

Policies and strategies implemented in Paraguay to control the COVID-19 Pandemic

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SUMMARY

Introduction: *The purpose of this article is to contribute to the discussion on the repercussions and disruptive effects of the COVID-19 pandemic on the region's health systems based on the description of the epidemiological scenario, and the policies and strategies implemented in Paraguay.* **Methodology:** *This is a case study, a cross-sectional descriptive type. The description was operationalized based on the following dimensions of analysis: crisis management model, governance, leadership, media, technological solutions for surveillance, clinical and healthcare management, care for health personnel, socio-sanitary repercussions, complemented with the rapid review of original articles, official documents, administrative and epidemiological data, and gray literature obtained from websites of national and international steering*

organizations. Structured matrices were used to organize the relevant information. **Results:** *Health policies were articulated with social policies and solidarity initiatives, immediate suppression measures, and reconfiguration of emergency care and specialized level. The cumulative incidence rate in Paraguay has reached 17 cases per 100 000 inhabitants, with a high proportion of asymptomatic or oligosymptomatic patients. The protagonism of multiple health, economic, scientific, and mass media actors was decisive in activating intersectoral responses, with the predominance of the National Health Authority's steering roles.* **Conclusion:** *Ethical and political dilemmas demand a broad debate and analysis, due to their impact and socio-health, political, and economic consequences. They also constitute opportunities to redesign strategies and measures to contain them in the short, medium, and long term.*

Key words: *Health system, Paraguay, Pandemic, COVID-19, health policies.*

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RESUMEN

Introducción: *El propósito de este artículo es contribuir a la discusión sobre las repercusiones y efectos disruptivos de la pandemia de COVID-19 en los sistemas de salud de la región a partir de la descripción del escenario epidemiológico, y de las políticas y estrategias implementadas en Paraguay.* **Metodología:** *Se trata de un estudio de caso, tipo descriptivo de corte transversal. La descripción fue operacionalizada a partir de las siguientes dimensiones de análisis: modelo de gestión por crisis, gobernanza, liderazgo, medios de comunicación, soluciones tecnológicas para la vigilancia, gestión clínica y asistencial, atención al personal de salud, repercusiones sociosanitarias, complementada con la*

revisión rápida de artículos originales, documentos oficiales, datos administrativos y epidemiológicos y literatura gris obtenida de sitios web de organizaciones rectoras nacionales e internacionales. Se utilizaron matrices estructuradas para organizar la información, relevante. Resultados: Las decisiones político-sanitarias fueron articuladas con políticas sociales e iniciativas solidarias, medidas de supresión inmediata, y reconfiguración de la atención de urgencias y nivel especializado. La tasa de incidencia acumulada en Paraguay ha llegado a 17 casos por 100 000 habitantes, con alta proporción de afectados asintomáticos u oligosintomáticos. El protagonismo de múltiples actores de salud, economía, ciencia y medios de comunicación masiva, fueron decisivos para activar respuestas intersectoriales, con predominio de roles de rectoría de la Autoridad Sanitaria Nacional. Conclusión: Dilemas éticos y políticos demandan un amplio debate y análisis, por su impacto y consecuencias sociosanitarias, políticas y económicas. También se constituyen en oportunidades para rediseñar estrategias y medidas para su contención a corto, mediano y largo plazo.

Palabras clave: Sistema de salud, Paraguay, Pandemia, COVID-19, políticas de salud.

INTRODUCTION

In December 2019, cases of pneumonia of unknown origin, confirmed and recognized as a pandemic by the World Health Organization (WHO), were reported in the city of Wuhan, China. By March 2020, the new coronavirus called Sars-CoV-2, which causes COVID-19 disease, had spread rapidly globally. To date, the pandemic has affected 216 countries and territories, with more than 46 734 454 million cases and 1 203 494 deaths. In Paraguay, 63 731 cases and 1 418 deaths have been reported (1).

The countries of the region share common scenarios characterized by institutionally weak governments, social deterioration, economic deceleration, limited financial room for maneuver, and medium and low average public spending on health. Such a situation generates an unequal impact on the emerging middle-classes and vulnerable strata with gaps in access to public services, inefficient administrative contexts, medium quality levels in terms of health response, and the need to adapt health systems to respond to the state of emergency and contingency, as

pointed out in a recent analysis (2).

Paraguay, a country of 7 152 000 people, has a fragmented and segmented health system, with inequities and difficulties in efficiently addressing the double disease burden of chronic non-communicable diseases and communicable diseases with high health impacts such as dengue, tuberculosis, and HIV. The population profile shows that almost half of the Paraguayan population is under 20 years old, and 7.5 % are older adults. 62.1 % reside in urban areas. The country's metropolitan area concentrates 37 % of the total population. The average annual population growth rate in 2019 was 1.40 % (3). The annual birth cohort is estimated at 150 000, with an average life expectancy of 73 years (71.6 in men and 77.5 in women) (4).

The illiteracy rate for those over 15 is 5.2 %, with 11 % of school absenteeism for those under 15. Only 65 % of the population has access to safe water, 55 % has garbage collection services and internet connectivity has reached 43 % (5).

The figures in the Human Development Report 2019 reflect the effects of the policies on the profile of inequalities, demonstrating the importance of the events and their consequences, beyond income levels. Paraguay, with an HDI of 0.972, varies according to adjustments for inequality of achievement in health, education, and standard of living (income), with Paraguay ranking 0.522 out of 151 countries (6,7).

The Ministry of Public Health and Social Welfare (MSPBS) exercises the steering role of the system, and at the same time carries out the function of providing services through an integrated network of public services, with four levels of care and complexity, and whose effective coverage is estimated at 65 %. Other relevant public hospitals are part of the public hospital network such as the Hospital de Clínicas (HC), which depends on the National University of Asunción (UNA), the Hospital de la Cruz Roja Paraguaya (CRP), a mixed entity with public and philanthropic funding sources. The Instituto de Previsión Social (IPS) covers approximately 18 to 20 % of the population with formal employment. The Military and Police Health hospitals cover approximately 3 % of the population. The private sector is made up of private hospitals and prepaid medical services, with 5 % coverage (8,9).

The provision of services, medicines, equipment, inputs, and technology and the availability of resources are considered unequal, making the quality of care inequitable. The system's providers have different financing modalities, target population, and service provision conditions, according to the type and conditions of employment, social position, and payment capacity (10,11).

As of this new government, reforms aimed at strengthening cross-cutting components began to be implemented, starting with the reorganization of services, territorial planning, and the definition of a portfolio of services by level of care to maximize efficiency and expand opportunities for access by making it more equitable. In the medium term, the progressive expansion of infrastructure standards, equipment, human resources, supplies and medicines, information and communication technologies (ICTs) at the regional and local levels and the renewal of the transportation fleet are also planned. The intermediate component would be the separation of the steering role and the provision of services, assuming the social protection of around 25 % of the excluded population with mixed financing sources as a state responsibility (12,13).

The purpose of this article is to contribute to the discussion on the repercussions and disruptive effects of the COVID-19 pandemic on the region's health systems based on the description of the epidemiological scenario and the policies and strategies implemented in Paraguay.

Methodology

This is a qualitative, descriptive, cross-sectional study, based on a country case study of Paraguay in the specific context of the COVID-19 pandemic. It describes dimensions established a priori, to analyze the response capacity of the health system. Original articles, publications, official documents, administrative and epidemiological data, including grey literature, obtained from websites of national and international leading organizations (Ministry of Public Health and Social Welfare, Pan American Health Organization, John Hopkins University, Andalusian School of Public Health, among others) were reviewed.

RESULTS

The following topics describe the main effects and actions implemented between March and October 2020.

Model of crisis management

Analysis and estimates guided by data provided by epidemiological surveillance and information systems have supported rapid decisions in both health and administrative aspects, such as planning and investment in complex and adaptive scenarios in uncertainty to identify and provide the best responses. Resources from the cooperation of bilateral and public-private agencies have been integrated, installing immediate suppression measures to prevent the spread based on the confinement or mandatory quarantine of the population, as well as massive surveillance and controls to detect cases. It has been necessary to reconfigure the model of care, with emphasis on specialized assistance to mitigate the initial impact and its consequences. This stage was classified as reactive management in European countries, whose effects provided timely lessons to Latin American countries when selecting strategies and reorganizing their services.

Governance and leadership

The political-administrative and health decisions required the protagonism of multiple actors from the executive branch, from the health, economic, academic, scientific and trade sectors, whose recommendations were decisive in the decision-making processes, although the contingency required the predominance of the National Health Authority's steering roles, responsible for issuing "mandatory provisions", establishing priorities and calling for the representation of opinions, with strong support and protagonism from the mass media. Experts affirm that "the greatest number of actors does not guarantee correct governance in times of crisis" (14-16). There were differences in compliance with government recommendations in some regions and municipalities (17).

There is a perception that each country has faced its health contingency individually with national measures, both at the departmental, local, and community levels. At the regional level, there are no visible strategies for joint cooperation between government actors and civil society to resolve specific health problems. The absence of clear regional leadership has been highlighted.

Health policy disruptions and lessons learned

The course of the reforms initiated in the new period of government (2018 - 2023) is temporarily interrupted, clearly projecting the model of a health system that the country needs, in the face of the challenge of COVID-19, a disease that affects all social classes, gender, and ethnic groups, highlighting that in Paraguay 71 % of the population has informal employment and the concern about the lack of guaranteed social protection for this sector (18).

The option for a health system based on primary health care, with the expansion of basic care units in regions with greater vulnerability and processes of functional reorganization, with a portfolio of services that is explicit in terms of levels of care and complexity, points in the right direction (19).

The early suppression measures established included the declaration of a state of a health emergency, the closure of international borders, schools, universities, public spaces, the sale of food in bars and restaurants, shops and malls, the suspension of international flights, and mandatory quarantine of travelers from abroad (in “hostels” and “health hotels”), Rigorous hygiene promotion, mandatory use of masks, social isolation measures (physical separation when confirming active disease and its contacts), social distancing (physical distance between people, avoiding contact), restriction of circulation schedules, and reorganization of passenger transportation. Table 1 shows a balance of lessons learned.

Table 1

Paraguay: Lessons Learned from Health Policies in the Pandemic. 2020.

Health policy decisions articulated with social policies are necessary. Links between the State, the market an society.
Definition and need for sustainable funding modalities in the context of a pandemic.
Rational use and transparent mechanisms for the allocation of material resources and logistics.
Orientation to sustainable reform processes, balancing political and technical times.
Designng a comprehensive social protection, in addition to expanding the range of services.
Assume universal access as a value, as a right and as an objective, not as a mere discourse of minimum coverage.
Clearly identify the weaknesses of the health system and the factors that particularly affect each country.
Reorganize the service networks, with a vision towards integral actions that mitigate the impact of the social and environmental determinants of health.
Need to promote debate on experiences and strategic actions implemented by the regions’s health systems (benchmarking).
The qualification of multidisciplinary human resources in health needs to be continuously evaluated.
Ethical approach to the management of resources allocated to the different dimensions of COVID-19.

Source: elaborated by the authors

Media and technological solutions

The media and different modalities of a virtual environment have expanded the opportunities for debate, exchange, and joint learning in real-time, allowing an extraordinary approach to the scientific flow through digital media, pre-print publications and peer review publications, experiences, conferences, and proposals for urgent implementation, including the promotion of responsible behavior in citizenship.

Epidemiological surveillance and the information system

The epidemiological profile of the disease records 67,948 cases according to data from epidemiological week 45, reported through the national surveillance network, which is made up of 1 257 reporting units, local, district, and regional epidemiological units (UER), updated weekly, with a predominance of cases in males (68 %) and in the 20-39 year age group (59 %), with a cumulative incidence rate of 17 per 100 000 inhabitants, 63 % of recovered cases, 48 % active cases, and 1 % of deaths (1 502 deaths).

The development of mathematical models

Through equations and simulations, a predictive curve was estimated, using epidemiological tools and basic statistics, from a baseline, alerting about

the risk reflected in figures several times higher than the actual records (Table 2). It is attributed to the early measures of the maintenance of cases below the projected curve for a whole semester, which could be verified comparatively with data of interactive maps in real-time provided by John Hopkins University.

Utilization of PCR diagnostic tests

The diagnostic tests of PCR, carried out in national laboratories, have been insufficient to respond to the demand in the first stage, attributed to the performance of other simultaneous tests (dengue and other prevalent diseases). This scenario generated the incorporation of academic institutions (IICS/UNA/PY: Instituto de Investigación en Ciencias de la Salud/Universidad Nacional de Asunción/Paraguay) and private services to expand the diagnostic capacity and the training of new teams. It was imperative to open new laboratories for biomolecular diagnosis in the metropolitan area and border cities. In the first months, the cumulative incidence rate and the case fatality rate was low. The number of tests performed per million inhabitants had progressive increases.

The interventions made may have influenced mortality indicators and the occurrence of cases observed in Paraguay. A comparison of the occurrence of cases and deaths to date shows much lower numbers than in Latin America (Table 3).

Table 2

Epidemiological surveillance and information systems

Bringing the scientific flow closer through digital media.
Elaboration of predictive curves using basic epidemiological and statistical tools.
Moderate cumulative incidence and low case fatality rate in the first semester.
High proportion of asymptomatic or oligosymptomatic population.
Estimation of the basic reproductive number (Ro), to project the exponential growth rate and the transmission rate in the population.
The delay in the increase of the transmission curve was attributed to the early adoption of public health measures.

Source: elaborated by the authors

Table 3
Latin America: Mortality and incidence rates by
COVID-19 as of October 30, 2020
(Selected countries)

Countries	Rates by 100 000 hab.	
	Mortality	Incidence
Argentina	68.52	2 575.02
Bolivia	76.04	1 235.78
Brazil	76.12	2 634.97
Chile	74.10	2 661.67
Paraguay	19.39	875.14
Peru	105.74	2 762.21
Uruguay	1.65	87.59
Venezuela	2.46	284.27

Source: (1).

Management of clinical care services

Adjustments have been made to the organization of services and innovations in emergency care, concentrating efforts on the third and fourth levels of care (specialized hospitals), with the primary objective of saving lives, maintaining minimum reproduction rates, and providing the time needed to progressively expand the installed capacity, testing capacity and sustainable provision of protective equipment for health personnel.

In Paraguay, the availability of functional beds and doctors trained in ICUs does not exceed 220 professionals throughout the country, highlighting the insufficiency of human resources in this specialty in overdemand scenarios such as the COVID-19 pandemic (19). These gaps in installed capacity in a weak system for providing care for serious cases requiring hospitalization have led to mobilization and alliances with the private sector in some regions. Experiences have been made in integrating and complementing joint care for services in the public network of the MSPBS and the social security system (IPS), to expand coverage of intensive care, within the framework of the new lines of “Reforms for Better Health in Paraguay” (2019).

Although the expansion of the disease tested the performance of the available workforce, the over-demand at the third and fourth levels

of care has set the agenda on the need for simultaneous expansion of health units at the basic levels, such as the installed capacity at the specialized level, with emphasis on the training of therapists, considering the potential endemicity and circulation of SARS-CoV-2.

The pandemic has tested the health human resources at all levels, which have remained resilient to two overlapping health contingencies, the dengue epidemic, and the COVID-19 pandemic, adapting to the strategies implemented in crisis scenarios, to effectively attend, treat and manage the high volume of affected patients. The patients take longer to recover and the less severe ones can evolve slowly, maintaining a high occupational bed capacity (20,21).

The activation of response mechanisms in-hospital emergencies required adjustments and organizational innovations, defining at all levels, strategic and coordination institutional and inter-institutional directives. The clinical rectory was fundamental to coordinate, inform, articulate logistics, operations, and manage both the available resources and the day-to-day events and experiences, demonstrating adequate activation of the response mechanisms.

The coordination between levels of care has been a challenge and a great effort for the joint and continuous accompaniment, for the identification and control of cases, follow-up of patients in their homes, application of triage and the identification of early complications, promoting and applying in parallel the education and implementation of non-pharmacological measures, and the care of patients with acute and chronic prevalent conditions (22).

In this context, the recent definition of a portfolio of services by life cycle and by levels of care and complexity (2019) constitutes a declaration of explicit commitment to advance in the guarantees for access to basic services for all citizens (23).

The reorganization of the emergency care included the design and implementation of new emergency strategies, ensuring the discrimination of respiratory and non-respiratory patient care, and associated with technological solutions to respond to over-demand (teleconsultations).

Mobilization of resources and strengthening of the installed capacity

The mobilization of resources and the strengthening of the installed capacity focused on the implementation of emergency strategies and the development of capacities in the different links of prevention, diagnosis, and treatment, articulating medium complexity hospitals with high complexity reference centers, and new contingency pavilions in the following services National Hospital of Itauguá, Hospital of Respiratory and Environmental Infections, Regional Hospitals of Ciudad del Este, Caaguazú, Concepción, San Pedro, District Hospitals of Villa Elisa, Limpio, San Lorenzo, General Hospital of Barrio Obrero, and the General Pediatric Hospital.

According to national indicators, Paraguay has 50 % of the expected standardized provision of ICU beds (734 beds), 300 of them distributed in 34 hospitals of the public sector (MSPBS), around 200 in the private sector, 154 corresponding to the Institute of Social Security (IPS), 45 available in the Hospital de Clínicas and 17 in the Tesai Foundation of Ciudad del Este. It is estimated that from 4 beds per 100 000 inhabitants at the beginning of the pandemic, the figure has increased to 10 beds per 100 000 inhabitants. These data demonstrate the opportunity to prepare the health system that the country has had, in the first six months.

Primary health care

Primary health care in different territories has become a great ally, contributing to the monitoring of mild cases, and in the processes of education of families, providing containment during the implementation of mandatory quarantine, although the pandemic had its impact on some priority programs, several of which were able to continue operating, others had to close (hypertension, diabetes, HIV, tuberculosis), in places that failed to incorporate technologies and teleconsultations, or adaptation of operation in safe conditions.

The priority and strategic expansion of family health units at the first level of care, before the pandemic, with institutional agreements at subsequent levels of care with the Institute of

Social Security (IPS), especially in vulnerable territories, is considered strength.

The predominant hospital-centric vision of two decades ago has changed significantly towards the integrated implementation of promotion and prevention, in a transversal manner at all levels of care incorporating the notion of continuity of care, and the capacity to resolve processes and make diagnoses at the first and second levels before they become more serious and costly (24,25).

The private subsystem does not currently have coverage standards and affordable costs to respond to eventual integration with the public subsystem, and it is estimated that only about 5 % of the population has access to private services and prepaid medicine.

The supply of inputs, logistics, equipment

The provision of individual protection equipment (EPI), medicines, basic disposable materials, electronic devices, and respirators has been difficult due to the concentration of production in a limited number of countries and the high demand and complexity of mass transportation, which required extraordinary efforts. Health professionals and teams have faced in the first stage the consequences of limited availability of replacement personal protective equipment (EPI), with the availability of inputs estimated to be below average.

Strengthening the skills of non-intensive doctors and nurses

The strengthening of competencies of non-intensive doctors and nurses, assimilated from less complex hospitals, has been an emergency strategy that allowed the expansion of the health workforce, limited to 220 critical care specialists and 700 nursing professionals trained to provide support at specialized levels. It was also necessary to hire professionals from various disciplines and sub-specialists in emergency positions in the last five months to meet the demand.

Table 4

Some relevant considerations on clinical and care management

It is estimated that there are 5 doctors per 100 000 inhabitants. The availability of personnel and health professionals is below average.

There are about 22.5 community health workers per 10 000 people. At the national level, the geographic distribution is not equitable, especially in dispersed and underserved rural areas (26).

About 70 % of health professionals work in the capital and metropolitan area, where 30 % of the population resides.

Epidemiological, clinical, and preventive protocols were continuously adjusted by scientific societies, supported by global and regional regulations (PAHO-WHO-CDC).

Need to increase the number of family doctors and the medium- and long-term training of therapists, to respond to emergencies and contingencies in the event of endemic behavior of the COVID-19.

Return of health professionals from labor markets in the countries of the region.

Non-pharmaceutical measures applied early have influenced mortality indicators compared to Latin American countries.

Law No. 4392/2011 created the National Fund of Solidarity Resources for Health (FONARESS). It was regulated in 2013 to guarantee access to high complexity medicine to people without any kind of health insurance. However, there is no evidence of its compliance.

In practice, the IPS and the MSPBS provide residual coverage for catastrophic diseases.

Postponement of the inclusion of the private sector in integration agreements currently in force for the neonatal, child, and adult intensive care (27).

Source: elaborated by the authors.

DISCUSSION

The socio-health approach to the pandemic

The roles of community agents and members of family health teams have not been able to develop community social services, especially health care for more vulnerable populations including indigenous communities, diminishing the potential effects on group well-being, in contexts where the differential impact of social determinants of health is stronger.

It is necessary to guarantee an ethical approach in the use of health resources such as the availability of diagnostic tests with an equity approach, as well as access to vaccines, and the consideration of the ethical implications of clinical trials conducted on human subjects with pre-approved drugs already used in other previous pandemic scenarios.

The case fatality rate for COVID-19 observed in different countries around the world has varied between 0.3 and 5.8 % attributed to underreporting of asymptomatic or mild cases (overestimation of case fatality), and to incomplete case follow-up data or underreporting of deaths (underestimation).

At the regional level, the pandemic is evolving unevenly, with highly compromised areas being noted in contrast to less affected areas. The evolution and trends in different countries confirm outbreaks (second wave), reinforcing uncertainty about the behavior of the virus, and the type of immunity it generates, without ruling out an endemic evolution (10,11).

The capacity of the countries to react to the challenges of adaptation and changes implemented in the pandemic has been directly related to the strengths of the governing institutions, in this case, health, academic-scientific and technological institutions, in the search for cost-effective solutions, and interpretation of the opportunities for transformation and change.

There has been little supranational coordination, atomization of efforts, and few initiatives for interregional action. The type of political and technical leadership, the capacity of social organization, and the existence of conflicts derived from the economic effects have influenced the evolution and results between one country and another, aspects that will condition the changes and transformations necessary to face the real impact of the pandemic in the future.

In Paraguay, there is a cumulative incidence rate of 17 cases per 100 000 inhabitants up to epidemiological week 45 of 2020. The behavior of the epidemic curve is attributed to early measures of isolation, suppression (total quarantine), without ruling out possible false negatives, and the under-recording of undetected cases due to initial restrictions on access to reagents that made massive testing difficult at that time.

Paraguay has a deficit of installed capacity at the specialized level, reflected in a single supply indicator (2 intensive care beds per 1 000 inhabitants), compared to other countries in the region. European countries are in a privileged position with rates of 33 per 100 000 inhabitants, attributed to the specialized care they have developed for the care of elderly patients. Spain and Italy have 9 and 8 beds per 100 000 inhabitants.

The COVID-19 pandemic, of which a potential endemicity is estimated, shows the urgent need to invest in the expansion of the installed capacity, the training of intensivists, nurses, and physiotherapists, resuming the previous agendas with more objectivity, considering that only about 24.74 % of the total population of Paraguay have some kind of health insurance, including social security and private insurance.

Early isolation measures modified the flow of patients in hospitals, a factor that contributed to the balance of demand and allowed public systems

to provide coverage to all citizens, although this rationalization is estimated to have had an impact on the increase in mortality from other causes, related to chronic and prevalent diseases.

Primary health care has been one of the factors to which the lesser impact of the pandemic is attributed, among others, through systematic contact with the community, to a greater or lesser extent for the attention, information, and care of both chronic-degenerative and acute diseases prevalent in most of the country's departments that have family health units. This shows that the first level must continue to be strengthened, to respond to people's expectations by preparing it materially.

In Brazil, for example, despite an extensive primary care network, uncoordinated measures did not allow the use of this workforce to identify and track cases, which brought high rates of cases and deaths in the country (28), Giovanella et al. (29), highlights the potential of PHC in the response to surveillance, monitoring of individual case care through community work. They describe examples of actions carried out in some Brazilian federal capitals and municipalities, despite the absence of a national policy. They also point out the importance of the role of PHC in the care of other ailments that continue to affect the populations. The authors map out in detail the actions that can be implemented, consistent with the attributes of PHC, recognizing that what is critical in this issue is to ensure resources to strengthen these practices.

The level of the informal economy makes this model of care the option for acting on social and environmental determinants in unfavorable economic and social contexts. This facilitates the periodic evaluation of lessons on what does not work and the strengthening of urgent components that are still delayed, projected as a qualified and accessible PHC, with the incorporation of technologies and communication systems, information, education, and health promotion networks that empower the population.

The availability of open data and the modeling of the pandemic in real-time, since the beginning, has contributed to the understanding of the transmission patterns of SARS-CoV-2, showing variation in the impact in the different Latin American countries. Several of these

countries have had predictable evolutions, going through different stages, in which suppression-oriented measures have been applied followed by mitigation strategies, with highly contagious behaviors for long periods.

In most cases, control of the pandemic has faced uncertain scenarios. The mathematical models and the estimation of the basic reproductive number have provided useful projections to dimension the average number of citizens that would be infected from a primary case, discriminating comparatively differential attack rates by countries, regions, and territories. In this way, it is possible to anticipate, intervene and evaluate the magnitude of the effects and the direct and indirect impact of the pandemic on health, as well as to guide the selection of measures and the flexible design of surveillance and containment strategies. For this purpose, it should be assumed the heterogeneity of cultural factors, social contact structures, biological conditions, crossed immunity with other viruses, susceptibility related to natural immunity factors, transmissibility, exposure mechanisms, severity, and super-propagation effects attributed to hyperconnectivity nodes and bridges, to closed spaces where dissemination occurs very quickly, suboptimal working conditions, which modify the patterns in more contacted societies, with a higher degree of intergenerational contact, demonstrated in seroprevalence studies as opposed to compartmentalized structures. All of this makes it difficult for health systems to develop strategies and respond in a quality manner (30).

The level of data disaggregation is restricted in regions and territories that lack digital notification systems. That is why only aggregated data is obtained, incorporating not only sex and age variables but also disaggregation by ethnicity. Since mortality databases are not public, there are delays in updating data by weeks, affecting the availability of nominal data, with acceptable periodicity. This is due to the lack of connectivity, transmission infrastructure, trained personnel with analytical skills, regulatory protection systems, and access to open data (31,32).

CONCLUSION

The challenges faced by Latin American health systems in the face of the pandemic trigger ethical dilemmas that require extensive debate and analysis, due to their impact and socio-health, political and economic consequences, which at the same time constitute opportunities to redesign strategies and measures for their containment in the short, medium and long term.

The emerging knowledge of global, regional, and sub-regional experiences has allowed the expansion of the scientific knowledge in all areas related to the management of the pandemic by the new SARS-CoV-2 and the COVID-19 disease. The accelerated exchange of scientific communications in the political-health, epidemiological, clinical, economic, and social fields, has contributed to the formulation of new options for health policy, clinical management, strengthening of information systems, and processes for the promotion and prevention of responsible behavior among citizens.

Finally, the pandemic reproduces previous conditions of inequality in scenarios of poverty and social vulnerability in Paraguay and Latin America.

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