

Mechanisms for Managing Medical Institutions in Times of Crisis

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ABSTRACT

Medical institutions face a lot of problems with insufficient staffing, infrastructure, special materials and equipment during the crisis. The health care system depends on government action at the national and regional levels, especially it is about problem-solving strategies and action plans. This article is based on a qualitative analysis of the experience of crisis management in connection with the spread of COVID-19.

Germany and the Czech Republic have proven the importance of strategic and integrated approaches to good governance. It is determined that the centralized management with a possibility of acceptance of local regional decisions by medical establishments is effective in times of crisis. It is proved that the crisis causes reorganization of medical institutions, redistribution of functions and responsibilities of medical staff, transformation of the management system and change of strategies. Strategic and integrated approaches provide centralized management and involvement of the private sector, institutions and the public in the process of counteracting the consequences of the crisis. Management processes and mechanisms are characterized by speed, flexibility and adaptability to changing crisis situations. The government is the main regulator in a crisis.

Education and training, reorganization of medical services and medical institutions, the formation of a digital market, the development of new types of equipment occur as a result of strategic management. Strategic management is based on the flexibility and adaptability of the health care system to possible changes. The experience of functioning of management mechanisms of medical organizations in the conditions of crisis depends on an initial condition of human resources, physical infrastructure and institutional capacity of authorities at national and regional levels. A strategic and comprehensive approach to crisis management in Germany and the Czech Republic proves the effectiveness of counteracting the consequences of the crisis.

Keywords: Crisis management of the health care system, medical institutions, management of the COVID-19 pandemic, flexibility of medical organisations, adaptability of medical organisations, public administration in the health care system.

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INTRODUCTION

Crisis phenomena (such as spreading of SARS-CoV-2) threaten to overload the health care system due to disruptions in the supply chain of drugs and medicines (Hick et al., 2020), lack of resources, lack of strategies and action plans. In times of crisis, resources need to be effectively redistributed based on clinically rational decisions. This also includes developing a strategy for preparation and conservation, adaptation and replacement, reallocation of resources and resource reuse (Hick et al., 2020).

The crisis necessitates the reset of the system and the functioning of medical organisations, the development of crisis management policy (Spinelli & Pellino, 2020). "The current COVID-19 pandemic has strained medical resources... The COVID-19 public health crisis has strained health care systems" (Cohen et al., 2020).

Recent research on the management of health organisations in a crisis suggests a lack of knowledge in the management of health institutions in a crisis due to the spreading of COVID-19. The purpose of the article is to analyze the management mechanisms of medical institutions based on the experience of Germany and the Czech Republic.

LITERATURE REVIEW

In the scientific literature the crisis in the context of health care is considered as: 1) inability to ensure the overcoming the effects on the health of the population of certain diseases (Small et al., 2017; Saloner et al., 2018); 2) inefficiency of management, financing, reform of the health care system, which is exacerbated by the influence of socio-economic factors (Economou et al. 2015).

In a crisis situation, medical institutions are unable to cope with the problems of overcoming diseases of various kinds

due to various factors. "In this time of crisis, innovative and adaptive methods of practicing will be required across all health professions" (Cadogan & Hughes, 2020). Factors that exacerbate the crisis include racism, poverty, inadequate management of the health care system in the context of the spread of disease, lack of resources (logistical, human, financial, informational, technological, institutional), insufficient access to health care services, inefficiency of public management and lack of strategies, social security mechanisms and others (Correia, Dussault, & Pontes, 2015; Saloner *et al.*, 2018).

In "underdeveloped or developing countries" such factors are the most common, which leads to a higher incidence rate compared to developed countries in conditions of insufficient efficiency of the health care system. The socio-economic situation also has a significant impact on the state of medicine in the country (Economou *et al.*, 2015). Economic problems make the health care system vulnerable in the context of the management, financing and operations of health facilities (Economou *et al.*, 2015). The economic crisis also causes an increase in panic and fear among the population, leading to "economic stress" (Giorgi, Arcangeli, Mucci, *et al.*, 2015). Governments adopt austerity regimes that increase "economic stress" and panic, dissatisfaction with such policies among the population (Cervero-Liceras, McKee & Legido-Quigley, 2015), threaten service delivery and increase inequality among the population (Karanikolos & Kentikelenis, 2016). "Patients, health professionals, and the general public are under insurmountable psychological pressure which may lead to various psychological problems, such as anxiety, fear, depression, and insomnia" (Li *et al.*, 2020).

Medical staff is becoming a source of savings, particularly within the EU. On the other hand, the morbidity of the population leads to a decrease in labor productivity, increased health care costs for treatment, reduced economic benefits of employers from employees (Dobbs & Manyika, 2015).

The development of health care management strategies (Hick *et al.*, 2020) and the integration of a strategic approach, a clear and well-designed reform plan and efficient resource allocation (Economou *et al.*, 2015) are important prerequisites for an effective health care management mechanism in times of crisis. Monitoring, innovation and impact assessment are important elements of health crisis response policy (Correia, Dussault, Pontes, 2015).

A crisis situation requires the study of alternative mechanisms depending on the level of impact and the state of health of the population. The methods within the mechanisms can be Crisis Resolution Teams (CRTs), which increase the level of public satisfaction with services, reduce the level of hospitalization (Wheeler *et al.*, 2015). Such a mechanism depends on regional specifics, models and management methods, the quality of training of medical staff (Wheeler *et al.*, 2015).

Healthcare facilities need to develop long-term multi-level strategies which are based on clinical information and existing capacity building plans. This will optimize the use of available limited resources (Hick *et al.*, 2020). "While preparing for the possibility of crisis triage, health care organizations must also be proactive about ensuring access and mitigating bias in times of scarcity" (Solomon, Wynia & Gostin, 2020).

The analysis of the literature shows the study of the effects of different types of crisis on the health care system depending on micro- and macro-factors. The type of crisis determines the strategy, action plan, management

mechanism and possible consequences. The mechanism of management of medical institutions requires detailed strategic, operational and long-term planning in the context of the solvency crisis of 2020 and the crisis caused by the spread of SARS-CoV-2.

DATA AND METHODS

Design and approach

The study is based on a qualitative assessment of the integration of the management strategy of medical institutions in a crisis. This study builds on the strategic management of the health care system in a crisis (Economou *et al.* 2015; Hick *et al.*, 2020). As recent scientific publications (Hick *et al.*, 2020) demonstrate the importance of strategic plans to overcome the crisis, we examine how countries integrate strategies into the existing health care system.

The article studies the experience of crisis management in developed European countries, which provide medical institutions with the necessary infrastructure, staff, services, planning of medical care and make strategic decisions during the spread of SARS-CoV-2.

Data and methods

We use in this study the World Health Organization (2020) database. It contains the Health Systems Response Monitoring (HSRM) that gives a possibility to collect and systematize information concerning pandemic policies in certain countries.

We compare data from Germany and the Czech Republic according to the following criteria:

1. Physical infrastructure.
2. Labor resources.
3. Strategic leadership.

The experience of Germany and the Czech Republic was chosen for the analysis due to the possibility of comparison according to the chosen criteria: 1) comparison of physical infrastructure: infrastructure for providing basic medical care; problematic issues of physical infrastructure; advantages of physical infrastructure; infrastructure management; participation of the private sector, the education sector; financing; 2) comparison of human resources and strategic management for the existing advantages and disadvantages.

Research limitation

The study is based on a qualitative methodology due to the lack of comparable data from European countries. Therefore, there is no information at all about the experience of counteracting the Covid-19 crisis in Ukraine in the database of the World Health Organization (2020) and we can see limited information about the experience of crisis management in Sweden. Instead, information concerning the crisis management in Germany and the Czech Republic is sufficiently detailed for comparison and analysis.

The study focuses only on the experience of crisis management in Germany and the Czech Republic due to the lack of complete information concerning the actions of the government and health care systems of European countries. Nevertheless, this article highlights the key elements of governance and demonstrates the importance of strategy, speed of crisis response and coordination of all actors of the public-private section.

RESULTS AND DISCUSSION

Health Systems Response Monitoring (HSRM) was developed in connection with the dissemination of COVID-19 in order to collect and systematize the most accurate,

new information on the response of the countries to the crisis (World Health Organization, 2020). The HSRM provides a basis for analyzing the response of the countries to the pandemic and provides information on large-scale initiatives in health systems within Europe. The HSRM focuses on action in health systems and provides information on larger health initiatives. HSRM is a joint project of the WHO Regional Office for Europe, the European Commission and the European Observatory on Health System and Policy.

Physical infrastructure

Germany is characterized by the speed of response and spread of the Covid-19, in particular the first stage – testing of the population (167 thousand tests were done as of 15.03.2020). Testing was conducted in outpatient clinics and testing centers. The main disadvantages are the insufficient level of provision of the population with the opportunity to do the test due to the limited number of laboratories and the long testing period (7 days), lack of materials in the laboratories. At the same time, outpatient clinics adapted quickly due to doubling the number of employees, reorganization of services (Table 1).

Table 1. Comparison of physical infrastructure: Germany and the Czech Republic

Criterion	Germany	Czech Republic
Infrastructure for basic medical care	Mobile testing units near medical institutions Doctors visit patients, 400 testing centers, testing in certain companies	Provision of hospital beds and ventilators (41% and 66%, were not used at the end of April 2020). Redistribution of staff and beds. All types of medical care and treatment that do not require immediate intervention have been postponed. Increasing the number of certified laboratories
Problem areas	Test waiting period is too long (up to 7 days) Lack of laboratory materials and protective equipment Reuse of protective equipment	Lack of different types of protective equipment at the beginning of the crisis Problems with testing potential Overloading the administration of general medical institutions
Benefits	Fast adaptation of medical staff by doubling human resources Reorganization of services The supply of medicines has not been stopped Formation of organisations for usage of pharmaceuticals	Increasing the capacity of laboratories and their capacities, sampling points (97 laboratories, 10,000 tests per day) Provision of the population with bed stock and ventilators Monitoring of medical institutions and monitoring of the situation on a daily basis Mass production of ventilators Licensing procedures for new medicines have been accelerated
Infrastructure management	Centralized, Ministry of Health	Centralized, Ministry of Health
Participation of the private sector, the education sector	Providing recommendations for conservation of resources (the Koch Institute) Supply of protective equipment to the private sector	Development of a new type of ventilator for ambulance (CoroVent) Concluding contracts with the private sector for the production of respirators
Financing	Centralized funding from the federal government, part of the funding - from the federal states. Appropriations for the purchase of equipment	

Source: World Health Organization (2020)

Health care system in Germany is decentralized, ensuring high availability of medical services. The number of hospital beds per 1000 inhabitants of the country is the largest in Europe (8.0). According to the Ministry of Health, there are currently 25,000 hospital beds with ventilators I.C.U. The German government and the federal states have published an "Emergency Plan for Hospitals" to double beds due to the temporary use of other facilities (hotels, rehabilitation centers), and the redistribution of all beds in hospitals. There is a Crisis Department of the Federal Government in Germany, which provides the development of institutions and recommendations in the fight against the crisis. The Ministry of Health regulates the procurement of medicines and protective equipment. International companies have received the status of government partners in procurement. In fact, the government has taken over the functions of importing the necessary materials and equipment. The ministry also

allocates resources and restricts regular sales channels. On April 9, 2020, the German Chemical Industry Association (Verband der Chemischen Industrie - VCI) launched the digital market for disinfectants (<https://notfalldesinfektion.vci.de/>). The resource was created to coordinate applications from medical institutions and to support the pharmaceutical and chemical sectors of medical organisations during the crisis. Emergency medical institutions have gained access to disinfectants. The modern digital market helps to improve supplies.

The Ministry of Health received additional funding of 7.8 billion euros for the purchase of materials from the federal government. Part of the proceeds will be provided by federal states and funds. The federal government centrally procures materials and equipment for intensive care hospitals through a € 5 billion allocation. COVID-19 has spread rapidly despite the active action of the German

government. It has led to a crisis in the health care system (Figure 1). Compared to the Czech Republic, the spreading of the virus in Germany exceeds the cumulative rate by an

average of 17 times for the period 01/03/2020 - 30/09/2020.

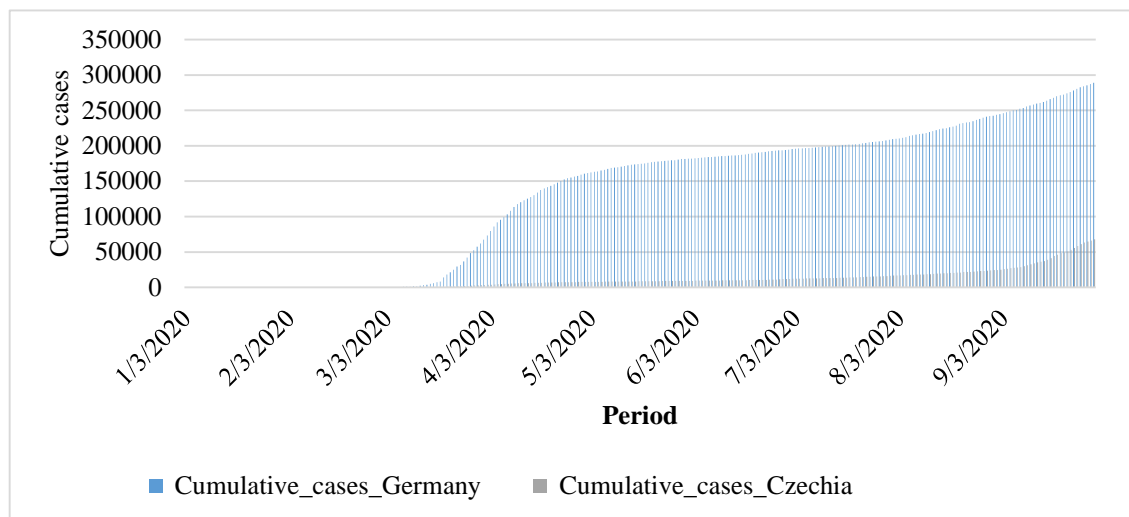


Figure 1. Germany and Czech Republic Cumulative cases COVID-19 statistics, 01/03/2020 – 30/09/2020 Source: World Health Organization (2020).

The crisis necessitated the rapid adaptation of infrastructure, labor and management strategies to start dynamic change. This has led to a high mortality rate in Germany compared to the Czech Republic (Figure 2). Therefore, the crisis in Germany was deeper and the management of medical institutions in this country required serious mechanisms. In the Czech Republic, the public initiative COVID-19 provided research and preparation for mass production through mass fundraising to finance the production of 250 ventilation systems. The government has simplified product licensing. It was done by making product design publicly available.

There was a shortage of various types of protection in the Czech Republic due to growing demand, market shortages, low inventories in the Office of State Material Reserves. The Ministry of Health, as it is in Germany, carries out centralized crisis management. In particular, the free sale and export of FFP3 respirators is prohibited, prices for respirators are regulated, the export of disinfectants is prohibited, stocks of medicines for treatment (Plaquenil) are regulated, accelerated licensing procedures for new medical devices and devices (for the treatment of COVID-19), including development, registration and obtaining a production permit.

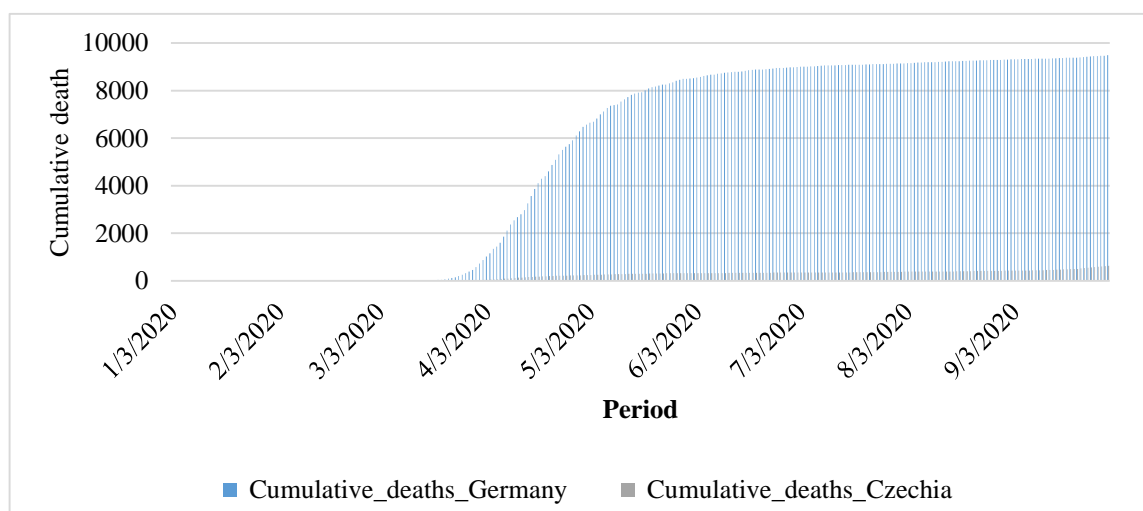


Figure 2. Germany and Czech Republic Cumulative cases COVID-19 statistics, 01/03/2020 – 30/09/2020 Source: World Health Organization (2020).

The Czech Republic has organized an air bridge with China to provide the population with protection, signed agreements with domestic manufacturers for the production of new types of respirators (Czech Technical University and TRIX Connection).

Workforce

Germany is increasing the level of human resources through the initiatives of medical institutions. Experience also shows the involvement of regional authorities and the federal government in the management of human resources in a crisis. As a result, the rate of increase in the number of medical institutions, training, advanced training, redistribution of responsibilities and functions is ensured. This provides flexibility of response and growing demand, increasing morbidity under conditions of increased pressure on medical resources, shortages of nurses (Table 2). "Nurses had a crucial role in providing intensive care and assisting with daily living activities" (Liu *et al.*, 2020).

Additional measures to expand existing human resources were focused on four areas: proposing physicians with part-time job to shift to full-time work; an appeal to medical students, nurses and employees of related health specialties to work in the clinical field; involvement of medical workers of retirement age in clinical practice; simplification of procedures for mutual recognition of foreign health professionals. Management of human resources takes place at the national and regional levels. Medical facilities are still limited in coordination. National and regional levels of government do not provide monitoring, supply and demand planning. Strengthening of human resources occurs through training and instruction in intensive care units through decision-making at the regional level. In general, in Germany education is decentralized and is at the level of hospitals and federal states. For example, coordination is carried out by the Association of Nurses in Rhineland-Palatinate and the costs are reimbursed by the country.

Table 2. Comparison of labor resources: Germany and the Czech Republic

Criterion	Germany	Czech Republic
Advantages	Redistribution of functions and responsibilities of employees, training and education Flexibility to respond to the crisis Employees shift to full-time Involvement of pensioners and students with medical education Simplification of procedures for recognition of foreign specialists in the medical field Ensuring flexibility in decision-making in planning and staffing Flexibility in the performance of functional responsibilities and division of tasks	Positive epidemiological development Provision of human resources Suspension of planned and non-urgent procedures 3,000 students worked as volunteers Volunteer training, online courses Childcare for medical staff Enabling foreign physicians not to take the Czech specialized exam Psychological assistance (hotline)
Disadvantages	Limited coordination and planning at the federal level	Regular vocation is prohibited Mandatory order for medical students to go to work after two years of study

Source: World Health Organization (2020).

The training involves a 16-hour training course to gain basic knowledge in lung ventilation and symptom control in patients with COVID-19 or a 16-hour refresher course for former intensive care nurses. "The intensive work drained health-care providers physically and emotionally" (Liu *et al.*, 2020). Therefore, government measures are aimed at eliminating physical and emotional stress. So, staff is provided with short trainings and courses in Germany. There is a redistribution of responsibilities to ensure flexibility, reducing the burden on health workers. Professional associations provide medical staff with free access to news, instructions, articles and webinars concerning treatment and patient care. "Regular and intensive training for all health-care providers is necessary to promote preparedness and efficacy in crisis management" (Liu *et al.*, 2020).

In addition, medical staff can receive psychological care based on international standards, medical students have the opportunity to pass exams for greater involvement in the practice of medical institutions, long-term care professionals receive 1,500 euros for working with patients, medical staff receives a bonus and interns have one-time assistance in amount of 900 euros. There were no problems with human resources at the beginning of the spread of the Covid-19 in the Czech Republic. Medical

institutions were exempted from carrying out scheduled and non-urgent procedures, which reduced the number of contacts of medical workers. There is no need for reallocation of human resources in the Czech Republic. About 3,000 students volunteered on a voluntary basis, prompting the government to respond by approving a decision to hire medical students if needed. Medical institutions are satisfied with the work of volunteers, which indicates a high level of training of medical staff in universities. Training and online courses are provided in medical organisations.

Regional authorities provide care for the children of medical staff and other vital areas. Medical workers are prohibited from taking regular leave in case of emergency from April 10, 2020. Foreign specialists are allowed to continue working without passing a specialized exam. To support medical staff, the government has set up hotlines to provide psychological assistance.

Strategic leadership

Strategic management in a crisis includes an action plan and health system management to ensure stability. The strategy includes mechanisms of action in case of emergencies in the field of dissemination of information, regulation and provision of services to the population. "Citizens and their leaders need to think carefully, weigh

risks in context, and pursue policies commensurate with the magnitude of the threat" (Jones, 2020). The Robert Koch Institute in Germany advises the competent authorities concerning measures to prevent and detect serious infectious diseases, prevent the spread of such diseases. This institute advises higher health authorities on measures that cover more than one federal state (Table 3). The Federal Ministry of Health is authorized to implement measures for the provision of pharmaceuticals and medical devices, including drugs, laboratory diagnostics, staff protective equipment and disinfectants. The Ministry of Health is strengthening the human resources of the health care system. For example, health care workers are authorized to perform medical functions if they are qualified.

In general, federal agencies, such as the Robert Koch Institute and local communities (public health departments) are fulfilling their responsibilities to support federal and regional measures to counter the pandemic. On March 4, 2020, the Robert Koch Institute in Germany updated the Preparedness Plan for the Crown Virus Pandemic. The main goal is to reduce morbidity and mortality, ensure the treatment of patients and provide accurate information to the public, society and the media. The Plan assesses the criteria of risk, diagnosis,

surveillance and communication. The plan provides three phases: containment, protection and mitigation. There is an Anti-Crisis Management Committee in Germany headed by the Ministry of Health, the Ministry of the Interior, Construction and Regional Development. The Robert Koch Institute, the Federal Institute for Medicines and Medical Devices (BfArM) and the Paul Ehrlich Institute (PEI) provide advisory support to the Committee. In Germany the Federal Cabinet of Ministers and the Chancellor of the Cabinet on issues related to Covid-19 were reorganized. These government agencies make collective decisions on long-term plans and projects in all areas of the economy, given that the pandemic affects all sectors and industries. In the Czech Republic countermeasures against COVID-19 are carried out centrally by the Ministry of Health, the Central COVID-19 Situation Management Group and the Central Crisis Staff. The Central Committee for Epidemiology monitors, coordinates and manages public health. The COVID-19 Central Management Group (Centrální řídicí tým COVID-19) advises the government, in particular with the authority to carry out "reasonable quarantine" measures. Such measures are aimed at gradually reducing non-pharmaceutical interventions. The group is developing recommendations for centralized control of the spread of the virus.

Table 3. Strategic management: Germany and the Czech Republic

Criterion	Germany	Czech Republic
Advantages	<p>Legal regulation (Law on Protection against Infections) at the national level</p> <p>Institutional support: providing recommendations by the Koch Institute to state authorities at the national and federal levels, internationally in the role of coordinator of the European Network of Epidemiological Surveillance and Control of Infectious Diseases.</p> <p>The Crisis Management Committee was formed. The Covid-19 Cabinet was reorganized.</p> <p>The influenza pandemic preparedness plan was published in 2005 and is updated regularly. This plan is based on the conclusions of evidence-based medicine. The plan covers the regional level and the level of local communities (regional pandemic preparedness plans)</p>	<p>Clear definition of government responsibilities and crisis management. Centralized management.</p> <p>Epidemiology Authority (Central Committee)</p> <p>Regular update of the action plan "Pandemic Action Plan"</p> <p>Functioning of the Central Crisis Staff</p> <p>Fast approval of legislative changes, acceleration of procurement procedures</p> <p>Formation of advisory bodies</p> <p>Communications are made through the websites of the government and relevant ministries</p>
Disadvantages	<p>Lack of long-term forecasts. The Action Plan was developed and updated during the spreading period of the Covid-19</p>	<p>The Central Crisis Staff started its work only after a few days after declaring an exceptional situation</p>

Source: World Health Organization (2020).

The Czech Republic is constantly monitoring the epidemic to curb the epidemic. "Monitoring infection rates and effective reproduction numbers continuously may effectively allow for quality improvement methods to be used to evaluate public health policies, provided data can be drawn continuously from different sources" (Hartley & Perencevich, 2020).

Criteria for crisis management are the experience of other countries, the needs of people to maintain a certain level of income, the condition of the private sector. The Czech Republic analyzes the situation every 14 days. In general, flexibility and adaptability are key elements of strategic crisis management. "The circumstances are rapidly

changing, even hourly; therefore, the principles are meant to be fluid and adaptable" (Stephens et al., 2020).

CONCLUSION

The experience of managing medical institutions in the crisis of Germany and the Czech Republic shows the centralization of functions, responsibilities at the national level through strategic action plans, readiness and formation of anti-crisis authorities. Authorities of national and regional level, state organisations for providing consultations and recommendations, ministries of other socially important spheres of life are involved in the management process. Management processes and

mechanisms are characterized by speed, flexibility and adaptability to the changing crisis situation.

The government engages the private sector in the supply of materials and equipment, speeds up licensing procedures, engages health professionals in treatment practices, allocates financial resources to increase the motivation of health professionals and provides psychological support. Medical institutions in Germany and the Czech Republic have the opportunity to provide education and training for young health professionals. In Germany there was a rapid reorganization of services to the population and the reorganization of medical institutions, while the Czech Republic is sufficiently staffed. A digital market has been formed in Germany to provide medical institutions with means of protection. The private sector has been involved in production. In the Czech Republic the government has provided the population with means of protection through supplies from China. There is no monitoring and long-term planning of the spread of the virus in Germany, while the situation is constantly monitored in the Czech Republic. At the same time, Germany is developing promising crisis response projects. Strategic management is based on the flexibility and adaptability of the health care system to possible changes, the needs of the population.

The experience of functioning of mechanisms of management of medical establishments in the conditions of crisis depends on an initial condition of human resources, physical infrastructure, institutional capacity of authorities at national and regional levels. A strategic and comprehensive approach to crisis management in Germany and the Czech Republic proves the effectiveness of counteracting the consequences of the crisis.

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