

ORIGINAL ARTICLES

CoViD-19 disease, Romanian health system response to outbreak and economic impact

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Abstract: The pandemic called COVID-19 disease has an exponential course since the first cases were reported showing in 9th of May, 2020, more than 4 million cases of COVID-19. United States and European Council (EC), together with other European Union institutions, were closely monitoring the situation in order to take quick action.

Objective: The aim of this article is to analyze the response to COVID 19 pandemic outbreak in term of strategy and money flow of Romanian health system in order to identify the strength and weakness and prepare for other similar provocative challenges.

Global and national strategy: United States Government is delivering a comprehensive package of services to support international partners around the world in combatting this disease adding American expertise for global benefit, saving lives by improving international partners abilities to respond to the COVID-19, and reducing secondary impacts. Meanwhile European Union is focused on 6 major coordinates limit the spread of the virus, ensure and provide medical supplies, decrease negative economic impact, support jobs, promoting research and help European citizens to repatriate. Despite all negative elements a proper and relatively quick response of Romanian Public Health System was noticed and the taken measures were harmonized and synchronized with the European coordinates, prioritize initiatives, build an action plan, establish a communication plan, workforce optimization and management strategy.

Conclusion: Global shock needs global response, with little or no government interventions, economic costs will be huge.

Keywords: COVID-19, SARS-CoV-2, Coronavirus, pandemic financial impact, hospitalization cost

BACKGROUND

COVID-19, coronavirus disease, is caused by a new type of coronavirus (SARS-CoV-2) and it was first identified in China in December 2019 when an outbreak in the municipality of Wuhan was described as quickly spreading to other regions of China and worldwide [1, 2]. By 7 of January 2020, isolated

cases had appeared in some European Union (EU) member states. At the end of February 2020, Italy reported a significant increase of coronavirus disease (COVID-19) cases concentrated in two of the northern regions of the country [3]. By March 2020, all European Union (EU) member states had reported an exponential increase of COVID-19 cases. European Council (EC), together with other EU institutions, is closely monitoring the situation in order to take quick action [3]. This includes approving of relevant European

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Union legislation and ongoing coordination with member states to share information, assess needs and ensure a coherent European Union wide response under direct coordination of The World Health Organization (WHO) [3]. On 11 March 2020, the World Health Organization (WHO) declare COVID-19 as global pandemic with an important issue: in this declaration they were talking about geographic spread, and not about the severity of the disease [4].

The pandemic called COVID-19 disease has an exponential course since the first cases were reported showing in 9th of May, 2020, more than 4 million cases. Disease caused by the new coronavirus that was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, COVID-19, have been reported globally with more than 286,000 deaths in 180 countries, including all United States with 1,4 million persons recovered [3, 5].

As epidemiological pattern, all groups of ages are at risk for infection including here severe form of disease, even death. However, seems that the probability of fatal disease is highest in people aged more than 65 years, those with comorbidity and those living in a nursing home or long-term care facility [6, 7, 8]. Of underlying condition, especially when those are not controlled is appropriate to mention as major risk factor for severe or critical COVID-19 disease [3-7]: Hypertension, Obesity, Chronic respiratory disease, Cardiovascular disease, Cancer, Renal disease, Diabetes [9]. As for diagnose WHO recommends as gold standard nasopharynx samples to be used in order to detect SARS-CoV-2. Nasal swabs or oropharyngeal swabs may be acceptable alternatives [9]. Lower respiratory tract samples have a demonstrated higher sensibility than upper tract samples, but WHO recommend not to obtain because of concerns about aerosolization of virus during collection procedures. Regarding treatment, no drug has been proven to be safe and effective for treating COVID-19. There are no Food and Drug Administration (FDA) or EMEA -approved drugs specifically to treat patients with COVID-19. In the medical literature, reports have appeared claiming or promoting successful treatment of patients with COVID-19 using a variety of agents [6, 8, 9]. A single conclusion has emerging: definitive clinical trial data are needed to identify optimal treatments for this disease. General clinical management of patients with COVID-19 includes infection prevention, control measures and supportive care, including supplemental oxygen and mechanical ventilatory when indicated. In is also compulsory to mention that as in the management of any disease, treatment decisions ultimately reside with the patient and their health care provider [6, 7, 9, 10, 11, 12].

Behind the medical challenge generated by COVID-19

pandemic and all concerns, analyst anticipate an economic crisis. That is why worldwide governments are involved in generate measures in order to decrease negative economic impact.

OBJECTIVE

The aim of this article is to analyze the response to COVID 19 pandemic outbreak in term of strategy and money flow of Romanian health system in order to identify the strength and weakness and prepare for other similar provocative challenges.

GLOBAL ANALYSIS AND DISCUSSION

If we have to define the concept of support, probably in the last 50 years the United States (U.S.) will fit perfectly since they have been the largest contributor to global health security [4]. US built the foundation upon which the global health system is based, contributing more than \$140 billion in global health assistance only in the last century and nowadays demonstrate leadership in fight to COVID-19 pandemic. From the beginning of the outbreak of COVID-19, the United States government provided more than \$500 million in assistance specifically aimed to support anti-pandemic measures [3, 4, 13, 14].

But this is not all, US Government is delivering a comprehensive package of services to support international partners around the world in combatting this disease. The program should add American expertise for global benefit, saving lives by improving international partners abilities to respond to the COVID-19, and reducing secondary impacts [13, 14].

The strategy mentioned is focus to: Save lives by increasing international partners ability to respond to the pandemic; Reduce secondary impacts of the disease; Promote U.S. leadership for global benefit [13].

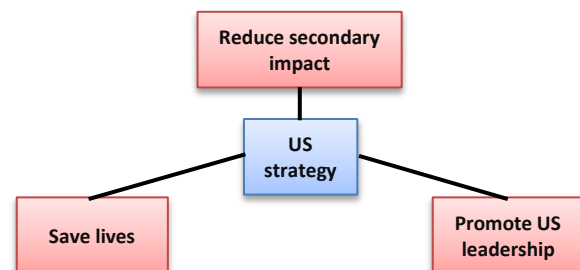


Figure 1: US Strategy for COVID-19 [13, 14]

The United States (US) was delivering a SAFE and more secure world from COVID-19 program as is state in the

following table [13,14].

The European Union's (EU) response to COVID-19 outbreak focuses on 6 major coordinates as they are mentioned above [15,16].

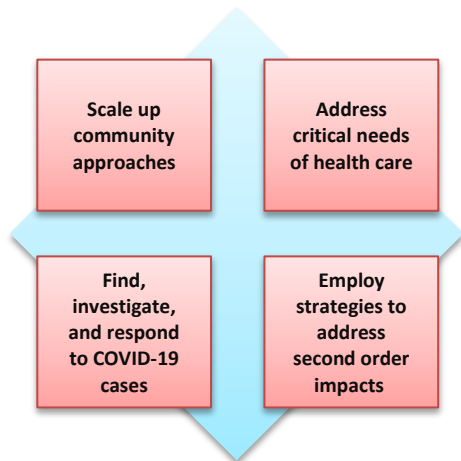


Figure 2: US program SAFE for a safer and more secure world from COVID -19



Figure 3: European Union strategy for COVID-19 disease [15, 16]

In order to slow down the transmission of the virus, European Union (EU) leaders agreed on a coordinated temporary restriction of non-essential travel to the EU for 30 days. The travel of European citizens outside the EU acquires negative recommendation. To coordinate the EU response to the COVID-19 outbreak the following measures were taken [15, 16, 17]:

- The Council activated the EU an integrated political crisis

response (IPCR) with mandatory weekly roundtables gathering EU institutions, EU agencies experts and representatives of member states

- European Commission and the Council are gathering contact and coordination between relevant national ministries
- The European Centre for Disease Control (ECDC) quantify daily risk assessments and epidemiological updates for the EU population.

By using the union civil protection mechanism, the EU has: coordinated the deployment of medical teams to most affected areas, facilitated the sourcing for additional protective equipment, especially medical masks, activated the Emergency Response Coordination Centre, to coordinate support 24/7, created a new common European reserve of emergency medical equipment including also ventilators and lab supplies. More than €300 million was allocated for research and support initiatives in medical field and a European COVID-19 data portal was launched to ensure the rapid collection and sharing of available research data [15, 16, 18, 19].

The EU and its member states are taking action to minimize the negative impact of outbreak on the economy. On 9 April 2020, the Eurogroup generated, three immediate safety nets, worth €540 billion for: protect and generate new jobs and businesses in member states. The EU is putting forward temporary support to mitigate unemployment risks in an emergency (SURE) to help people keep their job during the crisis. The scheme consists of loans to member states of up to €100 billion to cover the costs related to the creation or extension of national short-time work schemes. European Investment Bank (EIB) Group to create a pan-European guarantee fund providing that way loans up to €200 billion for companies with a focus on small and medium-sized enterprises (SMEs) throughout the EU [15, 17, 18, 19].

European Stability Mechanism set up Pandemic Crisis Support based on an existing credit line, which will include loans available to all euro area member states up to 2% of their internal product estimated at €240 billion. The EU also has increased its budget for 2020, with €3.1 billion as response to the COVID-19 crisis [18, 19]. This additional fund will be used to purchase and distribute medical supplies, including protective gear and ventilators, boost the production of testing kits, build mobile hospitals, transfer patients for treatment in between member states, repatriate EU citizens stranded abroad [19].

The EU has also adopted measures to ensure additional flexibility in the use of structural funds. On behalf of

Coronavirus Response Investment Initiative Plus member states can transfer money between different capital lines in order to meet their needs, resources can be redirected to the most affected regions and the opportunity request up to 100% financing from the EU budget between 1 July 2020 and 30 June 2021 for programs involving measures with impact in the COVID-19 pandemic [15, 16]. The EU and its member states were working to repatriate more than 650.000 EU citizens stranded abroad. EU countries and EU delegations provide consular assistance to help EU citizens return home, providing 75% of the costs of the return flights and add measures in order to help them to cross EU borders [16].

Although Li et al [10] estimate that 86% of all infections were undocumented prior to 23 January 2020, when travel restrictions were beginning per person, the transmission rate of undocumented infections was 55% from all of documented cases. Due to their increasing factor, undocumented patients were the source for 79% of documented cases [12]. They conclude that two favorable conditions are rising: existing estimates of case-fatality rates might be over-estimate and a grade of immunity is present in the system [12]. But they underline also that probably when interventions started in Europe and US the virus was already widely spread and simulation regarding on how measures of suppression will flatten the curve in the short period may be over-optimistic [12].

NATIONAL STRATEGY AND HEALTH ECONOMIC IMPACT

Geopolitical context

Romania is one of the countries that has to face the infection of the population with the new coronavirus. The most recent statistics shows that Romania has around 4.7 mil people that lives outside the country and they are spread all over the world [3, 19, 20].

According to statistics reported by the Ministry of Foreign Affairs from the total number of the Romanians that lives outside the borders in Italy lives 1.206.938 people which means that around 25% are located in the country that has the largest outbreak of the pandemic, and around 19% lives and works in Spain. This is the reason why Spain has become the second deadliest hotspot for COVID-19 after Italy with 27.967 cases and its death toll reached 24.824 on 1st of May 2020 [19, 20].

Having Italy as a "model" of how fast the virus spread among the citizens, medical stuff and hospitals and that no real actions were made until the spread was out of control, Romania introduced lockdown measures at an early stage in the outbreak: cancelled almost all flights in and out of the country, starting with the ones from the red zone,

authorities were also quick to close bars, restaurants, cinemas and schools. Police were urging people to stay at home [19, 20].

The representatives of the Intersectoral Committee for the Prevention and Limitation of Diseases with the New Coronavirus (COVID-19), together with the representatives of the authorities responsible for this field, held a teleconference on the evening of February 22, 2020, taking into account the evolution of cases in Italy areas where many Romanian citizens are or traveling from [19].

After this point the public health authorities included persons arriving in Romania from the affected localities in the Veneto region and the province of Lodi / Lombardy or who have traveled to these localities in the last 14 days, in the category of those who must stay in quarantine for 14 days after entering the country. These measures were similar to those applied by the Italian authorities. At the same time, upon arrival in Romania, all asymptomatic passengers from the affected areas, respectively Hubei (China) or from 11 regions of Italy will be sent to quarantine for a period of 14 days [1, 2, 19].

New measures were sent by the Ministry of Health to the health units and family doctors, through the county and Bucharest public health directorates which included [21]:

- measures to control and prevent infection with the new coronavirus at land, sea / river and air border crossings. The Ministry of Health provided the necessary medical staff at the border crossing points, with specialists from the public health directorates, including by secondment from other counties and health units;
- all persons, who fall within the definition of a suspicious case, should be reported immediately by all health units where they appear (emergency units, hospitals, family doctors) to the public health departments and the Monitoring Service within Emergency Situation Department (DSU);
- Ministry of Health completed the legislative framework with necessary measures for quarantine and for the management of suspected and confirmed cases of coronavirus infection (COVID-19);
- public information campaign on the new coronavirus infection;
- individual and collective prevention measures were taken and extended with a daily information bulletin on the evolution of the situation at international level and any additional measures taken by the Romanian authorities;

Also, on March 10, 2020 the Ministry of Health

operationalized the Operational Coordination Center, a unit that establishes in operational time the connection with the public health directorates and health units under the Ministry of Health subordination, to identify in real time the risk situations associated with COVID 19 infection and to establish measures that are required [20, 21].

The Operational Center had to provide up-to-date information and all the useful and vital information to establish the correct measures for the epidemic phases, real time stocks of medicines, medical equipment and disinfectants existing at national level in hospital units, the number of medical staff involved in the actions in order to limit the spread of infection, the number of free beds in infectious disease departments and Intensive Care Units [21].

Other important measure was to limit the scheduled hospitalizations in the hospitals coordinated by the Ministry of Health, in relation to the degree of bed occupancy (including ICU beds) and the local epidemiological evolution corroborated with daily report the situation of bed occupancy of the hospitals in the centralized electronic system of the Coordination Center. This measure was necessary both to ensure the capacity of hospitals to take over cases and to manage material and human resources correctly and efficiently [21].

Adequate public communication was ensured so that, during this period, the public could turn to hospitals only for emergencies. The aim was to avoid congestion in the sanitary units [21]. At that point was established a support network for infectious disease hospitals depending on the contagiousness of non-coronavirus cases. These hospitals are going to be support hospitals, in which patients will be transferred from the Infectious Diseases Hospital. In a first phase, was recommended that the support hospitals not be represented by the important emergency hospitals in the area, which can provide medical assistance for the other medical-surgical emergencies [21].

The Ministry of Health Plan also provides measures in case of extend of the crisis and in case of capacity exceed of Infectious Diseases Hospitals, as well regulations on the use of protective equipment [21].

On March 11, 2020 at the proposal of the Ministry of Health, the National Committee for Special Emergency Situations issued an order for including the temporary suspension, for a period of 6 months, of distribution, outside Romania, of medicines, medical devices and sanitary materials essential in prevention and treatment conditions associated with COVID-19 infection [21].

This measure is part of the action plan of the Ministry of

Health which aims to provide adequate and continuous stocks of medicines, medical devices and essential medical materials in this situation. The list was going to be established together with the experts from the specialized commissions of the ministry, taking into account in particular, medicines such as: antivirals, anti-inflammatory, antibiotics, antipyretics, antifungals, anesthetics, sedatives, as well as other medicines considered necessary in the treatment of cases of COVID-19 and their complications [21].

The list also included medical supplies and medical devices such as overalls, gloves, syringes, masks, goggles, disinfectant solutions, as well as other medical supplies and devices identified as necessary for the management of COVID-19 cases [21].

The Centre for Supervision and Control of Transmissible Diseases issued recommendations which were published on 12 March 2020 [21].

- The preventive measures considered as most effective include: frequent hygiene of the hands with hydro-alcoholic substances through friction if hands are not visibly dirty, or with water and soap if the hands are dirty; avoid touching eyes, nose and mouth; practice respiratory hygiene by coughing or sneezing in the elbow, or use napkin/tissues and throw it away immediately; wearing a mask if the person has respiratory symptoms and ensuring in such case the hygiene of the hands after removing the mask; maintain the social distance of minimum 1 meter from the persons with respiratory diseases.

- Protective Personal Equipment (PPE) must be used based on exposure risk and based on the dynamic of transmitting the pathogen agent. The overall use of PPE will have a supplementary impact on the lack of supplies of PPE.

- The state office mentions that for the people with no symptoms, it is not recommended to use masks of any type. The wearing of the masks when it is not recommended can cause useless costs, a burden on purchases and can create a false feeling of security that can lead to the neglect of other essential prevention measures.

Threats and weaknesses

In order to analyze the response to COVID-19 outbreak, we identify a panel of weaknesses which conduct in early stage to quick spread of the virus and generate uncontrolled local outbreaks:

A panel of negative elements should be considered when we analyze the Romanian Health System response to outbreak.

- Low infrastructure in term of hospitals, circuits, Intensive Care Units and number of available PPE for health workers

- Administrative human resources with lack of management skills, unable to generate procedures and coordinates the Public Health Departments

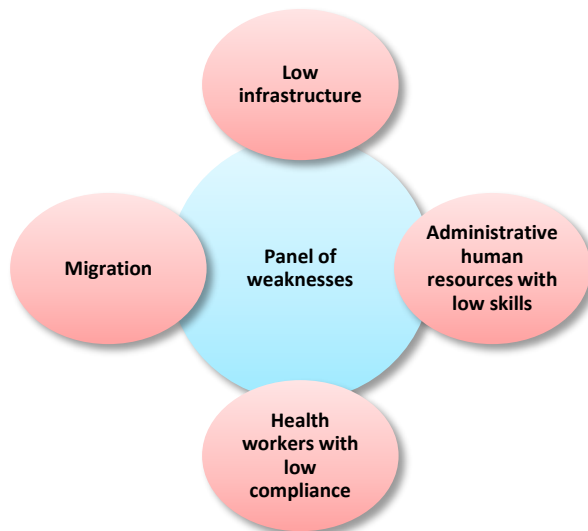


Figure 5: Panel of weaknesses regarding response to COVID-19 outbreak

- Health workers with low compliance at medical information and epidemiologic resources, unwilling in many situations to respect the new statement measures and legislation provided by Ministry of Health and National Health Institute
- Not as a last item, migration, the return of Romanian citizens from pandemic areas of Europe crossing the borders using in many situations false document of false declaration and being extremely low compliant of rules and measures, regarding quarantine or in self isolation

Ministry of Health strategy

Despite those negative elements a proper and relatively quick response of Public Health System and it could say that the taken measures were harmonize and synchronize with the European coordinates. Romanian Government through Ministry of Health established 5 directions as a strategy which enhanced the national response to COVID-19 disease.

When “everything is vital and important”, Ministry of Health and the other public institution involved in fighting the pandemic had to prioritize the initiatives. In order to do that a Plan of measures for the preparation of hospitals in the context of the COVID-19 Coronavirus epidemic was approved. This plan was the base of the strategy framework regarding the hospitals that can treat patients infected with COVID19. In collaboration with the local public

administration authorities, based on the local analysis of patient care capacities, was generated and approved the List of support hospitals for COVID - 19 positive patients requiring treatment for specific pathologies (eg heart disease, orthopedics, etc.)

Thus, a number of 57 hospitals/outpatient departments/buildings, 44 maternity hospitals, 60 hospitals and centers for performing dialysis procedures in all counties of the country and Bucharest were identified and designated as support units.

Supportive cases of COVID 19 that require medical care for other pathologies are also treated in support hospitals.

As a first step, designated support hospitals are non-emergency medical units that can provide medical care for other medical and surgical emergencies. Included in the network of support hospitals, municipal/city units and hospitals in other counties mainly those with Infectious Diseases departments, as well as hospitals in other networks than the Ministry of Health (Ministry of Transport, Ministry of National Defense, private health units).



Figure 6: Romanian Ministry of Health direction strategy

“The plan of measures for the preparation of the hospitals was elaborated by the specialists within the specialized commissions ICU, infectious diseases and specialists within the Ministry of Health, based on the recommendations of the WHO and EC. I asked the managers of the health units, but also the public health departments, the ambulance services to inform the medical and auxiliary staff, repeatedly, the procedures to be followed in this crisis situation, all the existing measures in the plan of measures, especially the

regulations. regarding the prevention measures and the correct use, depending on the exposure, of the medical staff, but also of the auxiliary” [21].

Also, all health units from public and private system have the obligation to ensure the provision of medical care to all patients, in accordance with the disposition of the approved plan of measures. Any refusal to ensure the provision of medical care according to the specific attributions it's going to be sanctioned according to the legal disposals [21].

Develop an action plan

In order to be able to control and establish the right measures Ministry of Health with the help of the Operational Center were able to collect in real time the stocks of medicines, medical equipment and disinfectants existing at national level from the hospitals, the number of medical staff involved and the number of free beds in infectious disease departments and Intensive Care Units.

As we could see the plan is to deliver the equipment or medication where is most needed, or to purchase the equipment or medication where is most needed.

In order to simplify the Purchases of materials, medicines and equipment necessary to combat the COVID-19 pandemic, during the state of emergency, are made directly by the central and local public authorities, the legal entities in which the state is the majority shareholder, the public health directorates, the health units, as well as the National Administration of Penitentiaries and the units subordinated based on the obligation to draw up a note justifying the necessity of the acquisition.

Regulations have been approved on the use of personal protective equipment (PPE) at the level of the health unit, rationally and correctly, depending on the department, staff and type of activity. Thus, in the context of COVID-19, personal protective equipment should be used based on the risk of exposure (eg type of activity) and the transmission dynamics of the pathogen (eg contact, drops or aerosols).

The type of PPE used when caring for patients with COVID-19 will vary depending on the situation, healthcare staff and work carried out. Medical personnel involved in the direct care of patients should use the following PPE: gowns, gloves, mask and eye protection (goggles or face shield).

Specifically, for aerosol-generating procedures for patients with COVID-19 (eg: intubation, noninvasive ventilation, tracheostomy, cardiopulmonary resuscitation, manual ventilation before intubation, bronchoscopy, gastroscopy, and COVID PCR testing) medical personnel should use as protection, gloves, gowns, masks FFP2 and FFP3; waterproof

aprons will also be used if overalls/gowns are not waterproof.

Build a communication plan

Creating a communication plan to collect key information from stakeholders regarding the planned initiatives and the capacity building was an important step in order to manage media coverage of the topics related to the new coronavirus infection.

Therefore, by the Decision of the National Committee for Special Emergency Situations no. 2 from February 24 2020 The Strategic Communication Group was established and it consists experts from several institutions like Ministry of Health, Ministry of Defense, Emergency Situation Department, National Institute of Public Health, General Inspectorate for Emergency Situations.

In order to support the population a Free Direct Line (Telverde) has become operational for coronavirus information in coordination of National Institute of Public Health and people can request information on how the virus manifests itself, how to prevent the disease and other details related to preventive behavior. However, the experts informed the populations that if they have any health problems or suspect that you may be infected, to continue to call the emergency number.

Workforce optimizations strategies

The evolution of the epidemiological situation determined by the spread of coronavirus on the Romanian territory, as well as the declaration of the pandemic by the World Health Organization determined the public health risk assessment for the next period as a result of the increased number of active surveillance, early detection, isolation and treatment of positive COVID 19 cases, follow-up of contacts and prevention of the continuous spread of the infection which imposes the need for additional staff involved in these activities [3, 20].

Therefore, at the proposal of the Ministry of Health, the Government of Romania approved the supplementation with 2000 positions within the county public health directorates and county ambulance services for a determined period of 6 months with 2000 positions [21].

In the current situation, the operative crews of the ambulance services are involved both in the transport of patients confirmed with COVID-19, and in the collection of samples from people in quarantine or home isolation.

Also, the staff of the public health directorates ensures the epidemiological triage from the border crossing points, monitors the self-isolated persons at home, monitors the

quarantined persons, collects field samples from the persons corresponding to the case definition for testing for COVID-19.

Currently, the number of posts allocated and fully distributed by ministerial order for the county and Bucharest public health departments is 3.862, and for the county ambulance services and the Bucharest-Ilfov Ambulance Service is 11.733 posts [21].

In order to prepare the health units and the health system and the emergency system to cope in case of an exponential increase of the cases with COVID and in case of signaling a personnel deficit in some areas it was necessary to detach the health personnel to cover the needs in the area. Therefore, specialized medical staff, primary care physicians, specialists or residents, medical staff, health auxiliaries and medical staff with higher education (chemists, biologists, biochemists, physicists, pharmacists and balneo-physiotherapists) employees of public health units are about to be seconded or delegated to other public health units that have a major staff shortage.

Management strategies

The socks which make up the pandemic cause a sharp drop in consumption and investment all over the world. With the previous experiences of pandemics, governments across the world have exercised a stronger caution towards outbreak by taking early measures, such as straitening the health infrastructure to prevent the outbreak.

With the measures taken by MoH regarding the fact that many hospitals were force to close outpatient departments and postponing or canceling elective visits and procedures,

it's most likely that the financial viability to be threatened, especially for those with preexisting financial challenges and those heavily reliant on revenue from outpatient and elective services.

A 2018 report from the Agency for Healthcare Research and Quality suggested that elective admissions accounted for more than 30% of total inpatient hospital revenue [22]. Elective procedures, especially orthopedic and cardiac surgical procedures, are among the most profitable services for hospitals[23]. By one estimate, hospitals earn \$700 more for elective admissions than for admissions through the emergency department [24]. Furthermore, for many hospitals, outpatient revenue now equals inpatient revenue, elective or otherwise [25].

Also in Romania though reduced outpatient and elective revenue may be partially offset by higher hospital and intensive care unit occupancy during the COVID-19 pandemic, and by an increase in services after the pandemic ends, this may not mitigate losses (particularly given the need for surge personnel and resources) or be evenly distributed across hospitals.

The COVID-19 pandemic represents an unprecedented medical and economic challenge for the Romanian health care system. In the absence of robust and sustained governmental support, almost all hospitals will experience financial difficulties.

But hospitals that are smaller, independent, rural, and have critical access status are particularly at risk. Policymakers provided dedicated support to these hospitals to access funds and allocated additional funding to them during the COVID-19 pandemic.

Table 1: Global Healthcare Systems Data

Country	Australia	New Zealand	Germany	UK	US	Romania
Healthcare expenditures per capita	AU \$7845 (\$5,612)	NZ \$5,892 (\$4,015)	€4,544 (\$4,924)	£2,989 (\$2332)	\$10,612	€1,029 (\$1,115)
Medical practitioners per 1,000 people	3,94	3,35	4,3	2,8	2,6	2,8
Beds per 1,000 people	3,9	2,6	6	2,5	2,8	6,8
Population aged +60 (%)	21,4	21,3	28,2	23,8	17	22,6

Source: https://insse.ro/cms/files/publicatii/Romania_in_cifre_breviar_statistic_2018.pdf, <https://www.ibisworld.com/industry-insider/coronavirus-insights/effects-of-covid-19-on-global-healthcare-systems/> [26]

According to the Medical Group Management Association, 97% of medical group practices have experienced a negative financial impact directly or indirectly related to COVID-19.

On average, these practices report a 55% decrease in revenue and a 60% decrease in patient volume since the start of the COVID-19 public health emergency [20, 24, 25].

In order to evaluate if Romania can face the expenditures due to COVID-19 outbreak we tried to compare data from different global healthcare system in their heroic and unprecedented ways to meet the challenges of COVID-19.

Hospitals and health systems face catastrophic financial challenges in light of the COVID-19 pandemic. We undertook four analyses to better understand and quantify these financial challenges.

Including:

- the effect of COVID-19 hospitalizations on hospital costs;
- the effect of cancelled and forgone services, caused by COVID-19, on hospital revenue;
- the additional costs associated with purchasing needed personal protective equipment (PPE); and
- the costs of the additional support some hospitals are providing to their workers.

a) Net Financial Impact of COVID-19 Hospitalizations

At this time there are no official estimates of the net financial impact of COVID-19 hospitalizations but for the over 6,800 patients tested positive until end of April, an expense of over 77 million lei (approximate 15 million euros) is estimated by the Ministry of Health [21, 26].

Table 2: Expenditure on protective equipment against COVID-19

Equipment	LEI	Euro
Protective coveralls	50,5 mil	10,4 mil
Disposable gown	15,2 mil	3,1 mil
Disposable caps	876,000	180,000
Disposable boots	3,1 mil	653,000
Disposable sort	732,000	150,000
Disposable gloves	7,7 mil	1,6 mil
Protective eyewear	2,2 mil	453,000
Protective visors	3,1 mil	640,000
FFP2 Mask	19,4 mil	4,1 mil
FFP3 Mask	2,4 mil	510,000
Surgical Mask	36,9 mil	7,6 mil
Disinfectant	21,8 mil	3,1 mil
Total	153,9 mil	32,5 mil

Source: Ministry of Health data collection from territory 30 April, 2020[27]

b) Total Revenue Losses from Cancelled Surgeries and Other Services

As a result of cancelled hospital services due to the COVID-19 pandemic, hospitals stand to lose approximately \$200

million lei (approximate 40 million euros) in revenue over a period of four months, from March to end of April 2020. This includes cancelled surgeries, various levels of cancelled non-elective surgeries and outpatient treatment, and reduced emergency department services [26].

c) Additional Costs Associated with Purchasing Needed PPE

In order to estimate future expenditures and budget allocation Ministry of Health is collecting regularly data from territory regarding the consumption and demand for equipment and supplies, such as PPE, which considerably increased as a result of the COVID-19 pandemic. Hospitals have incurred additional costs as they struggle to acquire additional supplies to meet the needs of their patients and staff. Moreover, current guidelines require all hospital workers to wear some PPE, regardless of whether they are in direct contact with COVID-19 patients. These guidelines increase the need and expense for PPE relative to normal operations.

d) Costs of Additional Support Some Hospitals are Providing to their Front-line Workers

The govern could not yet estimate the cost of support for front-line hospital workers in COVID-19 hotspots for costs of providing child care, housing, transportation, and medical screening and treatment for COVID-19 for front-line workers but measures were taken to provide such services for them [27].

This report attempts to quantify these effects over the short-term, which are limited to the impacts over a two-month period from March 1, 2020 to April 30, 2020.

Although the government moved quickly to provide relief and the budget expenditures was increase by 2,5 billion euros in order to fight the financial impact, more help is needed [26, 27].

This includes:

- 120 million euros were added in staff costs, and this includes the payment of the risk incentive of 500 euros gross per month for doctors, medical staff, paramedical staff, including auxiliary staff directly involved during the emergency.
- Social security expenditures from National House increased by over 1,4 billion euros (technical unemployment and other health expenditures).
- Expenditures on the reserve fund increase by 3 billion lei.
- The Ministry of Labor also receives 1,6 billion euros and the Ministry of Health 785 million euros.

Following the immediate measures and reallocations of the government, the Ministry of European Funds obtained following the negotiations with the European Commission, a package worth 1.16 billion euros, European funds that will be injected urgently into the Romanian medical system to contribute to the socio-economic measures taken by the Government during this period [15, 16, 26, 27].

The allocation is going to cover expenditures as following [15, 16, 26, 27]:

- 100 million euros reimbursement of the risk incentive of 500 euros gross per month for doctors, medical staff, paramedical staff, including auxiliary staff directly involved during the emergency;
- 350 million euros for reimbursements of the purchases of medical equipment (ventilators, injectors, COVID-19 tests, etc.) and protective equipment (masks, gloves, coveralls, etc.), with the possibility of increasing the allocation to 500 million.
- 682 million euros for the purchase of medical equipment and equipment for the coordination system of the national emergency system, by financing an IGSU project.

The World Bank has allocated more than \$1.4 billion to support the efforts of European and Central Asian countries to combat the effects of the COVID-19 pandemic. As of April 2, 2020, it has been approved to allocate approximately \$ 490 million to be distributed for new emergency response programs [15,16]. In addition, it was decided to reallocate approximately \$ 925 million, which will be redistributed from existing projects and loans, as well as additional funding, to support countries working to combat the effects of the COVID-19 pandemic [15]. Ministry of Health has purchased equipment for medical protection and treatment to fight against COVID worth 29 million euros from projects financed by the World Bank in Romania [27].

CONCLUSIONS

Global shock needs global response, with little or no government interventions, economic costs will be huge. For decrease negative impact, Government spending should be as large as the predicted economic costs, focusing directly on cash disbursement to firms and households. Central banks should support financial the government, not just through their own reserves but also by printing money if necessary. It is clear state that no country has fiscal capacity to stand alone [28].

Government priority should be on health expenditure but as

the specialist anticipated is mandatory to generate a strategy to flatten the contagion curve that may rise back in the end of 2020. The tasks of test 'at random' representative samples of the population to identify the most contagious groups and isolate immediately the more vulnerable (e.g. the old) should be in front of strategy. A global expand of intensive care capacity (both beds and equipment) by building new units or convert available other type of buildings (e.g. hotel, barracks, etc.) is needed. Another imperative measures is to relocate patient who need intensive care to non COVID hospitals in order to increase capacity of that one placed in concentrated area of contagion in terms of human resources and infrastructure.

Romania has harmonized with WHO and European Union requirements regarding preventive measures and legislation for COVID-19 disease and show a major and continuous concern in increasing testing capacity although the number of experts in that field was decreasing year by year. Despite the major weaknesses Ministry of Health adopted the best measures in order to combat the negative impact of pandemic. A perfect management strategy was setup in local outbreaks areas, introducing military management in hospitals in which wrong management decision were taken in early stage of COVID-19 disease.

Ministry of Health registered an extremely rapid reaction in support healthcare workers, purchase medical equipment and ventilators challenging the other health systems that faced with the same health problem forcing in a positive manner Public Health System for a simultaneous high inflow of SARS-CoV-2 positive patient in terms of human resources and infrastructure (mobile hospitals for patient with no and mild symptomatology, intensive care units etc.).

As part of European Nation, Romanian Government realized the harmonization of institution using emergency state providing this way an outstanding panel of experts in critical domains which initiate the best decision in a proper time, find the measures and optimal solutions for access to European available funds, cover the huge economic cost, helping Health System to fight against a complete new disease and providing the support for return of citizens in respect of European laws and Human Rights Declaration.

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References:

1. Guan WJ, Ni ZY, Hu Y, et al. Characteristics of coronavirus disease 2019 in China. *N Engl J Med*. 2020. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/32109013>.
2. Wu C, Chen X, Cai Y, et al. Risk factors associated with acute respiratory distress syndrome and death in patients with coronavirus disease 2019 pneumonia in Wuhan, China. *JAMA Intern Med*. 2020. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/32167524>.
3. World Health Organization. Coronavirus disease (COVID-2019) situation reports. 2020. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/>. Accessed April 9, 2020.
4. Washington Post "WHO declares a pandemic of coronavirus disease covid-19
5. <https://www.worldometers.info/coronavirus/>
6. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19): cases in U.S. 2020. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html>. Accessed April 9, 2020.
7. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19): People who are at higher risk for severe illness. 2020. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-at-higher-risk.html>. Accessed April 8, 2020.
8. Cai Q, Chen F, Luo F, et al. Obesity and COVID-19 severity in a designated hospital in Shenzhen, China. Preprints with the Lancet. 2020;[Preprint]. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3556658
9. Garg S, Kim L, Whitaker M, et al. Hospitalization rates and characteristics of patients hospitalized with laboratory-confirmed coronavirus disease 2019 - COVID-NET, 14 states, March 1-30, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(15):458-464.
10. Centers for Disease Control and Prevention. Evaluating and testing persons for coronavirus disease 2019 (COVID-19). 2020. Available at: <https://www.cdc.gov/coronavirus/2019-nCoV/hcp/clinical-criteria.html>. Accessed April 8, 2020. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/32298251>
11. Centers for Disease Control and Prevention. Interim guidelines for collecting, handling, and testing clinical specimens from persons for coronavirus disease 2019 (COVID-19). 2020. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/lab/guidelines-clinical-specimens.html>. Accessed April 8, 2020
12. Ruiyun Li et al. (2020), Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV2), *Science*, 16 March 2020, DOI: 10.1126/science. abb3221
13. <https://www.usaid.gov/coronavirus>
14. <https://www.defense.gov/Explore/Spotlight/Coronavirus/>
15. Coronavirus: European roadmap shows path towards common lifting of containment measures Brussels, 15 April 2020
16. Communication from the Commission – Temporary Framework for assessing antitrust issues related to business cooperation in response to situations of urgency stemming from the current COVID-19 outbreak C(2020) 3200 (OJ C 116 I, 8.4.2020, p. 7)
17. Rapid risk assessment: Coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – eighth update <https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-coronavirus-disease-2019-covid-19-pandemic-eighth-update>
18. guidelines on the optimal and rational supply of medicines to avoid shortages during the COVID-19 outbreak (C (2020) 2272 final)
19. Guidance on EU Emergency Assistance on Cross-Border Cooperation in Healthcare (C (2020) 2153 final).
20. World Health Organization (WHO). Coronavirus disease (COVID-19) outbreak. Geneva: WHO; [1 March 2020]
21. Delaration of Minister of Health in local Press. <http://www.ms.ro/comunicate/>
22. Weiss AJ, Elixhauser A, Andrews RM. Characteristics of operating room procedures in US hospitals, 2011. Accessed April 4, 2020. <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb170-Operating-Room-Procedures-United-States-2011.jsp>
23. Merritt Hawkins. 2019 Physician inpatient/outpatient revenue survey. Accessed April 4, 2020. https://www.merrithawkins.com/uploadedFiles/MerrittHawkins_RevenueSurvey_2019.pdf
24. McHugh M, Regenstein M, Siegel B. The profitability of Medicare admissions based on source of admission. *Acad Emerg Med*. 2008;15(10):900-907. doi:10.1111/j.1553-2712.2008.00238.xPubMedGoogle ScholarCrossref
25. American Hospital Association. AHA Hospital Statistics. Accessed April 4, 2020. <https://www.ahadata.com/aha-hospital-statistics/>
26. https://insse.ro/cms/files/publicatii/Romania_in_cifre_breviar_statistic_2018.pdf, <https://www.ibisworld.com/industry-insider/coronavirus-insights/effects-of-covid-19-on-global-healthcare-systems/>
27. Ministry of Health data collection from territory 30 April, 2020
28. Dobrin C., Dinulescu R., Costache R., Voicu L. One management method, two countries. Lean method applied in Romania and France, Proceedings of the 11th International Management Conference, 2015