



# Innovating in Health Care – Modern Challenges

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## ABSTRACT

**Introduction:** The goal of this article is to present that innovating in health care begins to become an imperative in present time. Innovating will enable the achievement of the highest quality health care results and the patients' satisfaction with the least amount of financial resources.

**Methods:** The thorough literature review of multifaceted sources was conducted including: studies, books, monographies and peer – reviewed journals with the goal of achieving the clearer picture of today's modern challenges in the complex field of health care innovation.

**Discussion:** Theoretical and empirical studies clearly indicate that the innovation is one of the key factors in the competitiveness of the organization and its survival in the market. Developed countries of the world today are making significant efforts in order for innovation to become a national priority, with special emphasis placed on measuring innovation performance. Results of theoretical and practical studies show that in the future, treatment of the most difficult and complex diseases of our time, through the entirely new discoveries and results, derived from the process of innovation, will project entirely new positive forms and outcomes in the health care.

**Conclusion:** There is no doubt that the humanity and medical science will through innovation succeed to win the battles against the majority of the most complex contemporary diseases. Malignant neoplasm of tomorrow, through the application of a new, innovative approaches to research, processes and treatments will become a chronic diseases. Among many, the particular problem in the process of innovation will represent the cost of research and development (R&D), production and the safety of prescription drugs.

**Keywords:** health care, innovation, measurement of innovation, quality, cost, malignant neoplasm, prescription drugs.

## INTRODUCTION

The aim of this paper is to present that innovating in health care begins to become an imperative in

the contemporary time. Innovating will create the achievement of the highest quality health care results and the patients' satisfaction by utilizing the least amount of financial resources. Developed countries of the world, today, are making significant efforts for innovation to become a national priority. Innovation process becomes a key to a successful organization of health care in the future (1). Innovation will be possible to the full extent, if we, as a whole society,

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agree with its importance and fully understand the nature of challenges faced while managing to mobilize human resources for these changes. Innovating and simultaneously managing these processes is necessary for several reasons: 1.) the financial resources at our disposal are limited, today, and will be limited in the future and 2.) the second part of the challenge represent the serious and ever deteriorating problem of the aging population (2). People are living longer and for maintenance of health for elderly population, from year to year, the society and taxpayers must allocate more and more resources. Innovation will improve the quality of health services, shorten treatment time, increase the number of cured, reduce the cost of treatment and medications, and create the patients – from observers, today, to active and satisfied partners in the future. In the future, in order to make the treatment of the most serious and complex illnesses of the present; such as: heart and blood vessels diseases, malignant neoplasms, diabetes and auto immune diseases (i.e. multiple sclerosis, lupus and others), more effective and efficient the process of innovation will have to get a completely new forms and outcomes (3).

## METHODS

A detailed literature review of various sources was conducted, including: studies, books, monographies and peer – reviewed journals with the goal of achieving the clearer picture of today's modern challenges in the complex field of health care innovation.

## DISCUSSION

Theoretical and practical studies clearly indicate that the innovation is one of the key factors responsible for the competitiveness of the service sector – oriented health care organizations and their survival in the increasingly competitive and globalized market. In the present, developed countries of the world are making significant efforts in order for the innovation to become a national priority, with special emphasis being placed on measuring of innovation performance. Already, in 1950, J. Schumpeter, in his work, titled "Capitalism, Socialism and Democracy", heralded innovation as the main factor of technological progress and economic development. He distinguished two types of innovation: the radical

and incremental (gradual) innovation. Both of these terms can be defined in different ways, depending on the perspective of the person who evaluates them. Although, many papers on this complex subject have been written, today's literature, has been still unable to define measure(s), through which, we could measure the "radicalism" of some innovations. Innovations which are by some researchers labeled as "radical", were evaluated as incremental or discontinued by other researchers. Analogously, there is no clear demarcation when considering high, medium or low levels of innovation. In the process of identifying the innovation, it is important to consider the marketing and technological perspective and the perspective of the macro and micro levels (4-6).

These definitions should be taken into account in applying innovation in healthcare service sector. Developed countries are now making significant efforts to measure innovation. This is a serious problem that we are facing. Without proper measurement we cannot talk about an efficient and effective innovation. Theoretical and empirical research clearly shows that innovation is a complex and multidimensional process. It never follows a straight line, and some of the stages of human history were stagnating or accelerating based on the dynamics of innovative processes. It is interesting to consider the reasons which contributed to these dynamics (7-8).

Returning to the short history, we can see that for our ancestors, which existed thousands of years before us, the life expectancy was 20 to 25 years. In the 1800s, the life expectancy has increased to 35 years and in 1900's was 48 years. In 2000, the average life expectancy has reached 78 years, an increase of 66 percent, or an additional 30 years of life, compared to the year in 1900. From the 1900's until the 1950s, life was constantly extended for, and by the mid -50s to mid- 60s of last century, the trend was stopped. After that, the life expectancy begins to grow again and continues this trend in the 21st century. The reason for this increase was that, in the first half of the last century, the modern medical discoveries managed to win battles over numerous infectious diseases, while providing the human kind with cleaner water, better sanitation and better child care. At the same time, for the first time in history, mankind has managed to conquer infectious diseases due to exceptional drugs including penicillin,

streptomycin and others. But, in mid-20th-century, after the fight against infectious diseases was completed, the medicine did not have adequate means to counter new diseases, such as; heart disease, autoimmune and malignant diseases. Since the mid -50s to mid- 60s of the last century, medicine has little to offer for the prevention or treatment of chronic and degenerative diseases , which are dominated by pathological picture of his society . Medical innovations have had a significant effect on the heart and blood vessels and malignant neoplasm, which in those years referred greatest number of lives . Many techniques , such as surgery bridging (Eng. bypass surgery), mounting pads or stents , heart transplantation , new drugs to control blood pressure, lowering cholesterol , or clot-busting , have the effect that the 1975th mortality from heart disease and blood vessels was reduced by 60%. Reducing mortality due to malignant neoplasms was less dramatic, but it had a constant decline (9-10).

In 1975, the five-year survival period for all types of malignancy was 50%. Today, the five-year survival period of almost 70 percent. Prior to the 1950 children diagnosed with leukemia had a prognosis of three months. Today, children diagnosed with leukemia have a 85 % chance to heal . With the help of medical innovation we just bought extra decade of life and health , but we also got a year of productive work and economic value added, increased household spending and increase tax revenues . The study, which was conducted at Columbia University (New York City , USA ) by Frank Lichtenberg has shown that the use of new drugs for the 40 % increase over the lifespan in 1980. up in 1990. In other words, for each year of life extension , five months is a result of the application of new drugs. If we manage that complex process of innovation in healthcare in detail clarify, would allow practitioners and decision makers to help evaluate , adapt and perform services in such a way to give priority to innovation in health care, representing true value . It is evident that prioritization is also a challenge. They need access to the full appreciation of the specificities of each community. In the modern world, innovation is considered a critical component of business productivity and condition of survival in the market (10-11).

In the second half of the last century, medical science has progressed exponentially. Unfortunately,

the system of paper documents (medical records) still provides information vital to the delivery of health care . Patient information is routinely kept in archives and keep the same mentality with which preserves and other stored goods. Paper registration is always associated with errors that are in health care is very expensive. From U.S. \$ 600 billion, which is spent on laboratory tests each year in the U.S., 70 percent is paid for the paper records. Huge savings possible with the introduction of electronic medical records ( EMR) . This electronic record can easily detect and troubleshoot errors. Treatment of patients and exchange of information on his health , according to medical records , it is very tedious and often impossible task. Without this insight it is impossible to know the patient's medical history . Electronic patient record status allows the doctor to quickly exchange images and test results with colleagues in the same clinic , other clinics around the country and the continent (12).

It is estimated that the electronic medical record (EMR) will be one of the priorities of innovation in developing countries. Unfortunately, a number of employees in health care, it is still a new fashion trend, not an essential need in improving the health care quality. Empirical research shows that managers of healthcare organizations recognize the importance of this document, but that its application should eliminate many barriers. Results of theoretical and empirical research suggest that in the future treatment of the most difficult and complex diseases of our time, in the process of innovation , get entirely new forms and outcomes (13).

For malignant neoplasms of tomorrow, a new, innovative approach to therapy will become a chronic disease. Cancer, though will not be eradicated , will create less fear patients , who, better informed , learn more easily live with this chronic disease. How true this will be the image will depend on the number and quality of new technologies that will emerge innovation. It is evident that the longer the life of these patients increased many times over the cost of their treatment , creating a tension between the demands of patients and those who pay for services. In treatment of malignant tumors the primary goal is to turn malignant disease into a chronic illness. To achieve this it is necessary to promote a healthy lifestyle and diet, to educate health care profession-

als and patients on the general basis to organize early control and reporting at the first signs of illness. In Bosnia and Herzegovina today, there are five oncology centers. In the treatment of malignant diseases they apply modern principles of surgery, chemotherapy, radiotherapy, chemotherapy and immunotherapy. Through education and prevention in the current phase, the goal is to reduce 10-20% of patients who are too late occur physicians for review (14).

Innovations in the treatment of malignant diseases are inevitable because of the complexity of disease and mortality. Innovation would primarily had to be transformed into useful therapies, which will be aimed at the right biological target, the appropriate patient and in a way that is acceptable to patients, healthcare professionals and society. Innovation must be successfully introduced to the market as professionals, and patients and those who pay the costs. All they need to see the potential benefits. Today we see an explosion of new therapies to treat cancer, and their prices remain very high. It is estimated that the global value of drugs for treatment of malignant neoplasms in 2005 amounted to 24 billion U.S.\$. From this amount, approximately U.S. \$ 15 billion was spent in the United States (15). Technology will detect which patients do not respond well to therapy. In this way, today known drugs in the near future will become obsolete. Doctors will be able to, very accurately, at any stage of the disease, undertake the essential treatment. As cancer will be transformed into the chronic disease, the patients will live longer, but, at the same time look for a more demanding care. Ten years ago the average cost to develop a new anti-cancer drug amounted to 400 million U.S.\$. Today, these costs amount to about \$ 1 billion. If they continue at this pace of growth, the costs of developing new drugs could soon reach U.S.\$ 2 billion, which is the amount that the existing market, by many parameters, hardly endure. The increase in the number of drugs that are intended to correct a specific group of patients, at the same time means that it will eventually disappear tempted to find drugs that are acceptable for all patients (15). Data from the United States for 2005 show that the costs of care for cancer patients in the last six months the patient's life is 70 percent of the total cost, and that will grow four times until 2025, since patients

will live longer and that will necessarily arise new therapies. This increase in cost will inevitably create tensions between those who provide the funds and those who consume them. This rapid increase in costs will necessarily lead to the fact that the expensive therapies are directed, and to use fewer hospitals, and more home care. One of the dilemmas in the future there will be political influences aging population, which will expect better service than what is offered today, the majority of older people. A small number of elderly people will be able to provide all the necessary care. The vast majority of others will have to rely on state protection. It is estimated that on a global scale in the future be a shortage of those who provide health care. Cancer or malignant neoplasms, cardiovascular disease and dementia in the future will be controlled and will join the list of chronic diseases as diabetes, asthma and high blood pressure. New ethical and moral dilemmas appear to be parallel to the successes brought down the incidence of the disease. Live longer and die more quickly, according to some, will be one of the basic principles of Western medicine of the 21st century (16).

An overarching goal is that we must define its way to the limited resources we have at our disposal for health, ensure maximum for patients, their families and society, as a whole. Theoretical studies indicate that innovation in health care – relates to products, processes or structures. The product is what the patient pays for and consists of goods or services (e.g. innovation in clinical procedures). Innovation in processes implies to the innovation in the production or delivery method. The patient usually does not pay for the process, but it is necessary to deliver the desired product or services. Structural innovations usually affect the internal and external infrastructures and create new business models (17).

Information technologies are becoming a key factor for innovation in health care. Hospitals and clinics in the world are trying, as soon as possible, to start applying the newest technologies related to medical equipment, procedures and treatments, paying less attention to innovation in communications and networking. One reason is the possibility of compromising the security and privacy of patients' intrusion into information systems. In recent years, improving safety in this segment and the possibility

of transmitting data and images around the world , grows the opportunity for significant innovation in this part of health care (18).

The modern world is increasingly using the services of other (i.e. outsourcing ) in diagnostic services - especially medical images, such as: mammograms , X-rays and consultation specialists. Telemedicine is used in the U.S. and other countries , in order to provide care to patients in remote and inaccessible locations. Most of today's health information system is designed to function autonomously , with its own rules and formats. They often prevent information to be globally integrated and always available . In some cases, the patient's electronic ticket from one hospital is not readable in another. Not only different languages and measurements, but also the conflicts and different decryption software, are the reason as to why it is impossible for the systems to exchange electronic data. Eliminating these barriers at local, regional and state levels, our ultimate goal should be the creation of medical records , which can travel along with patients around the world (19).

A particular problem in the process of innovation is the production of drugs and their safety. From today's tendency to produce drugs that are universally acceptable to all patients, drug manufacturers will have in the future to shift to the production of drugs that are precisely targeted to specific groups or even individuals. Analysis carried out in developed countries show that ( for 88 percent of chronic and complex diseases) drugs are the first choice for medical intervention. Americans with chronic and complex diseases, such as diabetes, heart disease, osteoporosis and cancer, contribute 75 percent of the cost for medical treatment in the USA. Regardless of the significant side effects, drugs today are remarkable segment of health care. Considering just diabetes, if not controlled, diabetes can lead to a cascade of potential complications that result in increasing the human , social and economic costs , including blindness, amputation, kidney disease, heart and ultimately death. Patients, who regularly take medications for diabetes medication costs increase, but the overall cost of treating diabetes and complications that it produces, are declining. For many diseases the situation is very similar. For all these innovative medicines are often both medically and economically most effective alternative. In developed coun-

tries, about 60 percent of patients with diabetes do not keep the disease under control in order to avoid serious complications.

Innovation and appropriate management innovation modern medical science adjusts medications individual needs of patients , providing them with the right medicine to the right dose at the right time From the standpoint of value for money drugs adapted to the needs of patients will also reduce the high costs associated with those who do not respond to them. This type of innovation is exactly what patients want today (20).

## CONCLUSION

Improving health care through innovation is one of the most important tasks facing healthcare providers, other organizations and individuals whose activities are related to health. Innovation is a continuous process that cannot be delayed. Innovation should be approached systematically taking into account the specificities of every country. Since this is a very broad field it is necessary to define priorities by taking into account the financial resources available in this area.

Health care today is abundant with basic innovations. Innovations that have been successfully applied to a single location, often spread very slowly, or are not spread at all, to other locations. Diffusion of innovations, today, creates an enormous challenge for all industries, health care systems and markets.

Then, when the humanity significantly innovated, life expectancy and quality of life were also significantly increased . Thanks to innovation, especially in eliminating infectious diseases, ensuring the population with drinking water and sufficient food, life span increased from 1900 until 2000 for nearly 30 years. Today's medical science is facing new challenges, these are diseases of cardio - vascular disease, malignant neoplasm, diabetes, auto - immune disease and dementia. There is no dilemma that science and health innovation will find a remedy to these diseases. Innovation is a very complex and multi-dimensional process, which requires a critical mass of trained personnel. To achieve maximum effect in updating all of our activities it must be subject to measurement. In this way we will be able to identify key indicators of quality health services, to observe

these indicators and measure quality outcomes. In this way we practice quality assurance shift towards constant improvement of quality. Quality must be a constant task for all stakeholders in health care.

## COMPETING INTERESTS

The authors declare no conflict of interest.

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