from outside the contracted healthcare service providers, to avoid conflicts of interest. This includes expert opinions and scientific input in various formats (e.g., collaboration with research institutions, hiring researchers, participation in international commissions).

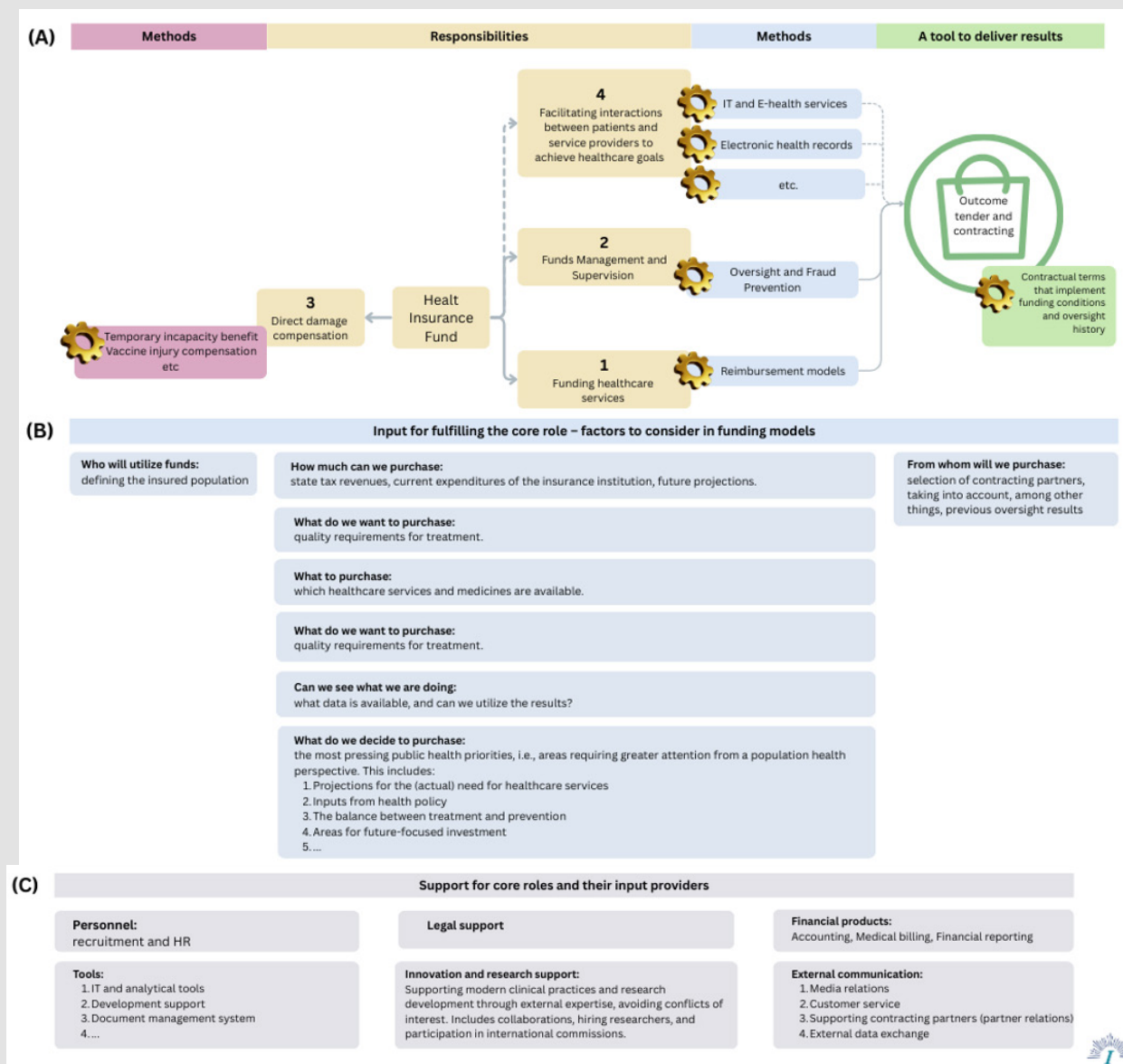


Figure 2: Business Model of a Health Insurance Company

Four major responsibilities of healthcare insurance companies are displayed in yellow (section A). The methods used to achieve these responsibilities are shown in blue. Contract is the form of delivery of major responsibilities towards service providers (in green). B - The second section outlines methods (in the form of services) that provide input into the major responsibilities (in blue). C - Most profound services providing help to input and major services (in grey).

Benefits of the IMPACT Approach

IMPACT is an approach that incorporates modern data analytics and AI developments to bring tools for managing medical data in surveillance and reimbursement. It also facilitates the flexible and timely application of the best available knowledge from modern medical science, population health needs, and health policy strategies. Specifically:

- It helps maximize health outcomes from limited resources like money, time, and healthcare professionals.
- It promotes the well-being and confidence of everyone in the complex healthcare system by encouraging collaboration and a sense of importance.
- It values and supports the essential roles required for successful healthcare management. By clarifying responsibilities, it fosters personal and professional growth, minimizes confusion and overwhelm, enhances respect, and encourages healthcare professionals to remain in the workforce.
- It encourages the adoption of scientific and technological innovations while phasing out outdated practices.
- It allows healthcare and insurance managers to operate with fewer specialists, improving quality while reducing overall complexity.
- It elevates surveillance, waste reduction, and fraud detection using AI modeling and automated approaches.
- It motivates healthcare providers to adopt the most effective treatment and logistical methods, helping to eliminate unnecessary costs.
- It focuses health insurance efforts on clinical areas that yield the greatest benefits for population health.
- And last. Traditionally, the health insurance fund has been viewed as a financial institution, with annual reports presented primarily as financial statements listing accounts and balances. However, the implementation of the IMPACT model also means that health insurance reports will evolve to integrate financial

expenditures with the corresponding health outcomes achieved. Which is no less of importance!

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