

# THE CORONAVIRUS PANDEMIC AND THE IMPACT OF ANTI-COVID-19 MEASURES ON THE POPULATION OF ROMANIA (MARCH 16, 2020 – MARCH 8, 2022)

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*Key-words:* pandemic, COVID-19, socio-demographics factors, measures, population.

**Abstract.** The study analyses the evolution of the Coronavirus (COVID-19) pandemic during the *States of Emergency and Alert* in Romania between March 16, 2020, and March 8, 2022, and the impact of the measures taken by the authorities on the population, as well as on the socio-economic, education and healthcare systems. The main demographic impact is related to the mortality rate, which was high among the population over 60 years of age, increasing the pressure on the healthcare system. The socio-economic impact triggered by the COVID-19 pandemic had medium and long-term effects: the loss of jobs, the economic crisis, a high unemployment rate, a limited access of the population to medical services, which has led to an economic decline in the field of transport, as well as school closures and switching to online courses for longer periods of time, while companies switched to remote working and made investments in the digitization of services.

## 1. INTRODUCTION

The SARS CoV-2 virus infection appeared in December 2019 in the city of Wuhan, China. The World Health Organization (WHO) announced on March 11, 2020 that the coronavirus epidemic was officially classified as a *pandemic*, since more than 118,000 cases had been registered in 114 countries, with 4,291 deaths reported worldwide (WHO, 2020). The official name for the new coronavirus was **SARS-CoV-2** (severe acute respiratory syndrome coronavirus 2), and the name for the disease it caused was **COVID-19**. The most vulnerable population category to this disease is the elderly and/or with people with comorbidities.

Some of the measures taken by the Romanian authorities to combat infection with the coronavirus during the state of emergency and alert in Romania between March 16, 2020 – March 8, 2022 were:

- on January 22, 2020, six hospitals were designated where COVID-positive patients would be to be hospitalized – the infectious diseases hospitals in Iași, Timișoara, Constanța, Cluj, together with the “Prof. Dr. Matei Balș” National Institute of Infectious Diseases and the “Victor Babeș” Clinical Hospital for Infectious Diseases, both in Bucharest –; thermal scanners were installed in all airports, an interministerial committee was established for the monitoring and management of potential COVID infections, the 24/7 presence of medical personnel in the airport medical offices was ensured, a passenger questionnaire was drawn up, kits were purchased for the quick diagnosis of suspected cases, medical and protective equipment, isolettes, disinfectant etc. were purchased.
- on February 26, 2020, the first case of infection with the new coronavirus was confirmed on Romanian territory; the Minister of Health issued an order for quarantining persons given the international public health emergency situation triggered by the COVID-19 infection, a measure applicable to all asymptomatic persons returning from areas with extensive community transmission ([www.mai.gov.ro](http://www.mai.gov.ro)).

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- on March 7, 2020, the first coronavirus case was confirmed in Bucharest.
- The National Committee for Special Emergency Situations decided to suspend the teaching process between March 11–22, 2020, while also taking into consideration the possibility of extending that period; road passenger transport was suspended for all routes to and from Italy (starting March 10), as well as rail transport (starting March 12). Food establishments and public and private providers of passenger transport were obliged to frequently disinfect surfaces and to avoid the amassing of crowds in commercial areas.
- on March 16, 2020, decree no. 195/2020 was issued regarding the establishment of *the state of emergency* on the territory of Romania for a period of 30 days, which as subsequently extended until May 14, 2020 by decree no. 240/14.04.2020.
- on March 17, 2020, *the first Military Ordinance* was issued regarding some first-degree emergency measures concerning crowds and the cross-border movement of certain goods. Following the 3/24 March 2020 Military Ordinance, drastic restrictions on the movement of people were imposed, restaurants and hotels were closed, public events in enclosed spaces were prohibited, only events of under 100 participants in open spaces were allowed, the mobility of the population was limited, air and land transport were subject to restrictions, quarantine measures were imposed for those coming from abroad, scheduled hospitalizations were limited in hospitals because of the degree of occupancy of hospital beds, the temporary suspension (6 months) of the outbound distribution of medicines and essential materials in the prevention and treatment of conditions associated with the infection with COVID-19.
- the first COVID-19 death was registered on March 22, 2020, that of a 67-year-old patient with very serious pre-existing conditions (cancer), hospitalized on March 18 at the ER of Filiași Hospital and transferred on the same day to IDCH Craiova (COVID19.stirioficiale.ro).
- on March 30, 2020, the municipality of Suceava and its neighboring area consisting of eight municipalities – Adâncata, Salcea, Ipotești, Bosanci, Moara, Șcheia, Pătrăuți and Mitocu Dragomirnei – were quarantined. The restriction was lifted on May 13, 2020.
- on May 15, 2020, the law regarding the establishment of a *state of alert* at the national level for a period of 30 days was passed through Government Decision no. 24/2020, and later extended until March 8, 2022, when it was repealed by Decision no. 16 (www.mai.gov.ro).

In March and April 2020, in the context of the COVID-19 health crisis, Latvia, Romania, Armenia, the Republic of Moldova, Estonia, Georgia, Albania, North Macedonia, Serbia and San Marino notified the Secretary General of the Council of Europe of their decision to activate Article 15 of the European Convention on Human Rights (ECHR), which had the effect of terminating the protection provided by international human rights law (Braithwaite, Harby, Miletic, 2021). These states were joined by France, Greece, Ireland, Turkey and the United Kingdom (www.irdo.ro). However, the activation of this article did not allow the derogation from the articles of the Convention that protect the right to life and prohibit torture and slavery. Since its accession to the ECHR, Romania had never suspended the European human rights protection system.

The fundamental rights that were affected or restricted by Romania, during the pandemic, according to the presidential decrees issued during the state of emergency, were the following: the right to free movement, the right to the protection of one's private and family life, the inviolability of the one's home, the right to getting an education, the freedom of assembly and association, the right to the protection of one's private property, the right to go on strike, one's economic freedom. According to article 48 letter b) of decree 195, the Ministry of Foreign Affairs has the task of notifying the Secretary General of the UN and the Secretary General of the Council of Europe regarding the measures taken as triggered by the decree establishing the state of emergency, which had the effect of limiting the exercise of various fundamental rights and freedoms (www.juridice.ro).

Going to the grocery store, the doctor's office or to work could only be done by filling out a personal statement, and if the person was over 65, they could only go out for two hours a day. Going out at night was also strictly prohibited and wearing a surgical mask became mandatory. Schools were closed indefinitely, and in order to avoid the cancellation of the entire school year, they switched to online education. Gloves, disinfectants, temperature measuring devices were also used.

The measures imposed by the authorities had a major impact on the entire social and economic life, and often led to the total or partial interruption of the activity of various economic operators, triggering financial difficulties and even the risk that certain economic operators might disappear from the market ([www.icj.ro](http://www.icj.ro)). Economic activities which had been suspended in March 2020 began to gradually resume starting May–June 2020, under increasingly strong economic and social pressures (Simionescu *et al.*, 2021). The pandemic exposed the vulnerability of economies to highly infectious diseases (Caselli *et al.*, 2021; Tisdell, C.A., 2020).

## 2. DATA AND METHODS

The study analyses the evolution of the Coronavirus pandemic during the state of emergency and alert – between March 16, 2020 and March 8, 2022 – and the impact of the measures taken by the authorities on the population, as well as on Romania's socio-economic, education and healthcare systems.

The study made use of multiple data:

a) the selection of statistical indicators: the LAU database, the Tempo Online data series published by the National Institute of Statistics in 2019, 2020, and 2021, [datelazi.ro](http://datelazi.ro), [dspb.ro](http://dspb.ro); [vaccinare-Covid.gov.ro](http://vaccinare-Covid.gov.ro).

b) building the database, graphs and maps regarding the number of COVID-19-infected people, the cumulative incidence of cases at county level / 14 days / % of inhabitants, the number of persons vaccinated by county (%), the number of vaccinated people by locality (%), the number of deaths (total number of persons), the number of deaths categorised according to the main cause of death; the number of people who died from COVID-19.

c) the research is based on the thorough study of the bibliography from the national and international scientific literature regarding the COVID-19 pandemic.

## 3. RESULTS AND DISCUSSIONS

### 3.1. Social protection policies

In 2020, the Romanian economy recorded one of the biggest contractions in Europe, 12.3% (according to Eurostat), only falling behind the states whose GDP is largely based on tourism (Spain, Croatia, Greece, Hungary, Portugal, France, Italy). Primary resource processing and car manufacturing were among the sectors that were hit the hardest by the recession, and the service sector was subject to pandemic-related restrictions (<https://www2.deloitte.com>). The economic crisis was mainly a supply crisis, as many companies were forced to reduce their activity. The COVID-19 pandemic forced many companies to close, resulting in an unprecedented trade disruption in most industry sectors (Donthu, Gustafsson, 2020), causing a massive economic shock due to business interruptions (Martin *et al.*, 2020); the worldwide economy has become anxious and uncertain (Louhichi *et al.*, 2021).

Access to health benefits, sickness and unemployment benefits has gained relevance during the pandemic. The implementation of the authorities' response to the pandemic was more difficult for low-income countries, which were not prepared ([www.ilo.org](http://www.ilo.org)).

As a member of the European Union and in order to access the financial recovery package, Romania had to rely on two pillars: ecological transition and digital transformation, with a view to promote cohesion and strengthen the resilience of the European Union. Digital transformation is essential for the business environment characterized by high competitiveness (Albu *et al.*, 2020).

The war against the pandemic forced governments and central banks to massively intervene in the economy to limit the damage (Dăianu, 2021). The Government of Romania took a series of measures to support the economy, the population, to protect health and to maintain jobs: postponing the payment of some tax obligations on the part of various economic agents during the crisis, postponing the payment of the specific tax or for utility services, such as electricity, natural gas, water, telephone and internet services and the payment of rent as well as state guarantees for loans and other grants, granting amounts to employers for the settlement of a part of the gross salary of the employees they decided to keep on (41.5%), providing technical unemployment allowances from the unemployment insurance budget within the limit of 75% of the average gross salary, granting allowances to parents for the supervision of children during the temporary closure of educational institutions, cancelling interests, penalties and all adjacent expenses related to outstanding main budget obligations, instituting work-from-home policies – one of the methods of organizing production and company services, and implicitly employment, requesting the postponement of payments for social contributions and taxes and financial aid for struggling small and medium-sized companies, which make up the foundation of the domestic economy, extending the validity of holiday vouchers; enabling online professional training activities, which have been recognized by the Ministry of Labor and Social Protection etc. (mfinante.gov.ro). Among the most vulnerable population categories the following stood out: incomplete families, urban families, people with a lower education level, low-income families.

Employment contracts were suspended, most of them in the following fields: the manufacturing industry, wholesale and retail trade, motor vehicle and motorcycle repair, as well as hotel and restaurant services, which accounted for more than 50% of the suspended contracts. One of the sectors most affected by the pandemic was tourism, due to the quarantine which limited the free movement of people, making access to tourist attractions impossible (Mitrică *et al.*, 2022). To mitigate the effects of the reduced activity during the pandemic, the decision was made to grant financial aid and reduce specific taxes for HoReCa businesses (Munteanu *et al.*, 2022).

The government adopted a set of social protection measures for employees during the pandemic, so that jobs could be saved, while also supporting the struggling economic sectors. The employees whose economic activities were suspended, limited or prohibited due to the COVID-19 pandemic received technical unemployment until March 31, 2022.

Consequences for the labour market:

- digital transformation has given workers greater freedoms, such as flexible working hours and work patterns that adapt to suit the individual.
- digitization requires more skills and qualifications on the side of the employees.

The Coronavirus pandemic has highlighted the need to accelerate digital transition in Europe. Capitalizing on the opportunities of this transition is essential for strengthening the economic base and competitiveness, facilitating the ecological transition, creating jobs and improving the lives of citizens (www.zf.ro).

In Romania, the effects of the economic crisis were felt through a depreciation of the national currency in relation to the euro, an evolution that was felt in bank loan rates, in higher telephone or utility bills, as well as in the real estate or car sector (www.forbes.ro). The impact of the Coronavirus pandemic has had a number of effects on the labor market: more women than men have lost their jobs, since they mainly work in fields that have been affected by closures or restructuring, such as the tourism sector, consumer industry, trade, HoReCa, and low-income earners were hit harder than middle and high earners.

### 3.2. The Coronavirus epidemic and the impact on the education system

On March 11, 2020, classes were suspended, initially for a period of 2 weeks. Once the state of emergency was declared, the online education system was introduced. After the abrogation of the state of emergency, only the students in their final years returned to classes, and only in compliance with the sanitary protection rules. Courses were organized to prepare teachers for online teaching, students were marked as absent if they did not participate in online classes, recording live courses was prohibited, while the *Teleşcoala* program, in partnership with the TVR Romanian Television, offered courses to students in the 8<sup>th</sup> and 12<sup>th</sup>/13<sup>th</sup> grades in order to help them sit the national exams etc.

Worldwide, the disruption of education systems has led to millions of children losing the chance of learning significant information that they would otherwise have learned had they been physically present in the classroom, with children from vulnerable social backgrounds and young children registering the greatest losses ([www.unicef.org/romania/ro](http://www.unicef.org/romania/ro)).

At the opening of the 2020–2021 school year, the Romanian government adopted the solution of decentralization and delegation of decisions at regional and local level. A series of measures were taken to enable the functioning of the education system: the mandatory wearing of protective masks, the minimum distance of 1 m between students, disinfecting spaces, installing plexiglass panels, providing protective equipment, adding extra educational spaces, covering the technological needs of teachers and students, offering online and hybrid lesson models, providing technical, educational and psychological support etc.

In the event of the temporary closure of educational institutions, parents were granted days off to be able to supervise their children for all working days during the state of emergency, benefitting from an allowance of 75% of the gross monthly salary, but not higher than 75% of the average gross monthly salary at the national level. This measure affected the economy, generated criticism from businesses and led to in-person learning becoming mandatory in the second part of the pandemic era, when high COVID incidences were being recorded (<https://www.mai.gov.ro/wp-content/uploads/2020/>).

At the European level, the measures to close schools and universities were mainly taken in March and April 2020. In April, 80%, i.e., 25 of the 31 European countries (EU, EFTA, UK) partially or totally closed preschool education, 90% (28 countries out of 31) closed primary schools, and 100% closed high school and university education (all 31 countries). Starting May 2020, most countries decided to partially reopen schools (<https://www.stepbystep.ro>). Complete school closures occurred only in Belgium, Germany, Ireland, Greece, Portugal, Montenegro, North Macedonia and Turkey (European Commission / EACEA / Eurydice, 2022).

The World Health Organization recommends in its documents the adoption of a system based on risk analysis, a system that takes into account several factors when deciding to reopen schools: epidemiological factors, the state and capacity of the public healthcare system, community participation, as well as the government's ability to provide social and economic support to the most disadvantaged categories.

On September 14, 2020, schools reopened, after a 6-month hiatus, for most students, except for those in the final years who continued their in-person activity at school, after the repeal of the state of emergency (Săgeată, 2022). Three traffic light-type school operation scenarios were implemented:

- *scenario 1* (green) – the in-person presence of all students in class (infection rate of < 1‰);
- *scenario 2* (yellow) – the in-person presence of preschoolers, students from grades 0 through 4 and students in their final years (infection rate between 1–3‰);
- *scenario 3* (red) – classes were held exclusively online (infection rate > 3‰).

Measures and protocols were approved to ensure the application of sanitary rules: cleaning and disinfection measures, the clear marking of entry and exit routes, wearing a protective mask, assigning and not exchanging student seats; ensuring a distance of at least 1m between students/preschoolers, the self-isolation of students at home if they displayed specific COVID-19 symptoms etc.

Scenarios for returning to school from May 5, 2021:

- *scenario 1* – the in-person presence of all students in class (infection rate < 1‰);
- *scenario 2* – the in-person presence of preschoolers, students in primary education and in their final years (infection rate > 1‰).

If the occurrence of one or more cases of COVID-19 was confirmed at the level of an educational unit, the class or the entire unit ran the risk of being closed for 14 days, with all learning activities being carried out online.

In February 2021, the Minister of Education announced the reopening of schools and the scenarios for them, with students being able to go to school in person as long as the infection rate was under 6/1000 inhabitants: all educational units where the vaccination rate was below the 60% threshold, in localities with an incidence of over 3‰, would have to switch to online classes. This threshold was removed in October 2021, and students were allowed to go to school irrespective of the infection threshold in the locality but depending on the degree of vaccination of school employees, which should not have been lower than 60%.

The structure of the school year was also altered, and students found themselves having two forced holidays: one in April 2021 when they had two weeks off by combining the holidays for Orthodox and Catholic Easter, and another in October 2021.

Compared to other countries in Europe, Romanian schools had the longest closure period, when students underwent online learning (European Commission / EACEA / Eurydice, 2022). Some children did not attend online classes because they did not have the technical means to be able to connect online, so the solution was to distribute tablets and free data subscriptions to the vulnerable, or to distribute printed materials. It was necessary to train teachers to increase their ability to convey information. The teaching staff had a triple role: as a teacher, as a manager of health protection measures and as a network administrator (Săgeată *et al.*, 2023).

Some of the risks noted during the pandemic were: children dropping out of school because some parents thought it was too dangerous to take them to school, some students were unable to go online because they did not have internet access or the digital means of logging into classes.

It was concluded that the closing of schools also had serious effects on society in general, not only on children, leading to the deepening of inequality in society, as well as to losses of personal and social income, due to the subsequent decrease of the GDP of the countries hit by the pandemic ([www.ecdc.europa.eu](http://www.ecdc.europa.eu)). A negative effect had to do with the lack of access to technology and with poverty. Almost half of Romania's children live under the poverty line, and technology, if present, is used mostly by adults.

### 3.3. The Coronavirus epidemic and the healthcare system in Romania

The Romanian healthcare system had been up against great difficulties for quite a few years, but the situation took centre stage due to the crisis caused by the pandemic. Romanian governments annually distribute between 5–6% of the GDP to the public healthcare system i.e., approximately 600 euros/person, while the EU average is five times higher ([www.dw.com/ro](http://www.dw.com/ro)). One cause of the issues the healthcare system faces is its politicization, with hospital managers and heads of public health departments being appointed based on political criteria. Both before and during the pandemic, the main struggle was the lack of specialized staff, especially doctors and intensive care nurses (Damian *et al.*, 2022).

Medical systems were faced with an unprecedented situation: services had to be reorganized, scheduled hospitalizations and surgical interventions were reduced, PPE was purchased, digital technologies were adopted, remote medical services were established, outpatient monitoring outside conventional clinics was underway, drive-through test points were organized; temporary vaccination centres were set up etc.

All hospitals in the country had to deal with their first restrictions, having to reduce by up to 80% their scheduled hospitalizations and scheduled surgical interventions for chronic patients in inpatient health units part of university centres, and to reduce outpatient activity by up to 50% compared to February 2020 (legislatie.just.ro).

At the national level, following a first order of the Minister of Health, hospitals were established specifically designed to treat COVID cases, together with support hospitals, as well as those designed for non-COVID cases. Hospitals dedicated to COVID-19 patients were clustered in certain counties, while in other areas the number of hospitals/county remained below the national average.

The strategy of the Ministry of Health was to acquire PPE, the equipment necessary for treatment, assess and increase testing capacity, preparing the hospitals etc. On May 29, 2020, the Ministry of Health decided to resume admissions, scheduled surgical interventions, as well as activity in outpatient clinics, depending on the local epidemiological evolution.

The number of hospitalizations at the national level decreased starting April 2020, when there were 70% fewer hospitalizations than in the same period of the previous year. The number decreased further between June and August 2020: Matei Balș Institute and Colentina Hospital, both in Bucharest, were among the most affected public hospitals, with considerable reductions (-90%) in the number of hospitalizations being registered between March and August 2020, compared to the same period of the previous year, a 50% decrease in the number of hospitalizations for tuberculosis patients, and a 46% decrease in the number of hospitalizations for oncology patients (observatoruldesanatate.ro).

Romanians postponed or avoided visiting the doctor during the coronavirus epidemic. This behaviour was driven by financial or emotional reasons (a low income, a fear of contracting the virus or receiving a worrying diagnosis). Almost half of Romanians living in the urban environment reduced their visits or entirely avoided going to their family doctor or to a specialist doctor. Thus, according to a study carried out in the Spring of 2021, 54% of family doctors and 68% of specialists interviewed noticed an increase in the number of emergencies/aggravation of conditions for patients suffering from chronic illnesses (www.ipsos.com).

On March 31, 2020, the number of people hospitalized infected with the coronavirus was 2,254, 62 of which were in the ICU. The maximum value for 2020 recorded on November 30, 2020 was 13,261 people hospitalized and 1,251 in the ICU. In 2021, the values recorded fairly large fluctuations corresponding to the waves of infection that characterized this pandemic: 7,763 people hospitalized, 997 in the ICU, on March 31, 2021, there were 13,248 people hospitalized and 1,412 in the ICU; the maximum value for 2021 was recorded on October 31, 2021, with 20,005 people admitted to the COVID wards, 1,874 of which were in the ICU. The lowest values were registered on July 31, 2021: 403 people hospitalized, 56 of which were in the ICU. At the end of 2021, the situation was as follows: 2,322 people hospitalized, 399 of which were in the ICU, on March 8, 2022, 4,176 new cases were registered; 4,340 people were admitted, 633 of which were in the ICU, according to COVID19.stirioficiale.ro data.

According to data from the Romanian Health Observatory, the Coronavirus pandemic has made it difficult for the chronically ill in Romania to access treatment, more than half of patients not receiving the necessary treatment. This has led to a deteriorating state of health of the population and to increased pressure on an already overwhelmed medical system.

### **3.4. The Coronavirus epidemic and the demographic impact**

The impact of the Coronavirus pandemic has highlighted the weaknesses of healthcare systems, public funding should be a priority for healthcare services, as should be strengthening the access to essential public healthcare services.

The evolution of SARS-CoV-2 cases was relatively slow, in the first two weeks after the detection of the first case the number of those infected was under 50. Between February 26, 2020 and March 8, 2022, the total number of COVID-19 cases in Romania increased from 1 to 2,781,086 total confirmed cases (Fig. 1). The city of Bucharest ranks first with 520,326 cases, followed by the counties of Cluj, Timiș, Ilfov, Constanța, Iași and Brașov with over 100,000 cases each; the counties with the lowest number of reported positive cases were: Covasna (18,988), Tulcea (20,147) and Harghita (21,089). Because of their demographic amplitude, Bucharest (the Capital city) together with other counties where the largest Romanian cities are located were potentially exposed to the SARS-CoV-2 virus infection (Mitrică *et al.*, 2021). During the analysed period, an exponential growth trend of positive cases can be noted, the trend becoming quite obvious especially starting November 2020.

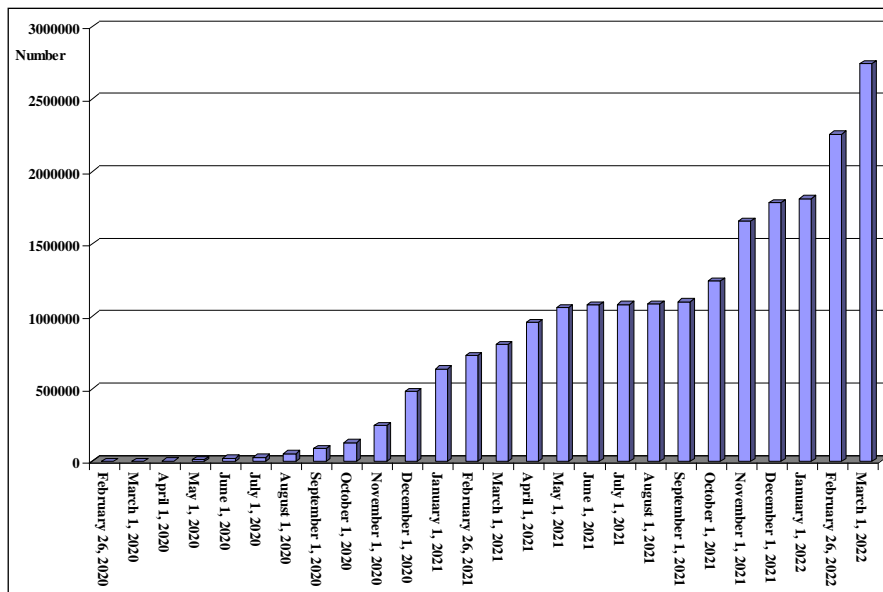


Fig. 1 – The evolution of COVID-19 cases (26.02.2020 – 1.03.2022).

Source: <https://www.worldometers.info/coronavirus/country/romania/>.

On July 15, 2020, the number of people confirmed as being infected with the coronavirus reached 34,226, the number of those hospitalized in the ICU being 248; the number of processed tests was 886,918, while the number of people who died as a result of the COVID-19 infection reached 1,952. Most counties (32) had a small number of infections, below 1,000 cases each. The minimum values (under 200 cases) were in the counties of Satu Mare, Sălaj, Caraș-Severin and Vâlcea (Fig. 2). The maximum value was recorded in Suceava County (4,200 cases), followed closely by the Municipality of Bucharest (approximately 4,000 cases).

The number of people confirmed positive at the national level increased very quickly – by approximately 600,000 cases – within five months, so that on December 31, 2020 it reached 629,018. 4,322 new cases (people who had not previously had a COVID-positive result) were registered. In specialized health units, the number of people admitted suffering from a COVID-19 infection was 9,124, 1,130 of which were admitted to the ICU. The number of people who died rose to 15,767.



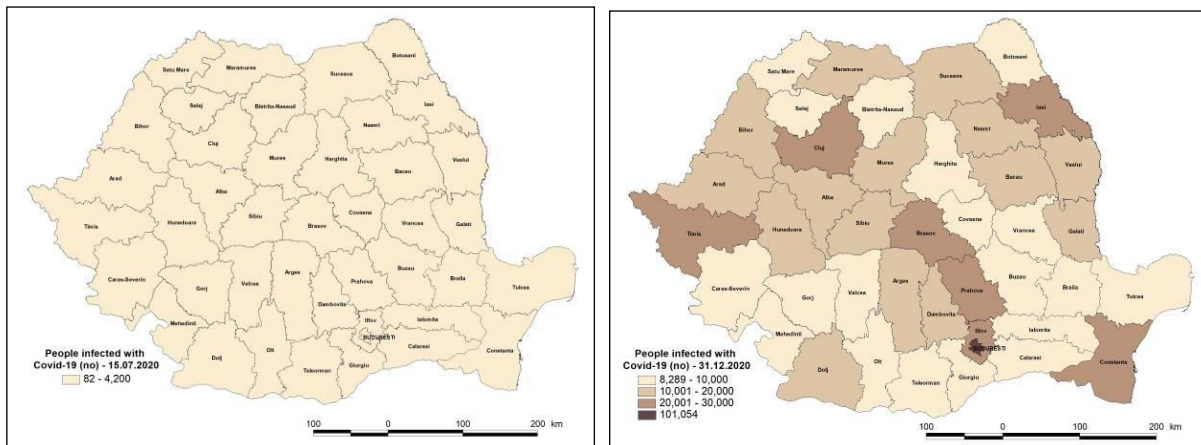


Fig. 2 – The number of people infected with COVID-19 (15.07.2020; 31.12.2020).  
Source: COVID19.stiriofficiale.ro.

Regarding the distribution of cases by county, the situation was as follows: Bucharest City together with 7 other counties – Cluj, Iași, Constanța, Timiș, Brașov, Prahova and Ilfov – had 45% of the total number of infections in Romania (282,896 cases). The counties with the lowest numbers of infections – approximately 5,000 cases – were Mehedinți, Covasna and Gorj.

On July 15, 2021, the number of people infected with the new coronavirus (COVID-19) was 1,081,467. The number of cured patients was 1,046,610, and the number of deceased people was 34,425. Up to that time, 8,515,041 RT-PCR tests and 1,630,177 rapid antigen tests had been processed at the national level. The counties with the highest number of positive tests were Brașov, Timiș, Cluj and the Municipality of Bucharest. The lowest number of people infected with COVID-19, under 10,000 cases, was registered in Harghita, Mehedinți, Tulcea, Covasna and Gorj (Fig. 3).

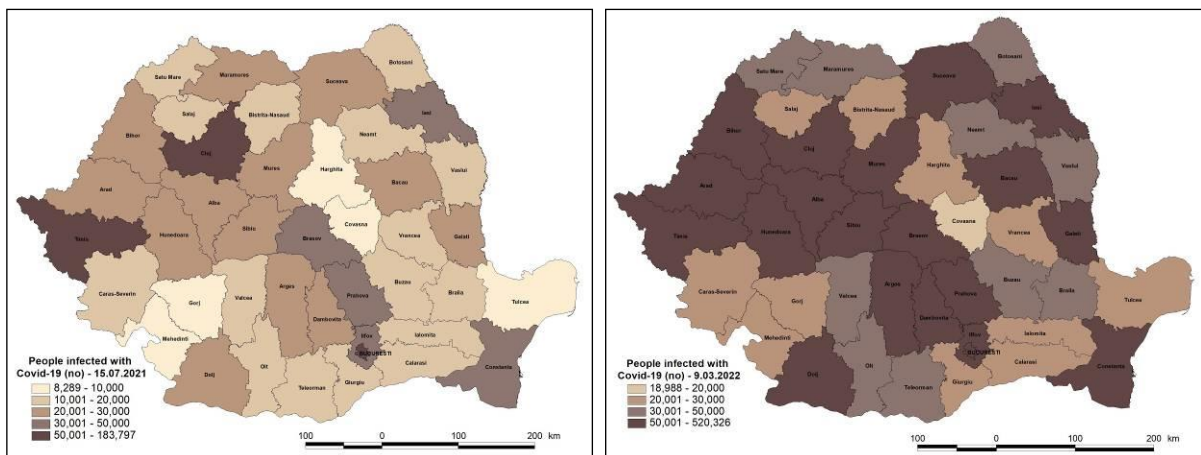


Fig. 3 – The number of people infected with COVID-19 (15.07.2021; 9.03.2022).  
Source: COVID19.stiriofficiale.ro.

On November 15, 2021 there were 1,744,440 people infected with COVID-19, 1,587,856 cured patients, and 53,264 deceased. Up to that time, 10,540,874 RT-PCR tests and 4,912,799 rapid antigen tests had been processed at the national level. In specialized health units, the number of people admitted with COVID-19 was 15,189, 1,720 of which were admitted to the ICU. Also, during the same period, Covasna, Tulcea and Harghita were among the counties with the minimum number of infected people. At the

opposite end of the spectrum, the leading counties in terms of the number of infections were the Municipality of Bucharest (with approximately 300,000 cases), followed by Cluj and Timiș.

On January 11, 2022, 1,857,502 COVID-19 cases were registered. 1,760,487 patients were deemed cured. The number of people admitted to hospital infected with COVID-19 was 3,023, and 415 people were admitted to the ICU. The lowest number of people infected with COVID-19 was also recorded in the previously-mentioned counties: Covasna, Tulcea and Harghita. The municipality of Bucharest recorded the maximum value of 317,540 infections.

The coefficient of cumulative infections / 14 days / 1,000 inhabitants is calculated by the Public Health Directorates, at the level of the Municipality of Bucharest and each of the counties. The 14-day incidence rate was analysed between November 1, 2020 and March 8, 2022. The highest values were recorded on December 1, 2020, April 1, 2021, November 1, 2021 and February 1, 2022. The lowest values were between June 1 – September 1, 2021 and on January 1, 2022.

The COVID-19 incidence rate on March 8, 2022 (when the state of alert ended) had the lowest values in the counties of Suceava (0.83‰), Harghita (0.94‰) and Neamț (1.03‰). The maximum values were recorded in the counties of Cluj (8.82‰), Ilfov (8.98‰) and the Municipality of Bucharest (13.41‰) (Fig.4).

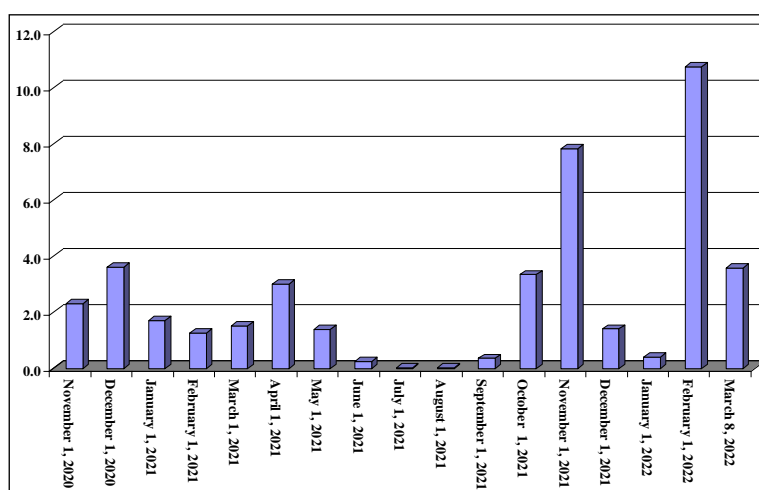


Fig. 4 – Cumulative incidence of cases at county level / 14 days / ‰ inhabitants (1.11.2020–8.03.2022).  
Source: COVID19.stiriofficiale.ro.

### 3.5. COVID vaccination in Romania

Vaccination in Romania against the COVID-19 infection started on December 27, 2020. Three stages were established: stage I – the vaccination of people working in the healthcare and social industries, stage II included the high-risk population and the workers carrying out activities in key, essential fields, while stage III included the general population. When establish the population groups, the following criteria were taken into account: the principles of ethics and social equity, epidemiological criteria, medical criteria, the risk of SARS-CoV-2 infection, essential activities etc. (vaccinare-COVID.gov.ro). The goal of the vaccination campaign was to maintain the basic essential services of society while putting a stop to the transmission of the virus (Mocanu *et al.*, 2021). The European Commission set out the strategy to accelerate the development and deployment of vaccines against COVID-19 (ec.europa.eu/commission/).

The vaccines that were administered on the territory of Romania were the following:

- the Pfizer BioNTech vaccine administered on December 27, 2020. The total number of people vaccinated that day was 2,066. The booster dose was administered starting September 28, 2021 (Table 1).

- the Moderna vaccine administered on February 4, 2021;
- the AstraZeneca vaccine administered starting February 15, 2021;
- the Johnson&Johnson vaccine administered starting May 4, 2021 – a single dose.
- the Pfizer Pediatric vaccine was administered starting January 26, 2022.

Table 1

Anti-COVID-19 vaccines authorized in Romania

<b>Vaccine/Producer</b> Vaccine name Technology used	<b>Number of doses</b> The period until booster dose (dose 2)	<b>Recommended age</b>
<b>PFIZER BioNTech</b> Comirnaty messenger RNA	2 doses (0,3 ml/dose) 21 days (3 weeks)	Persons over 12 years of age
<b>MODERNA</b> Spikevax (previously the Moderna COVID-19 Vaccine) messenger RNA	2 doses (0,5 ml/dose) 28 days (4 weeks)	Persons over 12 years of age
<b>ASTRAZENECA/OXFORD</b> Vaxzevria (previously the AstraZeneca COVID-19 Vaccine) Non-replicating viral vector	2 doses (0,5 ml/dose) 4–12 weeks	Persons over 18 years of age
<b>JANSSEN/JOHNSON&amp; JOHNSON</b>	1 dose (0,5 ml/dose)	Persons over 18 years of age

Source: <https://vaccinare-COVID.gov.ro/>.

On February 2, 2022, the percentage of the vaccinated population in Romania was as follows: general population – 41.85%, the population eligible for vaccination (5+) – 44.62%, and the adult population (18+) – 50.43%. The situation in residential areas was as follows: rural areas – 29.69%, urban areas – 41.69%, and municipalities – 43.05%. On December 5, 2021, the situation was as follows: rural areas – 25.05%, urban areas – 40.53%, and municipalities – 42.33%.

According to the data made available to the National Committee for the Coordination of Vaccination Activities against COVID-19 (CNCAV) by the National Institute of Public Health (INSP-CNSCBT) with the help of the National Electronic Register of Vaccinations (RENV) application, which keeps track of vaccinations from the start of the vaccination campaign, from December 27, 2020 until March 8, 2022, the situation was as follows: 16,728,347 vaccine doses were administered. The number of persons vaccinated with the first dose was 8,114,789, while the number of fully-vaccinated persons was 8,077,224; the number of persons vaccinated with the booster dose was 2,544,181 (Table 2).

Table 2

Persons vaccinated on March 8, 2022

<b>Vaccine type</b>	<b>Total no. of doses administered since December 27, 2020</b>	<b>Total no. of persons vaccinated with the first dose*</b>	<b>No. of fully-vaccinated persons</b>	<b>No. of persons vaccinated with the booster dose</b>
<b>Pfizer</b>	12,805,375	5,256,766	5,236,888	2,311,718
<b>Pfizer Pediatric</b>	15,747	8,959	6,788	0
<b>Moderna</b>	1,009,169	408,021	406,542	194,606
<b>AstraZeneca</b>	852,364	433,193	419,156	15
<b>Johnson&amp;Johnson</b>	2,045,692	2,007,850	2,007,850	37,842
<b>TOTAL</b>	<b>16,728,347</b>	<b>8,114,789</b>	<b>8,077,224</b>	<b>2,544,181</b>

\* It includes vaccinations administered with Johnson&Johnson as a booster dose, but also as the secondary dose as part of the heterologous schedule, following the update of reports in RENV.

Source: <https://stiriioficiale.ro/informatii>.

On May 26, 2021, the share of the population vaccinated with at least one dose was approximately 25% of the total eligible population. At county level, the maximum values were registered in Timiș – 25.1%, Brașov – 25.72%, Sibiu – 26.8%, Cluj – 33.2%, and the Municipality of

Bucharest – 36.1%, while the minimum values were recorded in Suceava – 11.7%, Botoșani – 12.4%, Giurgiu – 12.7%, Bacău – 13%, and Neamț – 13.6% (Fig. 5).

At locality level, the lowest vaccination values, below 0.5%, were registered in Bărbulești (Ialomița County) and Cămârzana (Satu Mare County). The maximum values of vaccinated people, over 40%, were recorded in Cluj-Napoca (Cluj County), Borsec (Harghita County) and Dumbrăvița (Timiș County).

On July 5, 2021, the percentage of the vaccinated population increased to approximately 30%. The counties with the lowest rates of vaccinated people are, with small differences, the same as those recorded on May 26, 2021: Suceava, Botoșani, Bacău, Giurgiu and Covasna. Conversely, the City of Bucharest has highest value (approximately 40%) of vaccinated population, followed by the counties of Timiș, Brașov, Sibiu and Cluj.

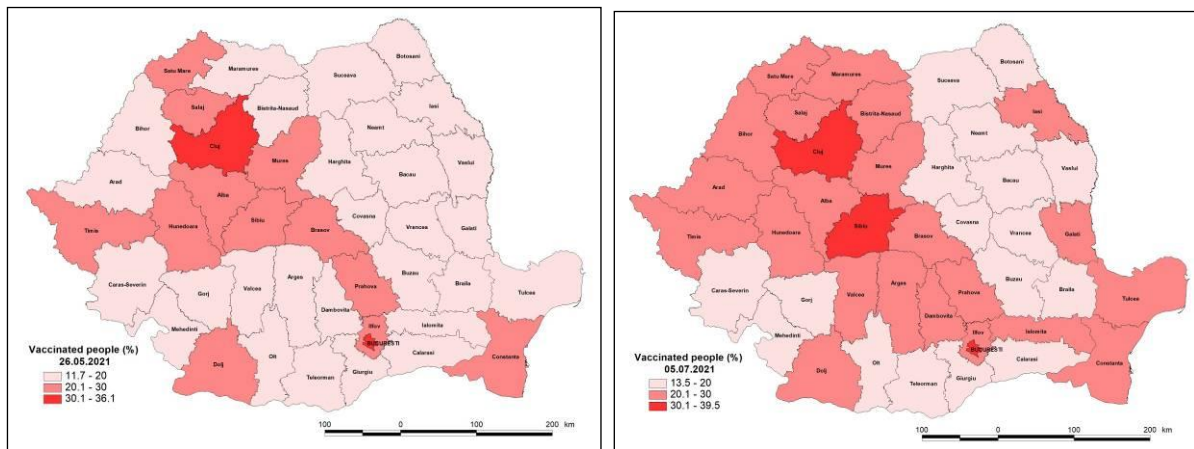


Fig. 5 – The percentage of vaccinated people by county (26.05.2021; 5.07.2021).

Source: <https://vaccinare-COVID.gov.ro/situatia-vaccinarii-in-romania/>.

At the administrative unit level, the lowest values of vaccinated people were registered in the localities of Bărbulești (Ialomița) – 0.21% and Cămârzana (Satu Mare) – 0.72%. The maximum values – over 40% vaccinated population – were recorded in Foieni (Satu Mare), Giroc (Timiș), Valea Lupului (Iași), Râmetea (Alba), Cluj-Napoca (Cluj), Borsec (Harghita) and Dumbrăvița (Timiș) (Fig. 6).

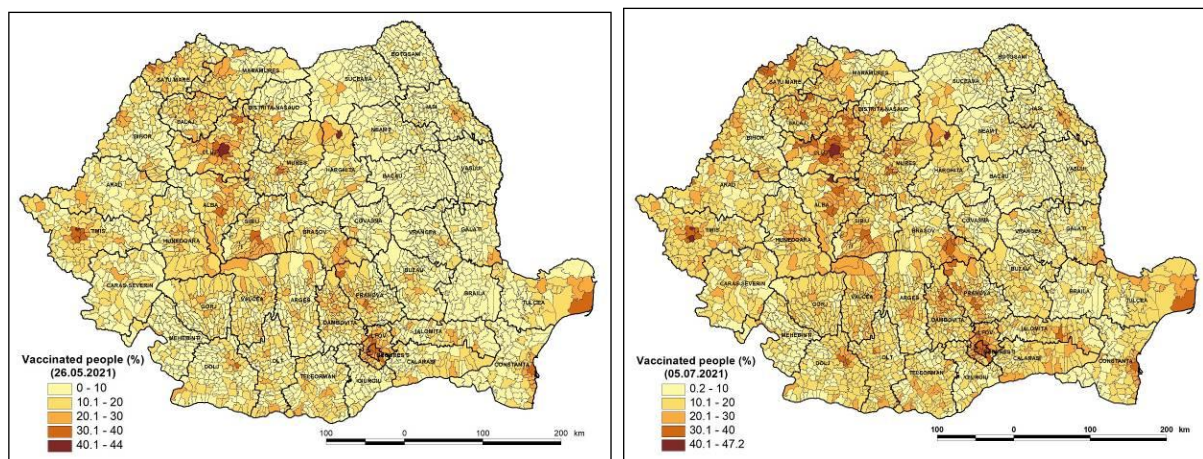


Fig. 6 – The percentage of vaccinated people by locality (26.05.2021; 5.07.2021).

Source: <https://vaccinare-COVID.gov.ro/situatia-vaccinarii-in-romania/>.

On October 5, 2021, the vaccination coverage of the eligible population over 12 years of age was 52.77% for the municipality of Bucharest, followed by 47.85% for Cluj, and 40.96% for Sibiu; 17 counties had a vaccination coverage rate between 30–39.9% and 22 counties ranged between 20–30% vaccination coverage. More than 5.64 million people were vaccinated with at least one dose; 5.45 million people were fully vaccinated and 228,865 people had the booster dose. In the 60–69 and 50–59 age groups, the vaccination coverage rate was over 40% (<https://gov.ro/ro/stiri/conferinta-de-presa>).

The highest percentages were recorded in the following counties: Timiș – 38.95%, Constanta – 39.82%, Sibiu – 40.96%, Cluj – 47.85%, and the Municipality of Bucharest – 52.77%, while the lowest values were recorded in Suceava – 20.60%, Giurgiu – 21.07%, Covasna – 21.88%, Bacău – 22.52%, and Botoșani – 22.34% (Fig. 7).

At the locality level, Dumbrăvița commune in Timiș County is the only one in the country where the percentage of the population that had received the COVID vaccine was over 50%. 16 localities have vaccination rates between 41.0% and 47.2%: Sfântu Gheorghe (Tulcea), Popești-Leordeni (Ilfov), Subcetate (Harghita), Moșnita Nouă (Timiș), Foieni (Satu Mare), Chiajna (Ilfov), Corbeanca (Ilfov), Florești (Cluj), Feleacu (Cluj), Otopeni (Ilfov), Borsec (Harghita), Cârcea (Dolj), Valea Lupului (Iași), Giroc (Timiș), Râmetea (Alba) and Cluj-Napoca (Cluj).

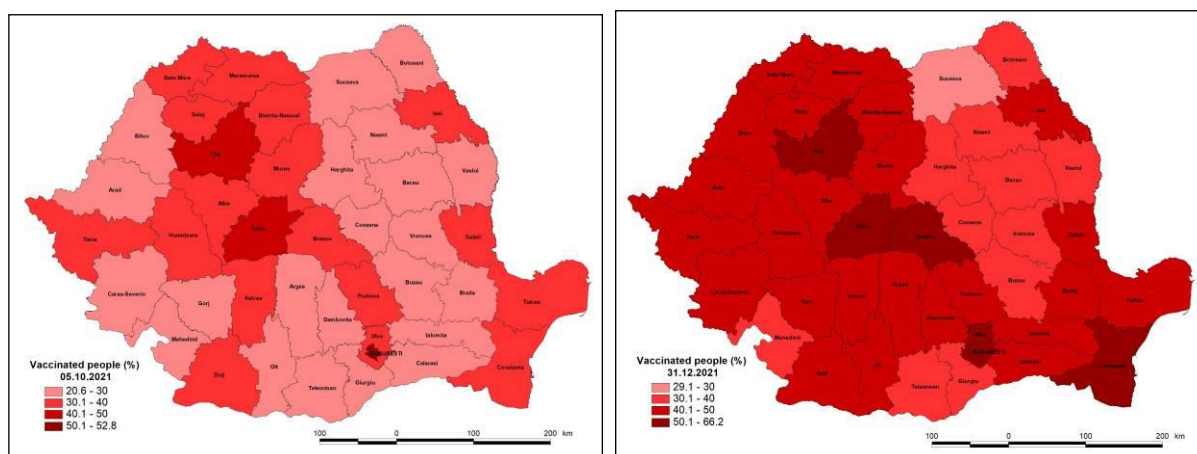


Fig. 7 – The percentage of vaccinated people by county (5.10.2021; 31.12.2021).

Source: <https://vaccinare-COVID.gov.ro/situatia-vaccinarii-in-romania/>.

The town with the lowest vaccination rate is Bărbulești in Ialomița County – 0.4%. Five other settlements had a vaccination rate below 3%: Ulma (Suceava), Slobozia Bradului (Vrancea), Dobromir (Constanța), Valea Moldovei (Suceava) and Jina (Sibiu).

In November 2021, the highest vaccination rate, over 50%, was registered for the category of people aged 50–59, followed by those aged 60–69 – 49%. The lowest percentage of vaccination was registered among people aged over 80 and children aged 12–15. Except for these two age groups, the other groups got close to 50%.

On December 16, 2021, 40.7% of the general population was vaccinated, 46.5% of the eligible population over 12 years old, and 48.8% of the adult population, over 18 years old. On January 5, 2022, the percentage of the vaccinated population in the two areas of residence was as follows: rural environment – 36.77%; urban environment – 41.26%, and municipalities – 43.05% (<https://vaccinare-COVID.gov.ro/situatia-vaccinarii-in-romania/>).

At the level of administrative units, the highest vaccination coverage rates, over 60%, were in Salva (Bistrița-Năsăud County) and Dumbrăvița (Timiș County). Twenty-six localities (0.8% of the total number) registered values between 50.5% and 59.4% vaccinated population. Twelve localities

(0.4%) have a vaccination rate below 6%. The localities of Bărbulești (Ialomița County) and Costache Negri (Galați County) register the minimum value of vaccination – 1% (Fig. 8). For the other localities, the situation is as follows: 61 localities (1.9% of the total number) registered between 6–10% vaccination rate, 761 localities (23.9%) – between 10.1–20%, 1,336 localities (42%) – between 20.1–30%, 770 localities (24.2%) – between 30.1–40%, and 214 localities (6.7%) – between 40.1–50%.

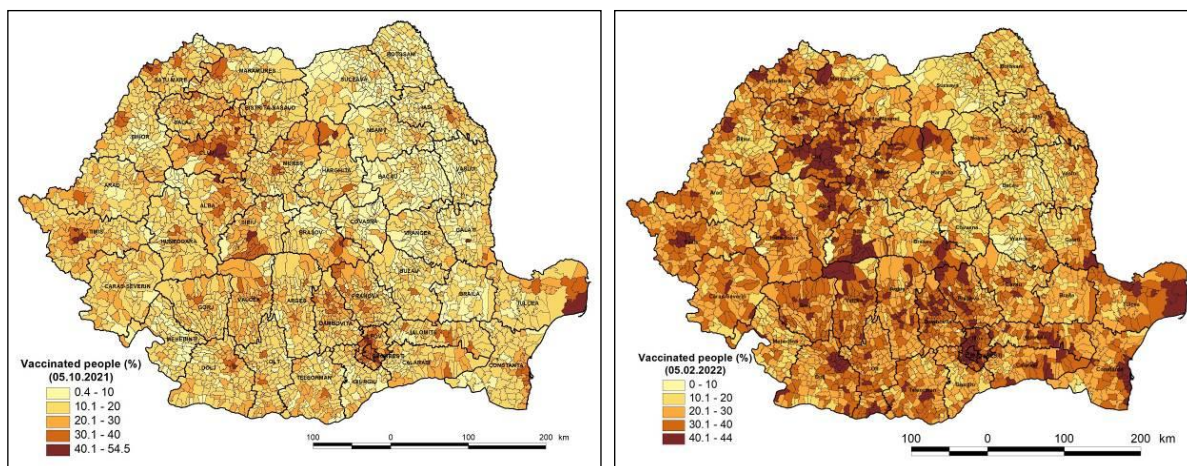


Fig. 8 – The percentage of vaccinated people by locality (5.10.2021; 5.02.2022).

Source: <https://vaccinare-COVID.gov.ro/situatia-vaccinarii-in-romania/>.

Between March 2020 and March 8, 2022 (when the state of alert ended) there were five pandemic waves in Romania:

- The first wave (February – September 2020) registered a maximum of infections on August 27 – 1,504 COVID-positive people;
- The second wave (October 2020 – February 2021) with a maximum number of 10,269 active cases registered on November 18, 2020;
- The third wave – the Alpha variant (March – August 2021) – the maximum number of daily cases registered was 6,651 on March 25, 2021);
- The fourth wave – the Delta variant (September – November 2021) – registered a maximum value on October 19 – 18,863.
- The fifth wave – the Omicron variant (December 2021 – February 2022) – on February 1, 2022, the maximum number of infections, 40,018, was recorded.

In the first year of the pandemic, a total of 632,263 cases of people infected with the new coronavirus (COVID-19) were confirmed, with 15,767 deaths. Until December 31, 2021, 1,808,891 cases of infection were registered, 11,341 of which were reinfected patients. The number of people who died in 2021 was 42,985. The total number of those who died after contracting SARS-Cov-2 reached 64,094 on March 8, 2022.

In late 2021 and early 2022 Europe was in full wave five. The authorities in Romania were preparing for this wave of the pandemic, there being a fairly high probability that the Omicron variant of the coronavirus would become dominant among the population. The fifth wave saw the peak of infections in late January and early February. The percentage of the fully vaccinated population was 40.1% of the total eligible population.

### 3.6. The evolution of the mortality rate

The main demographic impact has to do with the mortality rate, with deaths causing changes in the population structure and having socio-economic effects. The population's consumerist behaviour changed, the imposition of home isolation and social distancing as a measure against the spread of the virus affected mainly the young population, the pressure on the healthcare system increased, mortality was high among the over-60 population, as well as among those suffering from comorbidities.

The total number of deaths between January and November 2019 was 237,288. Most were caused by circulatory system diseases – 132,536 people. Next came those caused by tumours – 46,121 people, respiratory system diseases – 16,176, and digestive system diseases – 14,266.

Between January and November 2020, there was an increase in the total number of deaths, reaching 260,595, the maximum number of deaths being caused by circulatory system diseases, as in the previous year (Fig. 9). Next came those caused by tumours – 45,547 people, and respiratory system diseases (including COVID) – 30,373.

In 2021, between the months of January and November, there was an increase in the number of deaths, up to 307,192 people, 46,597 more than in 2020 during the same period and 69,000 more than in 2020 overall. In 2019, the highest number of deaths was recorded in January – 27,388 and March – 23,665; in 2020 the highest values were registered in October – 27,491 and November – 34,769, in 2021 the maximum values were recorded in the same months – 44,595 and 38,653, respectively.

In 2020, the total number of deaths was 297,345. By the main causes of death, the situation was as follows: circulatory system diseases – 162,780 people (54.7% of the total no. of deaths), tumours – 49,769 (16.7%), respiratory system diseases, including COVID – 38,578 (13%), digestive system diseases – 15,318 (5.2%), and other causes of death – 30,894 people (10.4%) (Fig. 10).

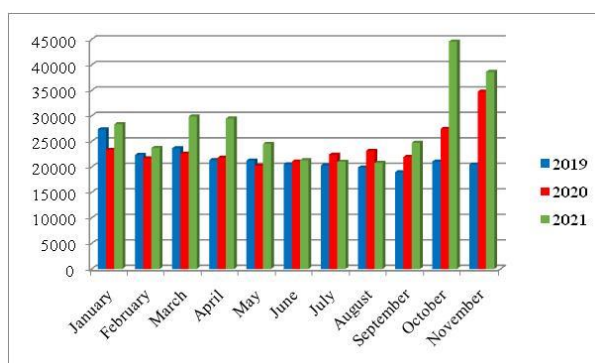


Fig. 9 – Deaths (total no. of people, 2019–2021).

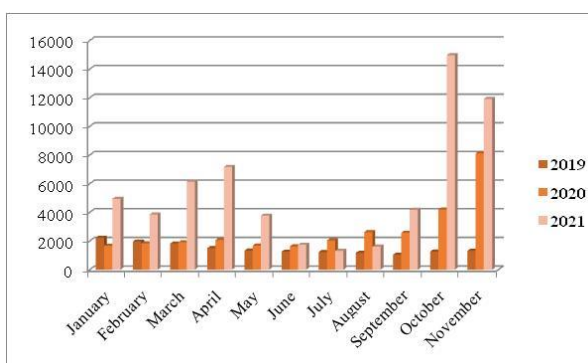


Fig. 10 – Deaths (respiratory system diseases – no. of people, 2019–2021).

Source: [https://insse.ro/cms/sites/default/files/com\\_presa/anexa\\_date/cauze\\_decis.xlsx](https://insse.ro/cms/sites/default/files/com_presa/anexa_date/cauze_decis.xlsx).

In Romania, the highest number of deaths since the start of the pandemic was recorded in October 2021 – 44,595 people, 2.9 times higher than the number of live births. At the other end of the spectrum was the month of August, with 20,788 deaths. The number of deaths recorded in October 2021 was 19,858 more than in September 2021. The number of people who died in October 2021 was 1.6 times higher than in October 2020. In October 2021, over two-thirds of the total number of deaths was recorded for people aged 70 and over. Conversely, the lowest number of deaths was recorded for the age groups 5–19 years (71 deaths), 0–4 years (119) and 20–29 years (141).

In terms of cause of death, most people died from circulatory system diseases – 159,153 people (51.8% of the total number of deaths registered between January and November 2021), respiratory system diseases, including COVID – 61,662 people (20.1%), tumours – 42,721 deaths (13.9%),

digestive system diseases – 14,251 deaths (4.6%), other diseases – 39,405 deaths (9.6%). The maximum number of deaths was recorded in October 2021 for all death categories. After four months when respiratory system diseases were the third-leading cause of death, in the months of September and October 2021 respiratory system diseases were, once more, the second main cause of death, a situation also recorded between October 2020 and April 2021 (Figs. 11, 12, 13).

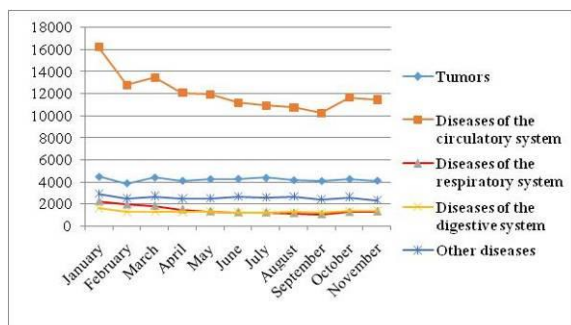


Fig. 11 – Deaths by main cause of death (2019).

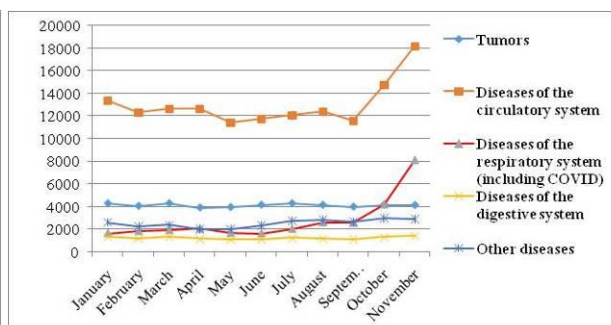


Fig. 12 – Deaths by main cause of death (2020).

Source: [https://insse.ro/cms/sites/default/files/com\\_presa/anexa\\_date/cauze\\_decis.xlsx](https://insse.ro/cms/sites/default/files/com_presa/anexa_date/cauze_decis.xlsx).

In 2020, the overall mortality rate was 297,345 deaths. In terms of living environment, 50.3% of deaths were recorded in rural areas and 49.7% in urban areas. In terms of sex, the number of deaths among the male population recorded higher values – 158,506 deaths, compared to that among the female population – 138,839 (Table 3).

In 2021 the overall mortality rate was 307,192 deaths. In terms of living environment, there was the same percentage of deaths recorded as in the previously analysed year. In terms of sex, the number of deaths among the male population recorded higher values – 52.1% of the total population.

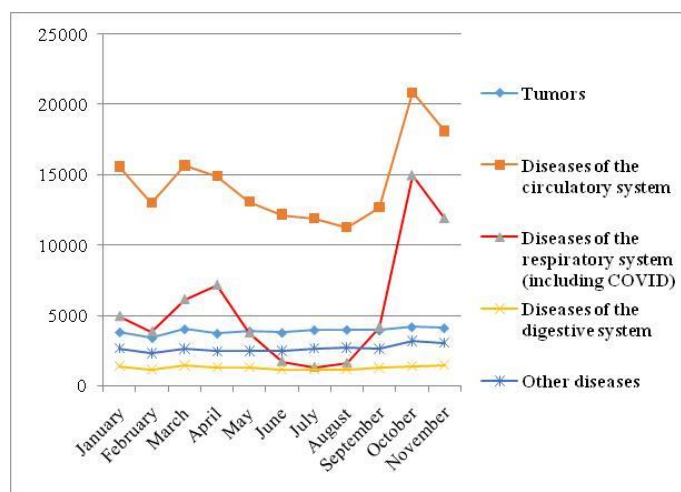


Fig. 13 – Deaths by main cause of death (2021).

Source: [https://insse.ro/cms/sites/default/files/com\\_presa/anexa\\_date/cauze\\_decis.xlsx](https://insse.ro/cms/sites/default/files/com_presa/anexa_date/cauze_decis.xlsx).



Table 3

## Mortality by environment residence

Living environment	January	February	March	April	May	June	July	August	September	October	November	December
A	1	2	3	4	5	6	7	8	9	10	11	12
<b>2020<sup>1)</sup></b>												
<b>Urban</b>	<b>11,531</b>	<b>10,745</b>	<b>11,156</b>	<b>10,733</b>	<b>10,382</b>	<b>10,259</b>	<b>11,243</b>	<b>11,751</b>	<b>10,921</b>	<b>13,973</b>	<b>17,755</b>	<b>17,435</b>
Male	6,010	5,610	5,882	5,691	5,479	5,399	5,973	6,305	5,861	7,564	9,628	9,483
Female	5,521	5,135	5,274	5,042	4,903	4,860	5,270	5,446	5,060	6,409	8,127	7,952
<b>Rural</b>	<b>12,529</b>	<b>11,406</b>	<b>11,689</b>	<b>11,166</b>	<b>10,589</b>	<b>10,744</b>	<b>11,163</b>	<b>11,522</b>	<b>10,813</b>	<b>13,581</b>	<b>17,197</b>	<b>17,062</b>
Male	6,636	6,069	6,096	5,886	5,616	5,772	5,958	6,241	5,847	7,270	9,236	8,994
Female	5,893	5,337	5,593	5,280	4,973	4,972	5,205	5,281	4,966	6,311	7,961	8,068
<b>2021<sup>2)</sup></b>												
<b>Urban</b>	<b>13,970</b>	<b>11,805</b>	<b>15,349</b>	<b>15,256</b>	<b>12,275</b>	<b>10,567</b>	<b>10,591</b>	<b>10,512</b>	<b>12,424</b>	<b>22,588</b>	<b>19,128</b>	13,285
Male	7,544	6,191	8,136	8,119	6,441	5,527	5,505	5,523	6,496	11,486	9,525	6,873
Female	6,426	5,614	7,213	7,137	5,834	5,040	5,086	4,989	5,928	11,102	9,603	6,412
<b>Rural</b>	<b>14,420</b>	<b>11,915</b>	<b>14,550</b>	<b>14,262</b>	<b>12,252</b>	<b>10,770</b>	<b>10,437</b>	<b>10,276</b>	<b>12,313</b>	<b>22,007</b>	<b>19,525</b>	14,355
Male	7,674	6,307	7,684	7,454	6,423	5,630	5,500	5,383	6,425	11,231	9,958	7,425
Female	6,746	5,608	6,866	6,808	5,829	5,140	4,937	4,893	5,888	10,776	9,567	6,930

Source: <https://insse.ro/cms/ro/tags/comunicat-miscarea-naturala-populatiei>.

*COVID-19 mortality by county*

The number of deaths caused by COVID-19 increased continuously: from two at the beginning of the pandemic to 15,767 deaths on December 31, 2020. At the end of 2021 there was an excess in the number of COVID-19 deaths of 42,985 compared to the previous year; on March 8, 2022, the number of those who died reached 64,156.

Starting May 2021, following various checks that had been carried out, a request was made by the Public Health Directorates in the country of the Ministry of Health, and deaths caused by the COVID-19 infection, from the previous period, were entered into the database.

On June 24, 2021, the number of people who died from COVID-19 was 31,985. The lowest values were registered in Giurgiu, Teleorman and Tulcea counties. Figures between 1,058 and 1,558 deaths were registered in the counties of Maramureş, Sibiu, Argeş, Braşov, Suceava, Constanţa, Timiş, Prahova and Bihor. The maximum number of deaths – 2,467 – was recorded in Bucharest.

On July 15, 2021, the death toll rose to 33,393 people, an increase of 1,408. The lowest values were recorded also in the three previously mentioned counties (under 300 deaths in each county) (Fig. 14). Bacău county was added to the list of counties with over 1,000 deaths and over, registering 1,000 deaths.

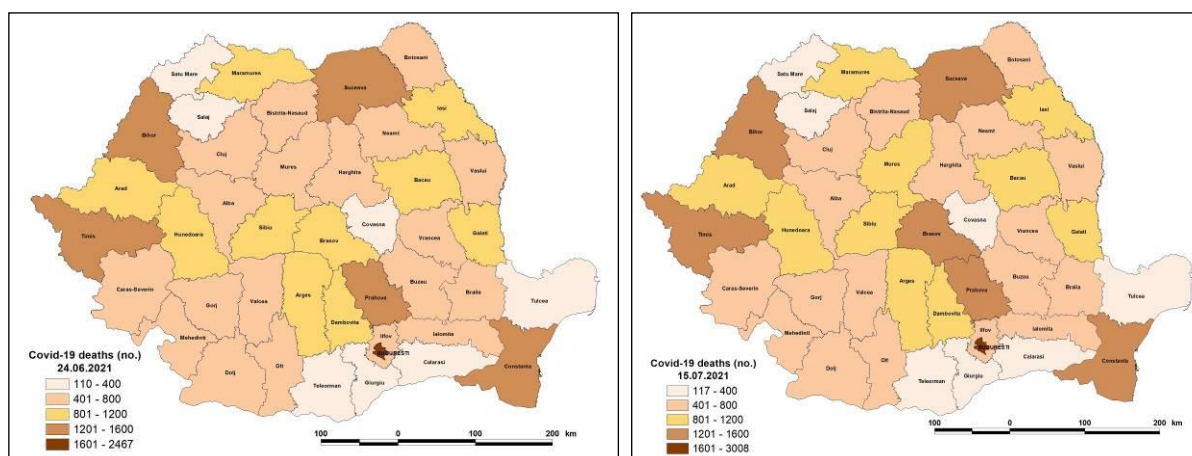


Fig. 14 – The number of people who succumbed to COVID-19 (24.06.2021; 15.07.2021).

Source: <https://www.mai.gov.ro/informare-COVID-19-grupul-de-comunicare-strategica>.

On November 15, 2021, the number of people who passed away was 51,686, an increase of 18,293 deaths compared to the previously analysed period. There was no county that registered fewer than 300 deaths. The minimum values, under 500 deaths, were in the counties of Giurgiu, Tulcea and Covasna. Twenty-three counties registered over 1,000 deaths (54.8% of the total number), the highest values being recorded in Bihor, Prahova and Bucharest. The following counties joined the previously mentioned counties with over 1,000 deaths: Alba, Caraş-Severin, Hunedoara, Botoşani, Vaslui, Dolj, Neamţ, Dâmboviţa, Mureş, Arad, Iaşi, and Galaţi.

As of January 5, 2022, the number of deaths was 57,663, an increase of 5,997 deaths compared to the previously analysed period. The number of deceased increased, so that at that time there was no county with fewer than 400 deaths. The minimum values were registered in the counties of Giurgiu, Tulcea and Covasna (Fig. 15). The number of counties with over 1,000 deaths increased to 25 (60% of the total number), the highest values being recorded in Bihor, Prahova and Bucharest. The following counties joined the previously mentioned counties with over 1,000 deaths: Bistriţa-Năşăud and Cluj. On March 8, 2022, the number of people who died as a result of the coronavirus infection reached 64,156.

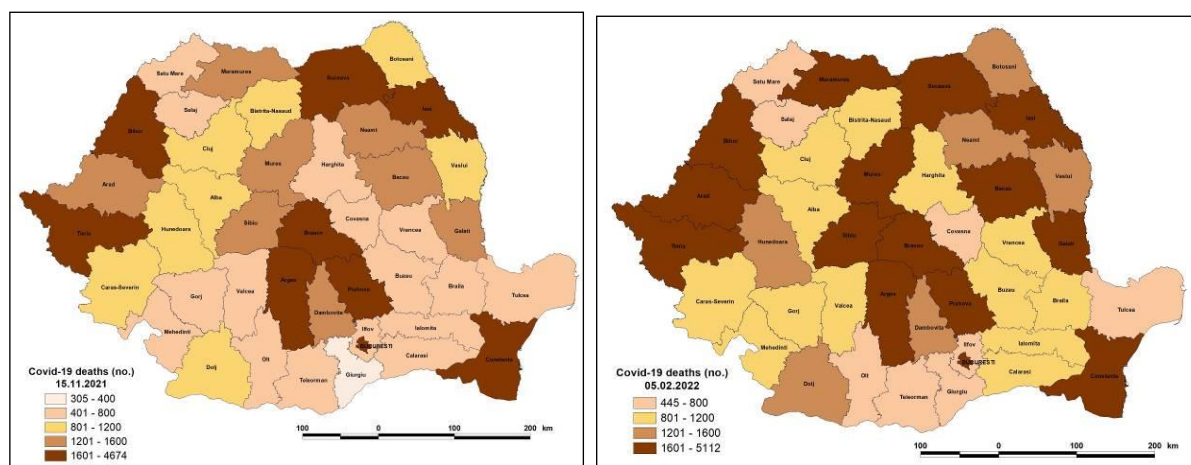


Fig. 15 – The number of people who succumbed to COVID-19 (15.11.2021; 5.01.2022).  
Source: <https://www.mai.gov.ro/informare-COVID-19-grupul-de-communicare-strategica>.

#### 4. CONCLUSIONS

The socio-economic impact of the COVID-19 pandemic had medium and long-term effects: the suspension of employment contracts during the state of emergency, especially in the accommodation, trade or construction fields, people with a low level of education were exposed to the risk of losing their jobs because they performed a seasonal activity or did not have a registered employment contract, the economic crisis, a high unemployment rate, the limited access of the population to health units and medical services, which led to the deterioration of the health of the chronically ill, restrictions were imposed on the movement of people, triggering an economic decline in the field of public and private transport, the long-term transition to online classes, with some of the students' health being affected by the lack of in-person activities, some children coming from financially-struggling families not having access to online classes, an increase in domestic violence cases.

The main demographic impact was related to the increase in the mortality rate, as the number of deaths triggered changes in the population structure, ultimately having socio-economic effects. The pressure on the medical system increased and remote medical services came into effect.

Concerns existed and measures were taken to maintain a decent standard of living: the introduction of state-paid technical unemployment, the postponement of utility services payments, the

postponement of payments for social contributions and taxes, companies switching to work-from-home and investing in the digitization of services, which offered employees greater freedoms, such as flexible working hours, while also requiring them learning new skills. The COVID-19 pandemic has accelerated the digital transition, as harnessing it is an essential part of improving the quality of life and establishing a solid economic base.

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