

Comparing the responses of countries and National Health Systems to the COVID-19 pandemic: a critical analysis with a case-report series

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Abstract. This review aimed to compare the different responses of countries to the pandemic, their National Health Systems, and their impact on citizens' health. This work aimed to create a narrative plot that connects different discussion points and suggests organizational solutions and strategic choices in the face of the pandemic.

In particular, this work focused on public health organizations, specifically the European Union and vaccination politics. It is also based on a case report series (about the United States, Germany, Vietnam, New Zealand, Cuba, and Italy), where each country has responded differently to the pandemic in terms of political decisions such as vaccination type, information to citizens, dealings with independent experts, and other specific country factors.

In comparing the various models of care systems response to the pandemic, it emerges that: we have found some (few) good practices, but without global coordination, and this is obviously not enough. It is now quite clear that there cannot be a "good answer" in a single nation. Uncoordinated local responses cannot counter a global phenomenon. The second point is that the general context must be considered from a strategic point of view.

With the threat of new pandemics (but also of health disasters linked to climate change, pollution, and wars), humanity finds itself at the crossroads between investing in a "democratic" management of international bodies but without power (and at the mercy of the need for funds with consequent conflicts) or in some new leadership proposals that advocate efficiency and problem-solving (and that would probably be able to

implement it) but that would place processes totally outside of the public's control.

Key Words:

COVID-19 pandemic, National Health Systems, Quality of life, Countries' responses to COVID.

Introduction

This article will focus on analyzing and comparing the different responses of countries to the pandemics and their National Health Systems in terms of their impact on citizens' health. This work aimed to create a narrative plot that connects different discussion points and suggests organizational solutions and strategic choices in the face of the pandemic. Methodologically, each linked point would have merited an ad hoc scoping review. This would have provided a more robust methodological framework but would have prevented, for the time it would have been necessary, the creation of that narrative path useful for setting the problem and suggesting a solution. Therefore, we chose to create a narrative review that might later be enhanced by additional systematic reviews. This paper will discuss how different countries and health systems, in general, have dealt with the pandemic. Data from the John Hopkins University¹ database were used, which show the official data transmitted by countries.

There has been discussion about the reliability of nations to communicate the state of the pandemic, but the data presented is what we have at the highest possible reliability². In this framework dealing with different kinds of responses to pandemics, it is somewhat obligatory, and vice versa, to remember at least three truly critical points dealing with the impact of the pandemic on the (different) health systems. These consequences have indirect repercussions on the functioning of health systems and the health of citizens. They, therefore, have an indirect relationship with the key theme of this presentation. However, these are such complex issues and are shown by strongly inhomogeneous sources that they deserve a separate article and discussion. This presentation, therefore, must limit itself to listing them. The first point is the terrible impact on healthcare workers, which has been well documented in the literature in terms of stress, COVID morbidity, and mortality³⁻⁶. The second point is the increase in general mortality rates in communities. In addition, general mortality rates have also increased because of the insufficient attention given to routine care because of the stress on health systems due to the pandemic, as it has been well documented in cardiology and oncology departments⁵. Finally, the increased excess of mortality in so-called sheltered homes for people with disabilities and old adults, especially those affected by neoplastic pathologies, highlights frightening organizational weaknesses, and frequent human rights violations⁷.

Comparing the Impacts of the Historic Pandemic on Mortality

We have often heard “Pandemics are a scourge for humanity that we believe can be overcome.” This “optimistic” point of view was based on the improvements in the economic and health status

of the populations of rich countries and on the progress of preventive and therapeutic tools. We were convinced that, at least in wealthy countries, we could have efficient health systems. These are also public health systems in Europe and a few other countries. People probably know that in countries like Africa, populations suffer and die of diseases like the Ebola virus Disease, Yellow Fever, and others. Still, we believed that these were not issues in our interest. In addition, the event of a new zoonosis, as well as the subsequent need for preparedness for it, have been completely underestimated. Even now, nearly three years after the COVID-19 pandemic began, the impact in terms of deaths and inhabitants may appear better than that of the worst pandemics in history. According to some estimates, the Spanish flu killed one-fifth of the world’s population⁸. In addition, the plague epidemic known as the black death caused between 57 and 200 million deaths⁹ (Table I). Better socio-economic conditions and the health support network of many (wealthy) nations may have played a role. When we compare the data to the optimistic claims made by politicians and experts about the ability of national health systems to handle the pandemic, the death toll is surprisingly high. This indicates a lack of ability to respond effectively.

Comparing Different Kinds of Health Systems on COVID Mortality Today

The global health community faced COVID-19 by using four different kinds of National different Health Services (NHSs) recognized by the WHO¹⁰: i) direct taxes finance – “the Beveridge” model, where the person being treated does not pay for care. The caregiver employees are government employees ii) the Bismarck model, which is financed by private

Table I. Participants awareness about tripledemic.

	Total Cases*	Total Deaths	World Population
COVID-19 (2019-May 2022)	530 million (11,5 Billion vaccines doses)	6,300,000	7,5 billion
Spanish flu (1918-1920)	500 million	25-50 million	2,5 billion
Black Death (1346-1353)		57-200 million	0,5 billion

*In May 2022^{6,8-9}.

health insurance; health centers and doctors are generally private; iii) the National Health Insurance (NHI) model, financed through payroll and tax deductions. Private hospitals and doctors provide health services; iv) the “Out-of-Pocket” model, based on the lack of universal health coverage. In this model, those with the highest income will take care of themselves, and the poor will continue to be ill or die. The study by Alfaro et al¹¹ compared the pandemic response of different models in terms of mortality and case incidence. Surprisingly, there would be no substantial differences. A slightly better outcome was found in the states with the National Health Insurance model, but the few states in this group were all wealthy countries. As shown in Figure 1, even within similar organizational systems, the responses have been variable¹⁰. This is due to external factors of the health systems that can influence the pandemic but also to “internal” factors typical of the specific nation model (for instance, system efficiency, specific organizational aspects, and corruption in the management of public money), which may have played a role. It is, therefore, worthwhile to examine some of the external factors and then specifically analyze the answers of some countries as “case reports”. Using case reports, we evaluated

the trend of the pandemic, considering the cases identified, the number of deaths, and the rate of vaccinations over time in some countries. It is not a question of verifying hypotheses but rather generating them.

Factors Independent or Partially Independent of the Health Systems Could Influence the Pandemic

What are the factors other than the efficiency of the national health system that can affect the response to the COVID-19 pandemic? Firstly, environmental factors, of which the climate was probably more relevant in the early waves, and delta and omicron seem less sensitive. Literature data indicate a risk window between +2 and +20°C, but high humidity also seemed to play a protective role, at least during the first two waves¹¹⁻¹⁶. Another factor identified is pollution, specifically PM2-10 microparticle pollution. Population densification and excess mobility were also found to be factors associated with the spread. All other variables being equal, the greater risk was found in urban areas and areas of greater tourist density (measured at the second wave)¹³. A very high lethality of viruses was

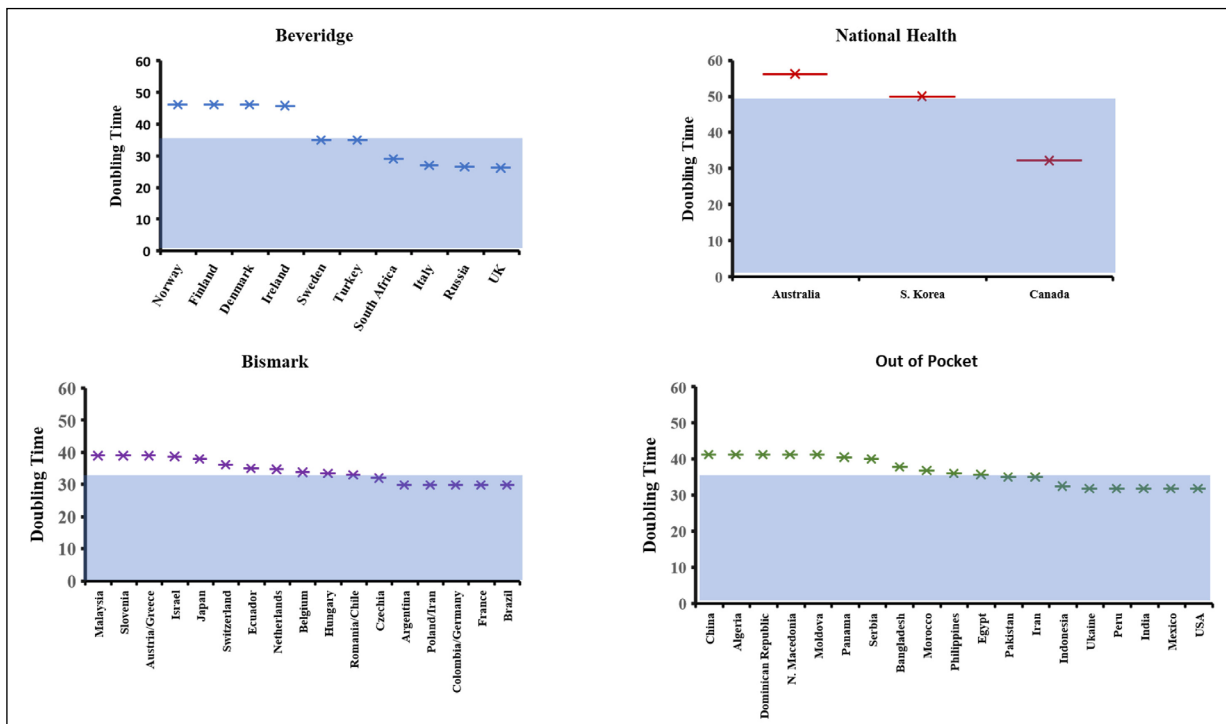


Figure 1. Deaths in the first 360 days of the pandemic in the different healthcare systems^{9,10}.

Table II. Countries with the highest case fatality ratios in the world.

Country	Cases/Fatality Ratio%
North Korea	1 (declared 6 deaths)
Yemen	18.2
Sudan	7.9
Peru	5.9
Syria	5.6

found in post-war and war areas with high densities in refugee camps; deprivation of food may be one of the determinants.

As shown in Table II, derived from data from the John Hopkins University COVID website¹, three of the five nations with the highest lethality for SARS-related CoV-2 diseases are actually in-war or post-war nations. It is conceivable that the data¹⁷⁻¹⁹ recruited from these countries are not often reliable.

An example is North Korea, where the scientific community does not take into consideration that there are evident communication errors, in fact, only six deaths are declared for this country¹.

Peru is also the country with the highest COVID death rate. This peculiarity is so far unexplained. In other countries, hunger, the increasing population in the refugee fields, the excess of people and frail people, injured, immunosuppressed, and untreated people may explain this outcome. In this regard, we recently published an editorial entitled

“War and Pandemic: A Negative Synergism Could Amplify the Catastrophe”²⁰. We referred to the war in Ukraine. The war is forcing many militaries and civils to lower social distance, depriving many prisoners and refugees of medicine when sick. There will be the possibility of many immunosuppressed people massed outdoors and outside destroyed hospitals without care. The likelihood of being infected simultaneously with human and animal viruses is high, and it could allow the birth of new variants. Russia had the worst death rate for COVID in March 2022 among the ex-G8 countries, about 1/3 higher than Italy (which has a much older population and is, therefore, more vulnerable to COVID deaths), twice as many as Germany and France, nearly three times the deaths in the UK and Japan and four times the deaths in Canada. The official estimates (which are always incomplete) tell us that around 700 people died of COVID daily in Russia. In Ukraine, barely 40% of the population was vaccinated¹⁸. Indeed, literature data^{21,22} raised some doubts about Sputnik-V vaccine efficacy.

Case Number 1 on Different Responses to Pandemic: United States

The first case reported is from the United States. Figure 2 shows the trend during the

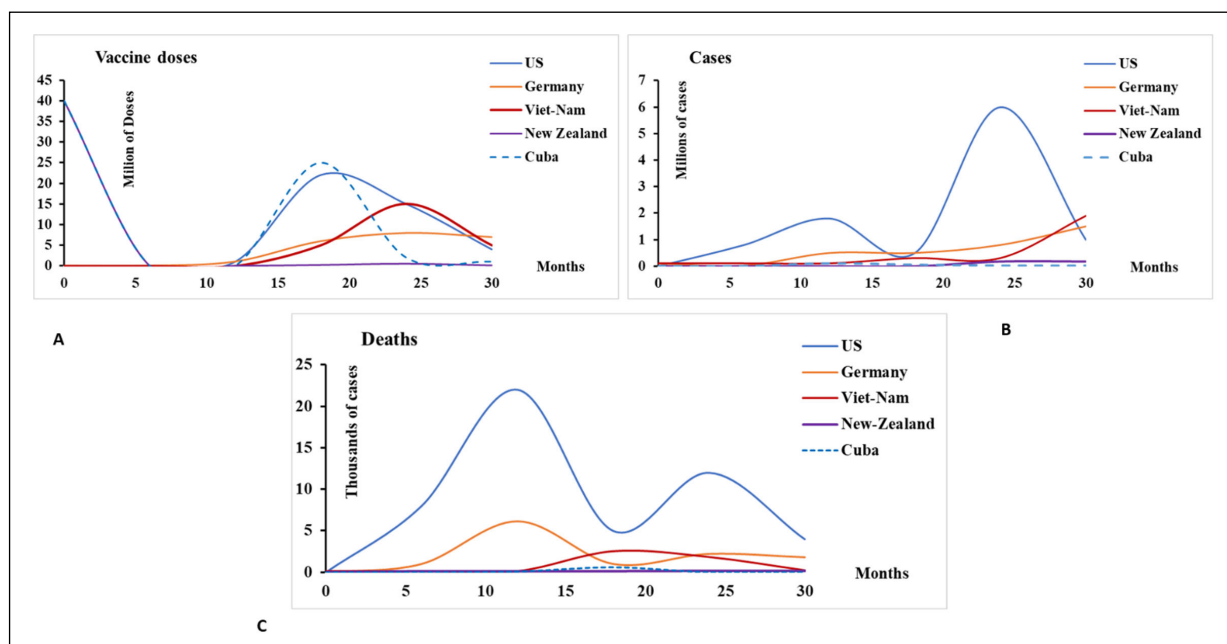


Figure 2. Trends in the pandemic in different countries. The graphs show (A) doses and (B) cases, while graph (C) shows cases of deaths in five different countries.

pandemic: cases are on May 27 and 28, 2022, in the US: deaths 3/1,000; cases 245/1,000; doses of vaccines/inhabitants 1.75. In terms of numbers, the death toll is quite high, ranking at 18th in the world. It is worth noting that vaccinations began early. The US has an “out-of-pocket” model; although the free vaccine administrations, mortality was shockingly high, especially among minorities and poor people^{21,22}. Hence, as in many other nations, indisputable evidence emerges: COVID is by no means an equalitarian virus. In general, the attitude of many people in the US was “better dead than locked up”. Relatively tighter directives were run in states governed by the Democratic Party, compared to much softer and more lax directives in republican-run states²¹. In the first part of the pandemic, the Trump presidency was strongly criticized for the manipulative use of information and for not taking enough into consideration the opinion of experts, in contrast, many have appreciated Andrew Cuomo’s leadership in New York State. In conclusion, the US faced the pandemic as a rich country with a health system open only to those who can afford it and a leadership oscillating between non-interventionism and the imposition of more restrictive measures, and overall, the pandemic had a very heavy impact. The manipulative use of self-styled experts by politicians was not exclusive to the United States but to many Western and non-Western countries. That is, politicians do not take into account the point of view of the real experts but rather that of those who say what the politician on duty wants to hear. In this regard, a famous tweet by Richard Horton, editor of the *Lancet*, denounced that “COVID-19 will be a case study on the death of independent scientific advice”²³.

Case Number 2 on Different Responses to Pandemic: Germany

The second case report concerns Germany (Figure 2) on May 27, 2022: Deaths 1.7/1,000, 57^o in the world; cases 313/1,000; doses of vaccines/inhabitants 2.2. Germany was considered by many to be a model, above all, because, in the first wave, it had better numbers than other European countries. However, in the third and fourth waves, the results were not so good, and the deaths were still high. Currently, Germany is the third country for an absolute number of cases in the last four weeks from May 27, 2022, but also among the

first for the mortality rate in the last four weeks. Notably, the vaccination rate is not exciting, especially compared to other EU countries. It is probably in relation to the persistence of high mortality.

Some interpreted the good results of Germany (especially in the first wave) as due to better efficiency and integration in the health system of proximity medicine (general practitioners, etc.)²⁴, while others attributed them to the greater availability of resources, including a greater number of places in the intensive room unit¹⁶. The gap with other countries has narrowed in the later stages of the pandemic, and, currently, the case fatality ratio and the incidence of mortality have also increased.

Perhaps with a virus with a higher diffusivity like omicron, the system went into crisis. Perhaps most important was the non-exceptional fraction of vaccines per inhabitant due to strong no-vax components. It is probably in relation to the persistence of a high mortality rate²⁴.

Case Number 3: Viet-Nam

The case of Vietnam is emblematic, a very low number of cases and deaths were found, and there was excellent efficacy in stopping contagions and deaths at the first wave, on 27 May 2022: Deaths 0.4/1,000; Cases 110/1,000; doses vaccines/inhabitants 3/4.

Then came the devastating impact of the delta variant. The response to the first vaccinations (partly with Moderna but widely with the Russian vaccine Sputnik-V) did not stop the crisis. Cases and deaths suddenly slowed down after the start of a wide vax campaign of vaccines (with the Cuban Soberana Plus vaccine)²⁵. Three significant aspects emerge from the trend in Vietnam:

- (i) First, there was good containment, probably due to the imposition of restrictive measures in the first part without a vaccine. This trend is similar to that of many Asian countries having different governments and health systems (i.e., Taiwan, Singapore and South Korea). Probably it was due to a culturally rooted attitude of responding in a more orderly manner to centralized directives.
- (ii) The second is the poor response of the Russian vaccine, also confirmed by the data in other countries¹ leading many of them, like Argentina, to change the type of vaccines.
- (iii) Finally, the apparent exceptional response of the Cuban Soberana Plus vaccine, which

seems to also be able to markedly reduce the spread of the virus. The trend in Vietnam in the last part is clearly better than that of the aforementioned Taiwan, South Korea and Singapore (which nevertheless had good responses)^{1,26}.

Case Number 4: New-Zealand

After the data from Vietnam and the good results cited from South Korea and Singapore, one might think that a top-down model of strong measures of containment is the best possible. But perhaps New Zealand can offer us something alternative (Figure 2).

In New Zealand, they have had a very low rate of deaths and cases 15 times less than the United States or Italy), deaths 0.4/1,000; cases 110/1,000; doses vaccines/inhabitants 2/3. Deaths seem to be on the rise lately, in part because the graph is in proportion, and previously, they had not had any. It is true that in May they had a rate similar to that of Italy (but they are now in autumn), so some problems have arisen. However, the trend, in general, is exceptionally good²⁶. Rates of vaccination are not very high (similar to Germany). The organizational model in New Zealand was “sharing and dialogue”. The first minister constantly organized media (even Facebook) meetings with citizens, often together with the opposition; the support of the best available scientists was constantly sought with the admission of errors when it was the case.

It is worth noting that during the second wave, America’s Cup took place without any restrictions, apart from very strict controls at the entrance and the blocking of all events for a few days when some cases were identified (no pressure from the powerful organizing committee was heard).

Of course, New Zealand is isolated, but in other isolated nations, there have been actual disasters. However, with omicron, the system went into some crisis.

Case Number 5: Cuba

In Cuba, they contained the first wave with rigid measures of distancing and prevention without vaccination until the arrival of the delta variant, on May 22, 2022: deaths 0.7/1,000; cases 97/1,000; doses vaccines/inhabitants, ratio 3/2. Then they had a frighteningly high mortality spike. At this point, the system went into crisis, there was no money to buy vaccines,

and the tools for diagnosing and sequencing the virus were very limited. Not even Italy, which was aided by Cuba at the time of its crisis during the first wave, offered substantial aid²⁷. So Cuban virologists developed Soverana Plus, a low-cost vaccine. It is a series of vaccines with inactivated viruses carried by a viral vector against which the population was already vaccinated against hepatitis B, (mumps)²⁵. At that time, no phase III studies were available, but Cubans, given the exponential growth in deaths, decided to start a vaccination program anyway²⁵. The proportion of vaccines is now the highest in the world, and the pandemic seems to have stopped.

Soberana also seems to be effective against the omicron variant, and perhaps also against the spread of the virus and not only against mortality. Such vaccine is cheap, and Cuba is to start exporting it (Iran, Vietnam, etc.). Some preliminary pre-print data²⁷ from the Italian Hospital Amedeo di Savoia seem to indicate a strong synergy when administered with mRNA vaccines as boosters.

By considering the economic status of Cuba, in comparison with other rich countries, its vaccination strategy seemed to work. Research on this vaccine must be implemented for reliable evidence of efficacy and safety²⁶.

Case Number 6: Italy

The state of the pandemic in Italy on May 27, 2022, shows deaths 2.8/1,000; cases 298/1,000; doses vaccines/inhabitants 2.4. The trend in Italy shows a very high death rate in all waves. One factor could be that the population is very old compared to other nations, which could influence the mortality rate, however, the deaths continued to be high in May 2022 (one of the highest in the last month). At that time, Italy was around 25th place in the world for mortality, despite the beginning of the pandemic, and the Italian National Health System was praised as one of the best in the world.

The pandemic highlighted several issues: rapid response to the crisis²⁷, coordinated responses, and communication²⁷⁻³³. Italy presents (in certain aspects accentuated) some of the flaws common to many European states, which we will therefore analyze in detail.

However, an interesting and debatable datum³³ is that in 2022, 13 of the top 30 countries in the world for death rates from COVID-19 were part of the European Union.

In particular, during the first months of the COVID-19 pandemic, some European countries

were unprepared to deal with the dramatic burst of infections, as noted for Italy by the WHO Regional Office for Europe³³. As a matter of fact, a document³⁴ entitled “An unprecedented challenge: Italy’s first response to COVID-19” was published. This document was addressed to countries that should have learned from the first Italian experience in the fight against COVID-19.

Focus on Shortcomings in the Current Public Health Organizations with a Focus on the European Union

Focusing on shortcomings in the current public health organizations in the European Union, it is possible to observe that three coronavirus outbreaks (just the first two should have alarmed us) have shown how

- 1) shortcomings in providing immediate and integrated answers,
- 2) issues in coordinating responses,
- 3) issues in managing information,
- 4) lack of resources

have favored the progression of epidemics. From the perspective of healthcare professionals, we believe that the current inefficiencies are the result of methodological errors in setting up medical priorities. In fact, they are common to the European responses and are the result of decades of policies in which all (or almost) the parties have alternated in the leadership of the different countries in Europe.

Concerning the issue of a lack of immediate response, we can take into account that Europe had at least a month to prepare. At the outbreak in China, European politicians said, “We are ready, we have the best health systems in the world”. In Italy, two outbreaks took place, both in peripheral hospitals in Lombardy and Veneto. The staff was not alerted and had no diagnostic or prevention tools, no specific guidelines have been issued^{28,29}. The operators became infected, and the hospitals themselves became the sounding board of the epidemic³⁰. There was total confusion about whether or not to impose a quarantine on the population and where to do it. The epidemic spread in the neighboring European regions in a few weeks, and their systems were not ready to respond. In almost all European regions, the propagation pattern was the same: contact with hospitals, contamination of health personnel who are not sufficiently equipped and explosion with the spread of the epidemic. “Sheltered houses” for the elderly

represented the third level of virus multiplication in many regions (with a common pattern across Europe)³⁵⁻³⁷. The chaos seems to result from decades of policies in which, in Western democracies, progressively lower attention was given to public health, and “precision medicine” was the model adopted as the only sector to be improved³⁸.

There was no shared line on the blocking of regions and activities. Concerning sports activities, the sports bodies decided on their own, showing supra-state power and obliviousness with no interest in public health. The double Champions League match between Atalanta and Valencia was allowed, with free access to the public, when the epidemic had already exploded in Europe. Perhaps it was no coincidence that the impact was so high in both cities (many players and fans of both teams were infected). Think of the stark contrast between the immediate blockade of the America’s Cup in New Zealand and the emergence of only two cases. One could think of better political leadership, but it must be said that politicians also decide based on citizens’ sensitivity.

There was no coordination in managing the flows of people, and new infectious cases were born into regions less affected by the epidemic³⁹, without an alert system that could impose quarantines and sometimes with conflicts (see facts in Corsica against the second homes of the “invaders” as reported by French press)³⁶.

Quarantines were sometimes managed too late, even in response to political pressures that had little regard for public health, see, for instance, the case of Nembro in Italy, or are not implemented at all in contrast with neighboring countries (Sweden)^{39,40}.

In the same period, due to a lack of laboratories, only the “symptomatic” cases were tested, which means that the diffusion in the hospital and the “sheltered homes” exploded because immunosuppressed people were often paucisymptomatic or asymptomatic⁴¹.

The different pandemic outcomes in Europe during the period 2020-2021 were due to the lack of a unique screening plan for different countries. On the other hand, the medical criteria were different in several regions and European countries before the pandemic burst. Furthermore, the allocation of resources in risk zones was not transparent, and in many European countries, single regions still seemed to decide independently, resulting in a lack of a shared operative medical protocol. This aspect also affected the medical status of health-fragile subjects such as immunocompromised or cancer patients⁴¹⁻⁴⁶.

European countries are reluctant to lose control of healthcare, as it is their responsibility, according to the treaties, rather than that of the Union, in this context; the pandemic highlighted the fragility of national health systems, and recently the EU has implemented an operative program adopted as a response to the COVID-19 pandemic with the aim of strengthening sanitary crisis preparedness in the EU (EU4Health program 2021-2027)⁴⁷.

There can be dozens of examples in all European countries, the most bizarre is in Italy where in March 2019, the leaders of the then two largest Italian governing and opposition parties a few weeks earlier encouraged people not to shut up at home but to frequent restaurants in Milan, and now they encourage the opposite by accusing each other⁴⁸.

Doctors and other health professionals working in the community paid a terrible price. They did not have clear guidelines and directions (often not even protections or a clinical training plan), and as a result, the information provided to users was counter-dictatorial. The media have completed disinformation and disorientation. The contradictory messages they provided were always justified by “experts”, i.e., biologists, internists, or anesthetists but rarely by epidemiologists dealing with communicable diseases.

As seen elsewhere, instead of choosing the best possible experts, politicians preferred to choose the “experts” who said what the politicians wanted to hear. In all European countries, but especially in the south and east, there was poor availability of diagnostic tests and few aids for prevention, a lack of beds in intensive care in some countries, and a shortage of staff. In fact, in previous years, there was a general weakening of national health systems. Almost all European resilience plans have declared the need to strengthen proximity medicine, but all the resources were directed to the increase of hospital beds or, in some cases, to the development of high technology^{43,46}.

Focus on Vaccination

The vaccination rate is a factor that cannot be considered totally external to the health systems but only partly.

Achieving a high rate of vaccine doses administered depended on:

- I. having the vaccines (or having the technology to produce them or the money to buy them),

- II. having a good organization to distribute and administer them,

- III. whether people want to get vaccinated.

There was a wild rush of rich countries to the first, second, third, and fourth doses of vaccine, while poor countries had no money to buy vaccines. However, vaccine-free areas, especially in poor countries, were one of the causes of the exponential spread of the virus and the emergence of new variants⁴⁵.

A systematic review⁴⁸ of the articles published on citizens’ perceptions of COVID vaccination was recently carried out, as well as some cross-sectional studies in the literature comparing vaccination hesitancy between countries. The rate of people with COVID-19 vaccine hesitancy was found to be around 18.5% in India vs. 20.1% in European studies (from 35% in Croatia to 15% in Portugal), with unequal distribution across demographic groups. A study⁴⁹ of predictors showed that women, younger age groups (especially 25 to 34-year-olds), people residing in households with children, inhabitants of smaller settlements, and people with lower levels of education had higher odds of vaccine hesitancy. The lack of trust in the five main actors responding to the COVID-19 pandemic (the National Civil Protection Headquarters, the government, the healthcare system, scientists-researchers, and the media) was also a significant predictor of vaccine hesitancy^{49,50}. Risk perception was an even stronger predictor: persons who perceived SARS-CoV-2 infection as a small risk were more than ten times more likely to be vaccine hesitant than those who perceived it as a great risk⁴⁹. We analyzed the countries with the highest number of doses per inhabitant in the world, as reported on the John Hopkins COVID website on May 27, 2022 (available at: <https://coronavirus.jhu.edu/map>).

Table III. Countries with the highest number of doses per inhabitant in May 2022.

Country	Doses
Cuba	3.3
Malta	2.9
Chile	2.9
Brunei	2.6
United Arab Emirates	2.51
Bhutan	2.47
Palau	2.47
China	2.45
South Korea	2.44
Uruguay and Singapore	2.41

Table IV. Comparison of biochemical parameters according to groups (n=7).

Country	Doses/ inhabitant.	World Rank
N Burundi	0.001	228 (First)
Congo (Kinshasa)	0.01	225 (IV ^o)
Haiti	0.02	187
Yemen	0.03	215 (XIV ^o)
South Sudan	0.06	227 (Second)
Papua	0.07	188
Cameroon	0.07	199
Madagascar	0.09	218 (XI ^o)
Malawi	0.10	221 (VIII ^o)
Mali	0.10	209

html). As shown in Table III, in the top ten countries, we found some very rich countries (as Singapore, Brunei, and the United Arab Emirates) but also some middle-income countries, such as Cuba, which is classified among middle-income nations according to the World Bank's classification (available at: <https://www.worldbank.org/en/about/annual-report>) in which cultural and/or organizational factors evidently played a role. In this context, the lowest rates of vaccination against SARS-CoV-2 in May 2022 (Table IV) were observed exclusively in the poorest nations in the world. If vaccination was a possible choice in (some) rich countries, in poor countries, that choice was not possible. Vaccines were found effective in limiting deaths: a negative correlation was found between vaccines per inhabitant and deaths/per inhabitant in 170 countries, but the same correlation was not evident concerning infection rates, so the vaccines evaluated in March 2022 were not effective at containing infections²⁰. In countries with at least one dose of vaccine per inhabitant, not all vaccines had the same efficacy. All vaccines seem equally unable to limit infections, but the countries adopting mRNA vaccines (Pfizer and Moderna) have a lower lethality of the virus than others⁴⁸⁻⁵⁰. If we then compare countries with mRNA vaccines separately with those with viral vehicle vaccines (such as Sputnik-V and Astra Zeneca), the former has a lower lethality of the virus. This difference is not evident if we compare the countries that used mRNA vaccines with the countries with inactivated virus vaccines, which at the time of the first analytical study were only the Chinese because there was still no data on the Cuban vaccine. As previously illustrated, the preliminary data on the Cuban vaccine seem to be very encouraging, and further investigations would be

necessary as this vaccine could have some efficacy in fighting the infection, it is cheap, and the new data on the side effects of mRNA vaccines attract attention²⁸. Despite the fact that the vaccines were all disappointing with respect to the expected results, controversy arose over the costs incurred for the purchase. Some groups, such as The People's Vaccine Alliance, have denounced an excessive surcharge in the costs of Moderna and Pfizer vaccines. While the companies that produced them had received immense public funding due to strong pressure in poor countries also in relation to these controversies, on May 5, 2021, the President of the United States, Joe Biden, surprised the world by declaring that he wanted to support the proposal to suspend vaccines for COVID-19 from the patent obligations for at least one year⁵⁰. A proposal for lifting intellectual property rights protection for COVID-19-related drugs and vaccines was put forward by India and South Africa to the World Trade Organization and was approved by more than 100 of 164 Member States. The European Union, however, has refused that proposal in the WTO, believing that a suspension of intellectual property rights would not only not increase the production of vaccines but would discourage innovation and adequate remuneration of investments in highly specialized industrial sectors⁵¹. The European Union seeks to respond to subsequent controversies by adopting an apparent policy of "Global solidarity during the COVID-19 pandemic". It appears on the official website of the European Commission: "The European Union's action against COVID-19 does not stop at its borders. As Team Europe, the EU and its member states are actively contributing to a wider global response to the COVID-19 pandemic. The EU is the world's biggest donor and exporter of vaccines in the world"⁵⁰, "The EU is assisting partner countries globally with vaccine donations and exports, as well as financial and humanitarian support for countries in need. Acting together, guided by the principles of solidarity and multilateralism, EU countries have provided support to partners around the world and secured significant funding to counteract the pandemic's disruptive consequences on a global scale"⁵². Europe, unlike the United States, is a "social federation". On March 11, the New York Times spread a piece of news that was almost ignored in Europe. The article, reports an incongruence between vaccinal doses exported, and subjects not yet vaccinated. In fact, during this period, the EU exported 34 million doses of coronavirus vaccines in a few weeks to dozens of countries^{51,52}. Only 6.5% of people in the EU received at

least one dose, compared to nearly 58% of Israelis, 33% of Brits and 19% of Americans.

In Search of Global Coordination

In comparing the various models of care systems' response to the pandemic, it emerges that there are some (few) good practices, but without global coordination, this is obviously not enough. It is now quite clear that there cannot be a "good answer" in a single nation. A global phenomenon cannot be countered by uncoordinated local responses; moreover, the general context must be considered from a strategic point of view. In this context, it is interesting to mention that an article published by Horton⁵⁵ focuses on the two proposals currently in evidence: the proposal for a health crisis management body initially funded by Bill Gates and the proposal for a new WHO initiative. Therefore, a proposal for two different management systems, public and private, also comprises an idea for a mixed solution⁵⁵.

Gates promotes the idea of GERM, a global epidemic response and mobilization team. It would comprise 3,000 full-time epidemiologists and geneticists, vaccine developers, and rapid response workers, dedicated to preventing future pandemics. GERM will have a "special personnel system" able to attract "the best staff possible". GERM would be given the authority to declare a pandemic and coordinate the global response. Gates estimates the cost would be US\$1 billion annually. He would finance it for the first few years, then the system would self-maintain with donations. As we have highlighted in recent research, Bill Gates' action is not isolated, but rather a sort of epiphenomenon in the history of scientific research in the last ten years. Private companies, in particular e-companies, are progressively conquering the top of research. In 10 years, they have reached the average ranking of the best American universities and have surpassed the European and Chinese universities. The trend of the top 30 e-companies in the SCIMAGO research ranking has risen in 10 years from a median ranking of 715 to a median ranking of 69, without differences in 2020 with the best 30 American universities, but with a trend towards further growth and a clear superiority over the thirty best European and Chinese universities. The same companies reaching leadership in research were recently accused by institutions in both the EU⁵⁶ and the US of the appropriation of data gathered illegally and amorally for their own benefit and for social

control. In practice, the loss of dominance by universities means that the role of science (including medical sciences) in Western society is in crisis. In fact, the development engine of Western society is based on the concept (or myth) of science as an instrument for human development from which everyone can benefit.

Simultaneously, WHO published a white paper suggesting the formation of a Global Health Emergency Council, led by heads of state, to "break the cycle of panic and neglect that has characterized the response to previous global health emergencies"⁵⁷. WHO⁴⁵ recommends the revision of International Health Regulations, stronger independent monitoring of national preparedness programs, the formation of a new global health emergency workforce, and the creation of new financing instruments. There is one assumption threaded through the white paper that should be subject to scrutiny the idea that WHO itself should be at "the center" of emergency preparedness. Repeated warnings about duplication and competition are designed to dissuade member states from "creating a parallel structure, which could lead to further fragmentation"⁵⁷⁻⁵⁹. The Global Health Emergency Council should be aligned with the governance of WHO.

WHO report concludes, "finally, it is clear that the world needs a strengthened WHO, with the authority, financing, and accountability to effectively fulfill its unique mandate as the directing and coordinating authority on international health work". The COVID-19 pandemic underlined the lack of decision-making power of the WHO and the EU, especially in clarifying the genesis of a phenomenon of global health. In this scenario, the global political system and the influence of different advanced economies in different parts of the world have caused decisional instability, as well as different and ambiguous scientific considerations about the epidemiology of COVID-19.

Conclusions

With the threat of new pandemics (but also of health disasters linked to climate, pollution, and wars), humanity finds itself at the crossroads between investing in "democratic" management but without power (and in any case, at the mercy of the need for funds with consequent conflicts) or in a leadership that advocates efficiency and problem-solving (and that would probably be able

to implement it), but that would place processes totally outside of the public control.

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Conflict of Interest

The Authors declare they have no potential conflict of interest.

Availability of Data and Materials

The data presented in this study are available on request from the corresponding author.

Ethics Approval

In accordance with the Italian legislation, when using already published data, ethical approval is not required. In any case, the Helsinki guidelines were complied.

Informed Consent

Not applicable.

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