

REVIEW

Evaluation and review of preventive measures applied during COVID-19 pandemic: strategies adopted by European countries

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Keywords

COVID-19 pandemic • SARS-CoV-2 • Preventive measures • Strategies • Europe

Summary

The COVID-19 pandemic has greatly jeopardized the European continent and the spread of SARS-COV-2 has led European countries to implement a series of preventive interventions aimed at decreasing the incidence rate of the disease, in consideration of the lack of specific therapies and of a vaccine. Each European country has behaved in different ways and timing accordingly to the epidemiological trend and to different political strategies. The main purpose of preventive measures

is to lower the incidence rate of the disease, avoiding the collapse of health systems and limiting the total number of severe cases and deaths. All these targets should fit with needs that go beyond scientific evidence such as economic interests, decisions of neighboring countries and specific socio-political factors for each country. The objective of this research is to clarify which preventive measures have been recommended and applied in different European countries.

Background: COVID-19 in Europe

THE PANDEMIC IN EUROPE

The COVID-19 pandemic has caused an unprecedented threat to Europe, given that many member states have experienced a sustained spread of the virus for several months [1]. The lack of a specific therapy and of a vaccine has forced all affected countries to implement various non-pharmacological measures in order to counter the spread of the infection [2]. As of October 9th, 2020 there were 3,874,181 cases in the area that includes the European Union (EU), the European Economic Area (EEA) and the United Kingdom, while in the world the total number reaches 36,583,084 cases. Fortunately, in the aforementioned area as a whole, a progressive downward trend in the incidence of the disease has been observed during the summer, even though sustained community transmission was still present in many member states [3]. Eight of the European countries that registered most cases of COVID-19 as of October 5th, 2020 are: the United Kingdom, Spain, Italy, Germany, France, Sweden, Belgium and the Netherlands [4]. This research aims to evaluate the different preventive measures implemented by these eight countries.

KEY POINTS ON THE WAYS OF TRANSMISSION OF THE SARS-CoV-2 VIRUS

The modes of transmission of the SARS-CoV-2 virus are mainly two: through the respiratory tract with production of droplets and transmission by contact, which can be

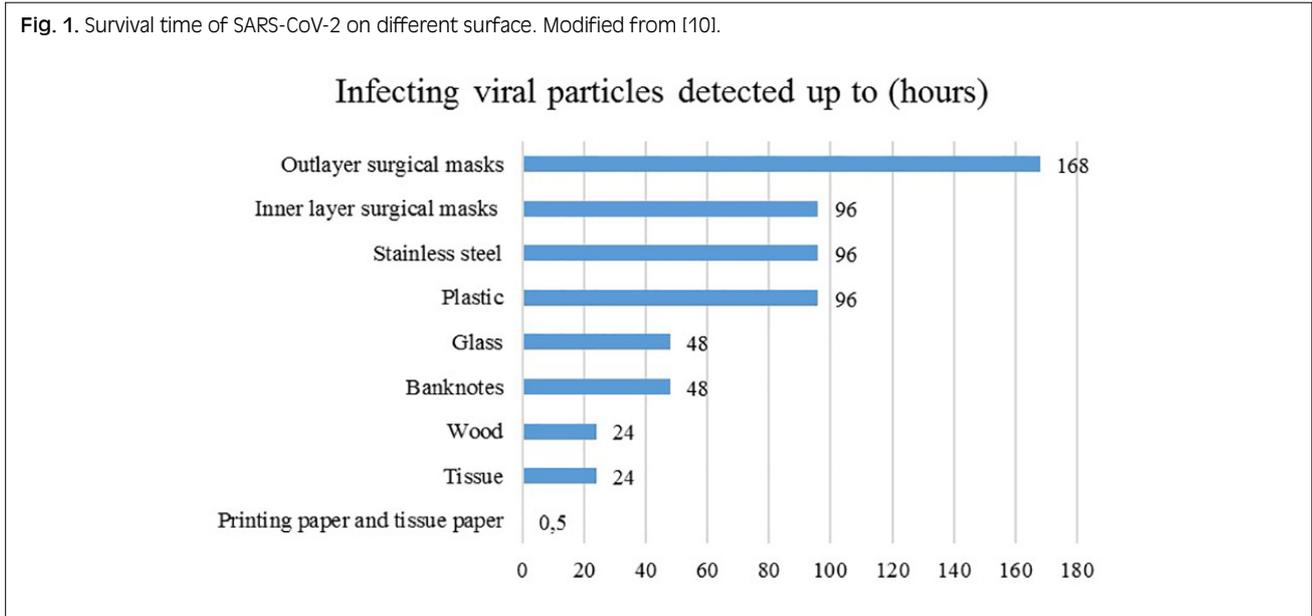
direct or indirect [5]. Contagion by respiratory tract occurs through the emission by the infected subject of droplets of saliva with a $\geq 5 \mu\text{m}$ diameter; these droplets can spread through normal daily gestures such as talking, sneezing and coughing [6]. This way of transmission implies that droplets can spread for short distances (about one meter) and directly reach susceptible subjects (direct contagion) through close person to person contact involving buccal/nasal mucosae or conjunctiva [7].

To date, it cannot be excluded that viral transmission may also be possible by air, especially in specific situations of particular interest for the hospital/healthcare environment, such as the formation of aerosols during intubation, tracheotomy and forced ventilation. Another situation of potential risk for air-transmitted infection could be identified in closed and very crowded environments in relation to droplets and to air recirculation due to air conditioning systems [8]. Transmission via the fecal-oral route remains doubtful [7, 9]. Given that the virus is able to survive for a variable time (from few hours to several days) on objects and surfaces (Fig. 1), indirect contagion is possible if the people who come into contact with the aforementioned fomites do not apply proper hand hygiene and/or disinfection procedures [10].

DISINFECTION METHODS AND TYPES OF BIOCIDES

The products currently used for disinfection of surfaces contaminated by the SARS-CoV-2 virus are those previously used for other coronaviruses, accordingly to a supposed similar survival time on surfaces and the lack of specific studies on this new virus [7]. The

Fig. 1. Survival time of SARS-CoV-2 on different surface. Modified from [10].



main disinfectants recommended at international and European level are the following: ethanol (ethyl alcohol), quaternary ammonium salts, hydrogen peroxide and sodium hypochlorite, to be used accordingly to the technical data sheet of the different products [10].

Description of preventive measures

GENERAL/COLLECTIVE MEASURES

Collective preventive measures aim to limit the transmission of the virus by reducing social contacts. One of the main recommendations taken into consideration in Europe was social distancing which consists of minimizing interpersonal physical contact/distance to reduce the possibility of transmission and new infections.

In support of this rule, during the acute phases of the pandemic, communications and recommendations were issued to stay at home (#stayathome message) and to go out only if strictly necessary. Depending on the epidemiological findings in progress, the creation of “red zones” was arranged at national level as a measure of total isolation of inhabited centres affected by disease outbreaks and during the acute phases of the pandemic a “lock-down” was imposed to the entire population (Fig. 2). In addition to the aforementioned social distancing, the governing bodies of the individual European states have gradually introduced a series of collective measures such as the closure of schools, universities and educational centres, as well as of workplaces and businesses such as coffee shops, restaurants, factories, shops and sports centres. The possibility of remote working through smart working, where possible, was also implemented and encouraged. In many countries, restrictions have been imposed on visits to residences for the elderly and the frail subjects and to prisons. Besides, in order to avoid gatherings of

people, the cancellation of events open to the public was ordered, including religious and socio-cultural events such as theatre performances, movie theatres, concerts, sporting events such as football matches, outdoor and indoor sports competitions [11].

INDIVIDUAL MEASURES

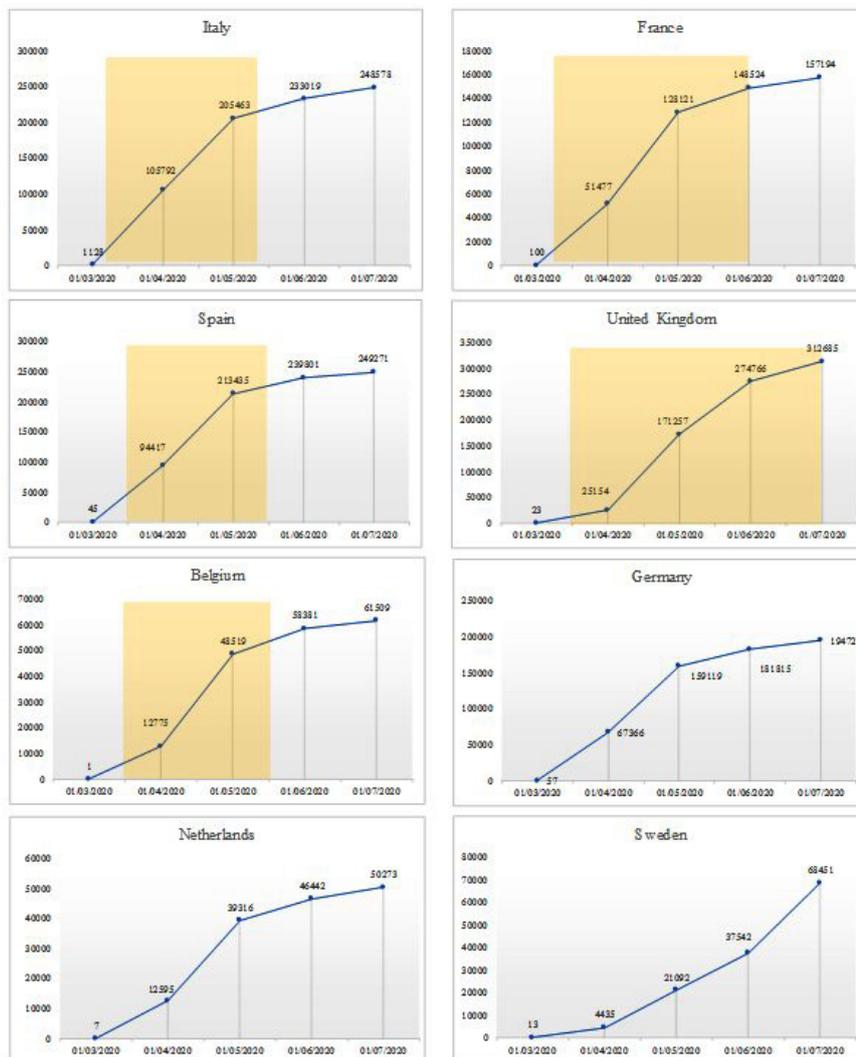
Individual measures have been considered essential for the prevention of direct and indirect SARS-CoV-2 infection. According to the provisions by the World Health Organization (WHO) and the European Centre for Disease Control (ECDC), adequate hand hygiene is defined as the basic point of preventive measures. Frequent hand washing with soap and water or thorough disinfection with alcohol-based gel is recommended. Another precautionary measure adopted by European countries is to adequately cover nose and mouth with disposable tissues or to use the bend of the elbow in case of sneezing and coughing in order to limit hands contamination [12].

Another non-pharmacological personal protective device is represented by face masks which are classified on the basis of the level of protection they provide. They range from masks produced with household tissues to surgical facial devices. Filter masks are also available, which protect users from viral particles, for use in healthcare settings during medical procedures that produce aerosols. Other personal protective equipment such as gloves, disposable gowns and face/eye protections should be used by healthcare professionals or those dealing with positive cases. The masks must be frequently changed to maintain their effectiveness and the combination with other preventive measures such as hand washing together with their proper use can increase its protective effectiveness [11].

ENVIRONMENTAL MEASURES

Environmental measures aim to combat indirect contagion. The SARS-CoV-2 virus is more stable in

Fig. 2. Total number of confirmed cases and “stay-at-home” orders in Italy, France, Spain, United Kingdom, Belgium, Germany, Netherlands and Sweden; March 1st - 1 July 1st 2020. The coloured area represents the period of national enforced lockdown. Modified from [31, 36-40].



the environment than other enveloped viruses and it is therefore advisable to implement additional preventive measures aimed at reducing the risk of infection such as: limiting exposure to the virus, correct hands hygiene, correct use of personal protective equipment and disinfection of surfaces and environments [13].

Proper management of indoor environment is one of the tools to limit the spread of COVID-19. The exchange of the air in the closed environment (home, offices, shops etc.) reduces the concentration of pollutants and the risk of exposure of those who stay indoors; it is recommended to open the windows for a few minutes several times per day rather than once for a long time. In case of impossibility of natural ventilation, it is advisable to carry out proper periodic maintenance of the air conditioners by regularly cleaning the air filters. The cleaning of the surfaces with detergents and disinfectants must be carried out following the instructions given by the manufacturers, remembering that the incorrect use

or dilution of a product can reduce the effectiveness of cleaning. Noteworthy, the effectiveness of disinfectants (e.g. ethyl alcohol, sodium hypochlorite etc.) is linked to the need to preventively remove dust and dirt. All products must be properly used, always wearing gloves. For daily house cleaning, particular attention must be paid to the most frequently touched surfaces (e.g. doors, door handles, windows, tables, light switches, toilets, etc.). When materials or furnishings cannot be washed (e.g. rugs, carpets and mattresses), use steam appliances for cleaning is advisable [14]. With regard to indoor environments in the health and social care and hospital sectors, in addition to the aforementioned regulations, a modification of the methods and timing of aeration and cleaning of the premises is necessary; personnel should be equipped with personal protective devices and adequately trained [5].

Based on current knowledge, there is no international evidence that justifies the use of disinfectants outdoors,

while the possibility of using normal detergents or water for ordinary street cleaning is confirmed, provided that the production of dust and aerosols is avoided. The use of disinfectants such as that based on sodium hypochlorite is not of proven usefulness and is currently not recommended due to an increased risk of environmental pollution [7].

Timing and execution of preventive measures in Europe

CONTACT-TRACING AND ISOLATION

A crucial point in the management of the pandemic has been the isolation of not only the subjects who tested positive but also of suspected and/or asymptomatic cases and close contacts. The isolation and quarantine measures adopted in various European countries were in many respects overlapping with an average duration of 14 days, which roughly coincides with the duration of the disease incubation [15]. Sweden stands out from other states in that it has always maintained isolation as a voluntary and in no case mandatory measure, in order to stimulate a responsible behavior of the population [16]. In order to decrease the spread of the infection, as suggested by the main international bodies, all the considered countries have advised the population, from the beginning of the pandemic, to self-isolate in case of onset of suspicious symptoms such as fever $> 37.5^{\circ}\text{C}$, cough, difficulty in breathing, sore throat and cold [12]. The isolation measure applies to symptomatic positive subjects who do not require hospitalization, to asymptomatic positive cases, to suspected cases and to close contacts of COVID-19 positive subjects. This measure consists in keeping the individual at home, so as to avoid contact with other people. During home isolation, subjects must not have physical contact with family members and roommates; when possible, it is recommended to avoid common areas, to eat and sleep separately and to use different bathrooms [17]. When it is not possible to guarantee a correct home isolation regimen, secondary facilities have been set up. It should be noted that the criteria for the definition of the “suspected case” have changed over the course of pandemic, in particular with regard to the epidemiological criteria [18].

European states have tried to cope with the COVID-19 emergency by adopting a common guideline, enhancing health personnel in numerical and qualitative terms, developing open-source digital capabilities and implementing contact tracing. In Germany, for example, the Ministry of Health funded the training of medical students to support health authorities in contact tracing, managing documentation and data entry.

As for contact tracing, the general trend has been to invest in technology, while at the same time guaranteeing the anonymity of data and preferring Bluetooth technology over geo-localization. In almost all the considered countries, the first opensource applications

were developed such as “Corona Warn” in Germany, “Immuni” in Italy, “StopCovid” in France and “NHS COVID19” in the United Kingdom. “Radar Covid” in Spain and “Corona Melder” in the Netherlands are still in development. The goals of these apps are to inform users as quickly as possible about exposure to a possible case of COVID-19 and to identify infected people before they present symptoms, preventing potential secondary transmission [19].

The use of these applications also makes it possible to lighten and facilitate the workload resulting from epidemiological investigations for healthcare professionals.

It should be noted that the federal state of Schleswig-Holstein in Germany has created a monitoring system entrusted to general practitioners (GPs); GPs have been entrusted with the care of infected patients isolated at home while the public health offices manage contacts and organization of isolation. From 20 April 2020, the Public Health Office in Berlin’s central “Mitte” district started using the SORMAS software app (“Outbreak Response Analysis and Management System”) for contact tracing activities.

As regards the acquisition of national data in Belgium, a daily report on the number of COVID-19 patients was planned to be published with data collected and transmitted by private facilities, hospitals, residential care centres and medical doctors to the Belgian Department of Public Health. In France, a database was created to collect on a national scale positive cases (SIDEPE system) and related contacts (CONTACT COVID system). In Italy, a national observatory coordinated by the Italian National Health Agency (Istituto Superiore di Sanità) has been established collecting all data from the regions and from the Agency’s laboratory on a daily basis. In Germany, the daily report of cases on the national territory can be consulted on the website of the Robert Koch Institute. The Netherlands and Spain publish reports on the website of the Ministry of Health, while in the United Kingdom data are published on the website of the National Statistics Office. Finally, in Sweden, the National Board of Health and Welfare follows and publishes the statistics relating to COVID-19 on a dedicated web page.

The Italian government, in addition to the management of positive cases in the general population, has also had to face and implement preventive measures to avoid the spread of COVID-19 among migrants hosted by immigration centres. To this end, special places have been identified (ground centres or specially equipped ships) to test incoming subjects. In addition, the Sicily region has set up a medical task force in the province of Syracuse to provide basic health services during the pandemic. Another difficult area to manage was that of the prison system. In Italy, where overcrowding is very often present in prisons, suspected cases have been placed in preventive isolation, in order to avoid the emergence of epidemic outbreaks. The same precaution was taken by the British Office which also arranged for the release of 300 inmates considered to be at high risk [16].

PLANNING AND REORGANIZATION OF THE HOSPITAL AND TERRITORIAL HEALTH SERVICES

Examined European states have changed the organizational plans of hospitals and local services trying to adapt their functioning accordingly to the various phases of the pandemic. To date, the situation is constantly evolving depending on the number of COVID-19 cases present in each country.

Europe had to face three important issues in the first phase of the pandemic: the containment of infections, the ability to perform high numbers of swabs per day for the diagnosis of COVID-19 cases, the organization of treatment for COVID-19 cases and at the same time the concomitant temporary suspension of treatment for non-urgent or temporarily non-curable diseases.

As can be seen in Table I, all the examined countries have increased their ability to carry out and process nasopharyngeal swabs compared to the initial stages of the pandemic in order to be able to identify as many cases as possible to limit and stem the spread of the SARS-CoV-2.

One of the prevailing actions that has been taken by each country during the acute phase has been to postpone non-urgent care, both at hospital and community levels. All the examined countries have activated hospital emergency plans by increasing the capability of semi-intensive and intensive care beds, cancelling scheduled non-urgent surgeries and specifically postponing interventions that could potentially decrease the availability of resuscitation places.

The reorganization of intensive care places varied in different countries. Since the beginning of March, in Belgium a national plan for the notification of saturation of intensive care places has been activated, in order to allow for transfers between hospitals; in France was activated the “White Plan” with the reorganization of the healthcare offer of hospitals and the creation of new intensive care places. In Germany, an online register has been set up with mandatory updating by hospitals indicating free places in intensive care and

the estimated maximum occupancy in the 24 hours following publication. Besides, on 11 May 2020, the Corona Treatment Center Jaffestrasse was opened for the exclusive treatment of COVID-19 patients. In Italy, the Minister of Health published a circular requesting all regions to increase intensive care places by 50% and to increase by 100% the number of pulmonary and infectious disease hospitalization places adequately equipped with semi-intensive care devices. In regions with highest incidence rates, such as Lombardy, COVID-19 hospitals have been established to treat only infected patients. The Italian national response has been fragmented in the different regions, with different local organizations. Table II shows the cumulative incidence, intensive care units (ICU) capacity and maximum daily ICU occupancy in every Italian region related to the first months of the pandemic [20]. Figure 3 shows how ICU occupancy has changed during the early period of pandemic in the evaluated European nations. ICU capacity data was not available as well as occupancy data from Spain [21]. In Spain, field hospitals have been set up, most of them in Madrid, to treat less serious cases. At the end of April, Sweden doubled the availability of intensive care places by adopting an interregional coordination plan. The Swedish Armed Forces have also been involved by setting up 30 intensive care places in field hospitals in Stockholm and in general no hospitals have been designated exclusively for COVID-19 patients. At the end of January, the NHS in the UK said it would make at least 30,000 ICU and 100,000 acute care beds available nationwide. COVID-19 was declared a “high consequence infectious disease” and the care of the sick was initially entrusted to five adequately equipped national hospitals. As the number of cases increased, all the hospitals available in the UK were used and available operating theaters were transformed into ICUs to increase the availability of beds [16].

As regards the territorial management of the acute phase, several countries have activated a telephone triage system for general practitioners and various national lines

Tab. I. Number of nasopharyngeal swabs performed by each country from week 10 of 2020 to week 29 of 2020. Modified from [42].

Nations	Week number of the year 2020			
	Week 10-14 (N)	Week 15-19 (N)	Week 20-24 (N)	Week 25-29 (N)
Belgium	96.963	510.361	456.034	432.619
France	363.858	679.521	1.064.100	1.469.235
Germany	1.370.655	1.806.652	1.852.338	2.406.653
Italy	671.004	1.874.451	1.715.994	1.617.331
Netherlands	92.261	175.417	218.631	368.431
Spain	NA	589.689 *	1.436.527	1.011.926
Sweden	53.739	120.945	205.831	372.130
United Kingdom	NA	1.393.248	3.699.076	3.250.062

* Data available from week 18. NA: data not available; Week 10: 2020 March 2 - 2020 March 8; Week 29: 2020 July 13 - 2020 July 19.

Tab. II. COVID-19 cumulative incidence for 100,000 inhabitants, ICU beds for 100,000 inhabitants, maximum daily ICU occupancy for 100,000 inhabitants (Italy; period March, 1 - July 16, 2020). Modified from [20].

Region (Italy)	Cumulative incidence	ICU capacity	Max daily ICU occupancy
Abruzzo	252	8.24	5.75
Basilicata	71.2	8.59	3.33
Bolzano (Aut. Prov.)	504	7.53	12.2
Calabria	62.4	7.18	1.17
Campania	82.1	8.67	3.10
Emilia-Romagna	653	10.1	8.43
Friuli-Venezia Giulia	274	10.4	5.01
Lazio	142	9.44	3.44
Liguria	642	11.9	11.4
Lombardy	951	8.98	13.8
Marche	443	7.02	11.0
Molise	144	6.12	2.90
Piedmont	718	7.29	10.3
Apulia	112	7.53	3.91
Sardinia	83.8	7.44	1.88
Sicily	69.8	8.13	1.58
Tuscany	277	11.9	7.94
Trento (Aut. Prov.)	831	5.91	15.0
Umbria	163	7.87	5.40
Aosta Valley	943	7.88	21.3
Veneto	397	10.1	7.25

dedicated to COVID-19 for information for citizens. In the case of telephone triage, in Belgium doctors were asked to go to the suspected positive/infected patient’s home with the appropriate personal protective equipment (PPE). In the Netherlands, outpatient visits were allowed only by appointment. These visits were planned at specific times only for COVID-19 suspected patients, and telematic visits were recommended if possible. In the UK, the Royal College of General Practice offered free telemedicine lectures to general practitioners and recommended visits only in case of need. In some regions of Italy, general practitioners, after adequate telephone triage, were able to activate the special continuity of care unit (USCA). Doctors and nurses belonging to these units went at home to test and provide care to patients not requiring hospitalization. In France, some territorial outpatient services have been created, managed by municipalities on a local basis, with private doctors and nurses to support the national health service. In Sweden some general medicine units have been organized. These units went at home of patients with flu symptoms to test their positivity to COVID-19; however, the responsibility for territorial management has been fragmented following the division of the country into different municipalities. In Germany, special indications for outpatient care have been established by the “Federal Joint Committee” to limit physical contact between patients and healthcare professionals and doctors have been offered the possibility of making paid tele-consultations. Spanish primary care

centres have cancelled non-urgent appointments and implemented online drug prescription for patients with chronic conditions.

The automatic renewal of drug prescriptions, especially for the chronically ill patients, has been implemented in several countries such as Italy, Germany and Spain in order to avoid crowding of people waiting in general medicine clinics. In some cases, such as in Germany, pharmacists have been allowed to modify, partially and if strictly necessary, medical prescriptions, and to dispense equivalent drugs in case of emergency. In England, the at home use of abortion drugs was allowed starting from March 30th 2020; this measure was extended to Scotland and Wales subsequently.

The compliance to the vaccination schedule, especially in children, has been heavily affected by the pandemic as well. In Europe, the suspension of the vaccination offer has not been officially declared, but some countries, such as the United Kingdom, report the possible failure to comply with the planned vaccination cycles which could increase the risk of epidemic outbreaks of vaccine-preventable infectious diseases. Belgium, in this regard, has indicated paediatric vaccinations in the age group under 15 months and new-born screening as essential and not to be delayed.

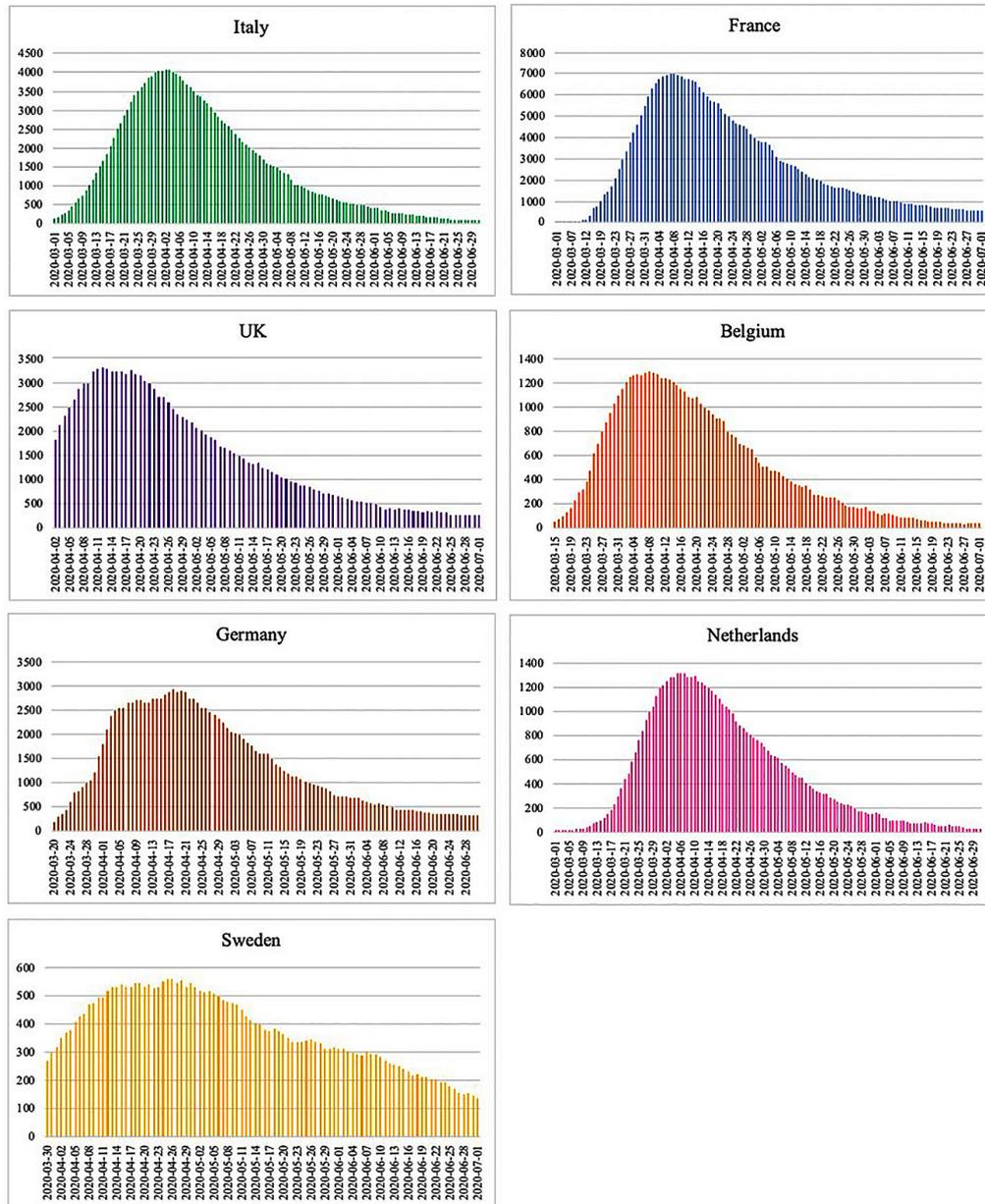
Mental care was completely transformed during the COVID-19 epidemic: psychological support services, mainly by telephone, have been implemented in several countries such as the Netherlands, France and Belgium. Many specialists in the sector have pointed out that the maintenance of mental health and support for chronic psychiatric patients has been underestimated; in France it has been considered in the guidelines since the end of March 2020.

The evidence that most deaths were recorded in residences for frail and elderly patients has placed the focus on the adequate management of these facilities, which were initially not considered to be at the same risk as hospitals. In many countries, access to these facilities has been forbidden for visitors to avoid contagion from the outside; group activities and the use of common areas have also been limited. In Belgium, it is estimated that about half of COVID-19 deaths have occurred in nursing homes; on April 15th, 2020, the Inter-ministerial Public Health Conference approved a project to support hospitals for elderly to increase manpower and materials if needed. In Sweden, the National Board of Health and Welfare has published some guidelines to support the care sector for the elderly and a fund has been set up to finance the same. In Belgium, many residential institutions for the elderly have suffered from the lack of supply of personal protective equipment and in Italy the Italian National Health Agency has published a guide for the prevention and control of COVID-19, specifying the organizational and structural requirements to limit the risk of infections [16].

HEALTH COMMUNICATION

During these months, most of the government bodies have used the various means of communication, such as TV, radio channels and direct streaming on the web

Fig. 3. Daily ICU occupancy, March, 1, 2020 - July, 1, 2020. Data from Spain relatively to this period was not available; data from Germany, Sweden, Belgium and UK are available later than March, 1 [21].



to inform, through press conferences, their citizens on the progress of the pandemic and on the progressively adopted measures (Tab. III).

Interviews and debates with public health experts were often held to inform the population about the epidemiology and severity of the infection. The use of commercials and social media has played an equally important role in promoting public health campaigns, reaching, especially in the second case, also adolescents and young adults.

In this context, the so-called “influencers” with the launch of the well-known hashtag #stayathome contributed in an important way to spreading the message. In general, from January until now, there has been a progressive

increase in information and official communications in line with the spreading of the epidemic.

Already starting from the end of January, all major European countries have progressively equipped themselves in communicating, through conventional channels, information on proper hand sanitation, respiratory etiquette and maintaining physical distancing when coughing or sneezing. In the following months, the broadcasting of television and radio commercials on the subject was intensified, with the dissemination of these also online, for example on platforms such as YouTube. The use of the internet was also useful to support citizens with regard to the management of offspring, provide advices for the correct way to do the grocery

Tab. III. Health communication strategies during the pandemic. Modified from [27].

Health communication strategies	
Often used	Sometimes or rarely used
<ul style="list-style-type: none"> • Daily conferences and briefings by government and/or public health agencies • Public health campaigns on traditional media (TV and radio) and social media • Information on COVID-19 webpages of existing official websites 	<ul style="list-style-type: none"> • Dedicated COVID-19 website • COVID-19 telephone hotline for questions • Posters, billboards, leaflets in public spaces • Text messages via SMS or emails • Leaflets and letters via post • Chatbots for standard COVID-19 questions

shopping and keep physically active. In addition to this, in countries such as France, especially following a drastic drop in healthcare supply in the first month of the lock-down, the use of these forms of communication was also useful in highlighting the need to provide continuity of care and to support for those suffering from chronic diseases.

Almost all European governing bodies have used similar methods of communicating information on the progress of the pandemic and on the measures progressively adopted. In Germany, official information on the epidemic was communicated regularly through daily bulletins organized by the Robert Koch Institute (RKI), the government’s leading scientific institution on infectious diseases. In Italy data were communicated through the official sites of the Ministry of Health, the Italian National Health Agency and Civil Protection; the government also provided daily bulletins on the epidemiological situation through live streams in which the head of civil protection and the director of the Italian National Health Agency were available to answer technical-scientific questions.

The Italian Ministry of Health, through the COVID-19 website, provided information about the disease and related symptoms, epidemiology, methods of prevention and treatment. In the UK, information was communicated through official government sites, social media and mass media (such as the BBC broadcaster). Since mid-March, daily conferences have also been held by the Prime Minister, flanked by other important political figures and experts in the scientific sector. A dedicated COVID-19 section on the British government website was immediately made accessible to the public. The Spanish government has released news on the progression of the epidemic and the implemented policies through daily press conferences. While the Minister of Health took over all the responsibilities relating to the management of the epidemic, it was in fact the head of the Coordination Centre for Health Alerts and Emergencies who provided most of the daily information. From March 14th 2020, at the start of the lock-down, all the ministries involved in this operation (health, economy, defence, domestic affairs) have been responsible for communicating any

type of update on the adopted measures. Noteworthy, a consultation channel on WhatsApp, called Hispabot-COVID-19, has been launched; an artificial intelligence was designed with the aim of responding to citizens’ doubts about the COVID-19 disease. In the Netherlands, from a communicative point of view, the management of the pandemic was comparable to that of many other countries, except for masks, the use of which has not been promoted, except for health workers and for suspected or confirmed cases needing access to treatment. Besides, a series of webinars organized by patient associations was launched in order to inform about the risk related to a specific disease and the prevention measures to be implemented.

The controversy over the use of masks turned on again in May with the reduction of restrictive measures, especially with regard to their use in places where keeping the distance is difficult, such as public transport. Supporters argue that these certainly make a contribution, albeit minimal, to containing the spread of the virus while the opponents argue that the use of masks gives a false sense of security. Studies published to date on the effectiveness of using the mask outdoors do not clarify this controversy [22-26].

In France, the government has often taken different positions on the usefulness of using masks; most recently, the one according to which masks should be reserved for healthcare professionals and subjects at risk such as frail patients, seems to be related to the difficulty in finding masks for the entire population.

Although the different governments have been committed to disseminate correct information regarding the epidemic, the progressive increase in the circulation of information even on unconventional channels has led to its fragmentation and often inconsistency, creating confusion among citizens. A problem of significant importance that has arisen is that of the spread of “fake news”. The Italian Intelligence Company (SOCINT) has warned the government of how numerous news concerning the origin of the virus and the alleged existence of a SARS-CoV-2 vaccine deliberately not made available to the population were gaining ground on the net. It is estimated that in other European countries such as Germany, Spain, France and the UK the total number of people involved in spreading disinformation on different web platforms has reached about half a million [16].

One of the limitations shown by the various governments is that they have not adequately implemented information channels for ethnic minorities [27]. Sweden is an exception: via the public health website it has provided citizens with information on COVID-19 in 25 different languages. The Swedish government has also tried to get the message across to people for whom the language barrier is a serious problem (e.g. those living in poor socio-economic conditions and those who have recently moved to Sweden) through the dissemination of printed information leaflets in several languages. Since January, Belgium has launched a website specifically created to provide information on the pandemic, available in the

three national languages (Dutch, French and German) and in English. In addition, leaflets were also created and made available in other languages such as Arabic, Spanish, Italian, Polish, Romanian and Turkish [16].

COLLECTIVE AND INDIVIDUAL PREVENTIVE MEASURES

Since the beginning of the pandemic, physical distancing has been the essential tool to limit the spread of SARS-CoV-2. In all the examined states, this measure was one of the first to be adopted and is still in force.

The physical distancing has in fact allowed the partial and progressive resumption of various activities. Shops, restaurants, coffee shops, gyms, churches, museums and other places frequented by a large number of people have had to review their activities and organization in order to respect interpersonal distancing and to avoid a rapid increase in the number of infections.

According to the WHO, the distance to be maintained between individuals is at least 1 meter [28]. Not all the examined states have complied with this minimum distance; Belgium, Germany, the Netherlands and Spain have in fact defined 1.5 meters as the minimum distance to keep from other people. In Italy, the distance is increased from 1 to 2 meters during intense physical activity. In England the distance to be maintained is 1.5 meters, but from July 5th 2020, if this is not feasible, the distance of 1 meter can be maintained. In Scotland and Wales, however, the distance to be maintained is 2 meters [16].

The difficulty in maintaining social distancing lies in the fact that it is often very difficult to calculate, without suitable tools, at what distance one places oneself from other people. In order to facilitate the maintenance of distance from other individuals, various solutions can be used, especially in closed places or in places where crowding is possible. Some of these include: the use of adequate signs to define the correct distance, restricted access and the use of face masks. In addition, for entry into the shops, two states (Belgium and Italy) have given precise indications, with reference to how many people can enter the place depending on the width of the same [16].

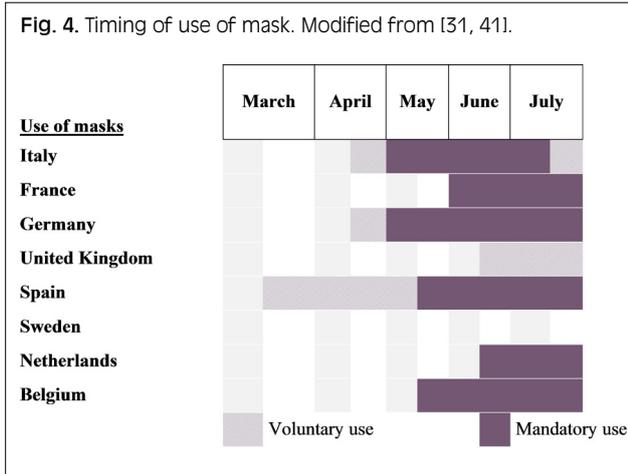
At the beginning of the pandemic, the use of face masks was recommended only to people with suspected symptoms of COVID-19 and to groups of workers at risk for contagion. With the progress of knowledge about SARS-CoV-2 and the role of asymptomatic infected subjects in the spread of infection, many states have decided to make the use of masks mandatory or recommended in different situations (Fig. 4). In the UK, face masks have been used as a recommended but not mandatory temporary measure until the end of July; in Spain, Italy, the Netherlands, France, Belgium and Germany it is a mandatory measure adopted especially during the transition phase. In particular, Italy, France and Spain have made it mandatory in any situation in which interpersonal distance cannot be maintained. Belgium has made it mandatory in means of transport and in the workplace, if the minimum distance cannot be

respected, and from June 8th 2020, given the reopening of coffee shops and restaurants, it is also mandatory for waiters. It remains strongly recommended in public spaces when the inter-personal safety distance cannot be respected. For the Netherlands, where the use of the mask is seen as a measure of dubious utility, it remains mandatory to wear it on public transport. It should be noted that in this country the general population is not advised to use surgical masks as they must be preserved for use by health professionals while the use of community masks is instead encouraged. Finally, for Germany, the mask must be worn in public transport and in shops, but this obligation is not uniform throughout the national territory [16, 29].

It is important to keep in mind, as WHO continues to remind, that the use of face masks can be a great help in containing the spread of SARS-CoV-2 especially when it is difficult or cannot be kept the safe distance, but it is not the most important preventive measure. In fact, the use of masks can lead to a false sense of safety that tends to make subjects to forget all other preventive measures. It is essential to try to keep as high as possible the awareness of the population that preventive measures work best when applied together because they have a synergistic effect [30].

If in public places it is potentially easier to check compliance with safety measures, the problem remains for gatherings in private places. Belgium, France, Germany, Scotland and Wales have in fact defined the number of people/families who can get together privately already this summer [15].

Physical distancing plays an even more important role in the reopening of schools and workplaces. While for workers who can take advantage of smart working this is always the preferable choice, in realities like schools and educational centres, remote work becomes an increasingly difficult tool to manage [16]. In May and June, all the examined states that had closed schools (Belgium, Germany, Italy, Netherlands, Spain and United Kingdom) [31] progressively reopened kindergartens, educational centres, nursery schools, primary and secondary schools, even if in different ways and timing. School attendance has not been compulsory for Belgium, the Netherlands and Spain until the end of August; in these countries the reopening of these services had had the main objective of relieving parents from managing their children, especially for those who carry out essential jobs and who cannot take advantage of smart working. In Spain, in fact, children/teenagers who needed learning support activities, who had to take exams or whose parents did not have the opportunity to use teleworking, were admitted to educational services. In France, attendance at kindergarten, primary and secondary school returned to be mandatory from June 22nd 2020 and it is mandatory for teachers and high school students to wear a mask. In Germany, however, the decision to reopen schools is left to the individual federal states. In Italy, summer education centres and kindergartens have reopened, while mandatory schools have restarted their activity in September 2020. In



Sweden, from 15 June 2020, upper secondary school students can return to school, while school services have never been suspended for < 16 years-old students. In the UK, the recovery of primary schools started in September even though the initial goal was to reopen in June. Although in this country all the schools were closed on March 23rd 2020, a service for the children of essential workers, for children/young people with disabilities and for socially vulnerable ones was still active [16].

As regards the management of the progressive slowdown of restrictive measures, France, Spain and Italy have defined the epidemiological risk of the various regions and, for this reason, slowdown has been different in the different areas of each country [32].

Germany, on the other hand, left the decisions to individual federal states. In any case, all states mainly made their decisions by evaluating not only the national and regional epidemiological trend, but also taking into account the capability of their health system (particularly intensive care units) and hospitals in order to avoid the saturation of the system and to allow to have sufficient resources to manage a new possible increase in cases [16].

All states, except Sweden, Germany and the Netherlands, have adopted the restrictive measures that characterized the enforced lock-down in March, while the gradual slowdown began in May. From this point of view, there is a relative uniformity in the application of the measures and their subsequent withdrawal (Fig. 2) [16, 31].

Another crucial point is the management of restrictive measures applied to trips. From mid-March until June 15th, 2020, the countries of the European Union and the Schengen area, except Ireland, agreed to coordinate by applying restrictions on non-essential trips, as recommended by the European Commission [33]. All the states have then drawn up their own, continuously updated, list of the countries for which particular restrictions are applied. In addition, Italy, the United Kingdom, Belgium, Spain, Germany and France have requested, upon entry into the country, a period of quarantine in different ways (each country makes

it mandatory or recommended for different states). Sweden, on the other hand, has never applied this measure by asking incoming travelers to self-isolate if potentially at risk [34].

Conclusions

Dealing with and managing a pandemic like the one we are experiencing has created considerable difficulties for governments. In all the considered states, various task forces have been created to make the management of the crisis and the state of emergency more targeted. The two most affected areas were obviously the health system and the socio-economic one. Essential and necessary measures adopted during the lock-down have led to a decrease in infections during the most critical phase of the pandemic, but at the same time they have created social and economic hardship due to the closure of non-essential economic activities and the imposition of permanence at home. Managing these difficult situations has been a global challenge and, in some countries more than others, has further aggravated already ongoing economic crisis [16].

We believe that the correct and timely application of preventive measures to limit the infection from SARS-CoV-2 are the most effective tool to limit the new epidemic peak which is further aggravating the already highly compromised European situation, both from a social and economic point of view. The methods and timing of application of the aforementioned measures at European level have been assessed individually by the states and with substantial different approaches. To date, sharing objectives and strategies seems absolutely relevant in order to face the impact of COVID-19 throughout Europe.

Fortunately, a first step in this direction was taken when planning the vaccination campaign against COVID-19. The Health Ministers of Belgium, France, Germany, Italy, Luxembourg, the Netherlands, Spain and Switzerland in their declaration of December 15th 2020 are committed to greater sharing especially in view of the phase that will follow the administration of anti-COVID-19 vaccines [35]. This is certainly a strong signal that anticipates a continuous and ever greater sharing of preventive strategies aimed at containing the pandemic. Having a single strategy, obviously to be adapted to the epidemiological context of each country, can also be helpful in facilitating the understanding and sharing of the measures by individual citizens. In this case, it is not a question of renouncing national individuality but of sharing common objectives so that all Europe can cope with the pandemic.

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Authors' contributions

All named authors meet the International Committee of Medical Journal Editors (ICMJE) criteria for authorship for this article, take responsibility for the integrity of the work as a whole and have given their approval for this version to be published.

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