TRACEABILITY AS A STRATEGY IMPLEMENTED AT THE FIRST LEVEL OF CARE IN RESPONSE TO THE COVID-19 PANDEMIC IN THE REPUBLIC OF PANAMA

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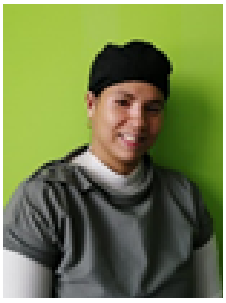

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RESUMEN

Worldwide, the different public health systems, especially primary care, have been seriously affected by SARS-CoV-2. In Latin America, in the Central American region, specifically in the Republic

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of Panama, several prevention policies were implemented in the face of the pandemic. According to the Centers for Disease Control and Prevention (CDC), the best strategy is to avoid exposure to the virus. China has taught us that quarantine, social distancing and isolation of populations can contain the pandemic. The purpose of this study is to establish, in a transparent manner, the management, in the primary phase, of the COVID-19 pandemic in Panama, through the mechanisms of containment of the viral infection. For the preparation of this report, the bibliography of scientific articles published between March 2020 and December 2020 was reviewed. These were used as a reference to learn about the management of Covid-19 and prevention measures in the Latin American region. At the beginning of the pandemic, the Effective Reproduction Rate (ER) was estimated to be above 5%; with the implementation of traceability, for the months of September and October 2020 it ranged between 0.96 and 0.98; however, by December of the same year, eight provinces had ERs above 1, with hospital overflow. The application of traceability entails a large investment, inter-institutional planning, community support; in addition to operating in very articulated and not numerous populations.

Keywords: Covid-19, Traceability, Primary Care, Panama, Health Strategy.

Introduction

With the onset of the SARS-CoV-2 pandemic, the causal agent of COVID-19, the serious shortcomings of the Panamanian health system became evident almost immediately, including a deficient hospital infrastructure. All these factors made it difficult to establish a consistent approach to the triple challenge of epidemiological containment, economic recovery and mitigation of social costs, as cited by Filgueria et al. (2020).

According to Barrio Cortés, in the year 2020, the risk, due to this viral infection, consists of an excessive increase in deaths, mainly due to the shortage of invasive mechanical ventilators and intensive care beds, in addition to the series of operating expenses and the deficit of health professionals specialized in critical care or intensive care medicine.

The health systems of the countries of the region have presented important weaknesses, since many of them are underfunded, segmented and fragmented. This leads to barriers to access and coverage, as is the particular case of the Panamanian health system, which is made up of two management models that coexist and compete without coinciding in the principle of universality and equal health for all (PAHO/WHO, 2021).

In Panama, since 1969, the Ministry of Health (MINSA), as the only National Health Authority (ASN), has been in charge of regulation, surveillance, financing and execution; subsequently, the second German-type model (Bismarck) emerged, giving rise to the Social Security Fund (CSS), as a management formula and access filter for the insured population, which is financed by worker-employer quotas, which go directly to the managing company. The State is limited to being the regulating entity of these services, as expressed by Guillen in 2020.

Likewise, there are problems in the allocation of resources, such as the low financing of the first level of care, where the recommended parameters for allocating 30% of public spending to primary care (PAHO in 2019) are not reached; and that, when this percentage is achieved, such investment translates into amounts that can be extremely low, in per capita terms (Hong Wang, Peter Berman, 2020). This reflects a lack of priority and, at the same time, hinders the achievement of efficiency and quality, showing a high fragmentation in the organization of services and health care.

The arrival of Covid-19 on Panamanian soil revealed a system that was very poorly equipped to offer quality public health care, mainly due to the fact that the population was sick, vulnerable and totally distant from health services aimed at preventing diseases, i.e., deficient primary health care (PAHO/WHO, in 2021).

Panama was the second Central American country to report its first case of the new Coronavirus, on March 9. The Canal nation, being the most connected country in the Central American region, became the place with the highest number of positive cases; in addition, it is one of the Latin American countries that carried out the most COVID-19 tests after the beginning of the pandemic. This allowed it to have more accurate data compared to the rest of the people in the region, as cited by Taget (2021).

Subsequently, quarantines and gender separation between men and women were imposed in order to be able to go out on the streets. In addition to this, working hours were reduced for both the public and private sectors, among other aspects. However, once the quarantine measures were relaxed, there was a gradual increase in the number of cases, with a high percentage of positive results. As a result, the country became the place with the highest number of cases reported per inhabitant for seven consecutive days, above other densely populated countries such as Brazil, Chile or Mexico (BBC NEWS, 2020).

The need to coordinate actions that could serve as a mechanism, not only to contain but also to monitor the disease, was raised, since one of the basic and important premises in any health system states that: "The greater the response capacity that can be provided at the first level of care, the lower the demand at the hospital level" (Gutiérrez-Aguilar et al., 2020).

This process of catching the disease, at the basic levels of care, translates into a greater response that contributes to not deteriorate the hospital level, thus reducing the expenditure of resources to address situations and diagnoses. For this reason, actions such as case traceability have emerged as a more effective mechanism as long as primary care teams are strengthened and trained to achieve the link, not only with families but also with communities (PAHO in 2021).

Traceability should be understood as an active search, in which all positive cases should be followed up, with the corresponding identification of contacts close to the community exposed to the infection (MINSA in 2020); this is an investigative process that will determine when cases begin and end. This would allow to analyze which were those incorrect practices that favor the dissemination of the agent in a given community to which education is provided, both to its inhabitants and to companies and businesses, already established. In addition to providing health support, the patient is also provided with food assistance, as well as social and psychological assistance (MIDES in 2021).

In Panama, the unified traceability team (composed of a general practitioner, dentist, nurses, laboratory technician, administrative staff, among others) was implemented to follow up on active cases, determining their direct and suspected contacts. In order to isolate them in their residences and to monitor compliance with sanitary measures. It is of vital importance, in order to stop the transmissibility of COVID-19, contain possible outbreaks, decrease the mortality rate to avoid the marked impact on health services (PAHO/WHO in 2021).

If such process turns out to be effective and with a systematic basis, it can contribute, notably, to the number of new cases, generated by each confirmed case, to maintain the Effective Reproduction (RT) index; taking into account that this epidemiological value is determinant in how effective are those behaviors that involve collectivity, such as: Social distancing and the use of masks to achieve a deceleration of contagions and establish the average number of people who are infected by a single person. Citing the definition given by the Texas Medical Center, during the year 2021.

Our country strengthened the traceability process in July (MINSA in 2020), under the coordination of the Ministry of Health, with the technical support of PAHO/WHO, in conjunction with the Joint Task Forces, the Social Security Fund and the leadership of the Local Authorities, Civic Clubs (MINSA in 2020), the participation and support of community and county leaders and the population in general.

The Operations Center for Community Control and Traceability before COVID-19 (COCYTC), issued the: "Operational Plan for strengthening the control and traceability of COVID-19 at the community level", which establishes the dynamics of action of the strategy and the traceability teams in the field, throughout the country. (PAHO in 2021).

Therefore, we must ask ourselves the following question: Have prevention measures been effective in Panama?

Traceability makes it possible to control the level of contagion and, consequently, to reduce patient overcrowding in the hospital system, especially in the Intensive Care Unit (ICU). This mechanism of action has contributed to a decrease in the RT (Reproduction Effective Index) levels since its implementation.

Based on what has been presented so far, we propose the need to carry out this research.

Research approach and design.

The type of approach is descriptive-narrative, the research is non-experimental and cross-sectional. For the realization of this study we took into account the bibliographic review of different scientific articles, published between March and December 2020, which will be used as a reference to know the management of the Covid-19 pandemic, and the prevention mechanisms implemented in our Latin American region.

The information will be considered, according to its relevance, validity and content in sites of scientific interest, such as: Google Scholar platform; as well as epidemiological reports issued by the World Health Organization (WHO), and the Pan American Health Organization (PAHO); in addition to considering the available literature given by a reference entity, such as the Center for Disease Control and Prevention (CDC).

As the research is centered in Panama, the information provided by research institutions will be analyzed, such as: Gorgas Memorial Institute (ICG), Research and High Technology

Institute (INDICASAT); and those contemplated in the public health regents, namely: The Ministry of Health (MINSA) and the Social Security Fund (CSS); also those obtained from other State entities such as: Ministry of Social Development (MIDES), Ministry of Security (MINSEG), Civic Clubs, among others, that can provide reliable information of a State nature.

To complement this, publications issued by the Panamanian press will be evaluated, as long as they are within the context established in this study.

Data extraction and review.

The initial search yielded a total of 187 bibliographic references, of which 36 articles and documents that met the previously established criteria were used. Ten articles were added from other sources, including local media and epidemiological information, which also met the parameters for statistical analysis.

The implementation of traceability in Panama was divided into phases, taking into account the beginning of the strategy, its entry into force and its subsequent application.

Development and discussion.

Phase N°1: Arrival of the biological agent, restriction regulations and mass testing.

The first case of Covid-19 in Panama was reported on March 8. A 40-year-old Panamanian woman entered the country on a flight from Spain. On March 9, MINSA informed the country that the RT-PCR tests were positive. This would mark the starting point, not only of the pandemic in the Central American isthmus, but would also bring changes in the models of care, in the implementation of norms, decrees and other measures aimed at avoiding the possible hospital collapse and the deficit of care (COVID-19 - Panama situation report N°1 - March 10, 2020 - PAHO/WHO in 2020).

Approximately one month after the beginning of the pandemic, our country reported the following figures:

SITUATION IN PANAMA AS OF APRIL 6, 2020			
CONFIRMED CASES		DEATHS	
EXISTING	NEW	EXISTING	NEW
2,100	112	55	1

Table N°1: Situation in Panama as of April 6, 2020. Source: PAHO - Report N°7.

Among the factors related to mortality are: age, arterial hypertension, diabetes, obesity, chronic respiratory disease, heart disease, liver disease, smoking, tuberculosis, HIV and cancer. As shown in this report, many of the aforementioned diseases are typical of the first level of health care. The COVID-19 began to show, from the beginning, that comorbidities are typical of pathologies that, for decades, have affected the Panamanian population (COVID-19 - Panama Situation Report N°7 - April 06, 2020 - PAHO/WHO in 2020).

Panama presented an Effective R0 above 5 and, for the second week, it dropped between 2 and 3; then it was estimated at 1.8. However, it was still far from the target of 1.0. This indicated an increase in the number of confirmed cases per 100,000 inhabitants, due in part to the strategy of mass testing, a fundamental pillar for the subsequent implementation of traceability, since the number of tests performed per day and per million inhabitants, from day zero, was equal to that of developed countries with greater diagnostic capacity, such as the United States, Italy and South Korea: United States, Italy and South Korea (Figure N°1) (PAHO in 2020).

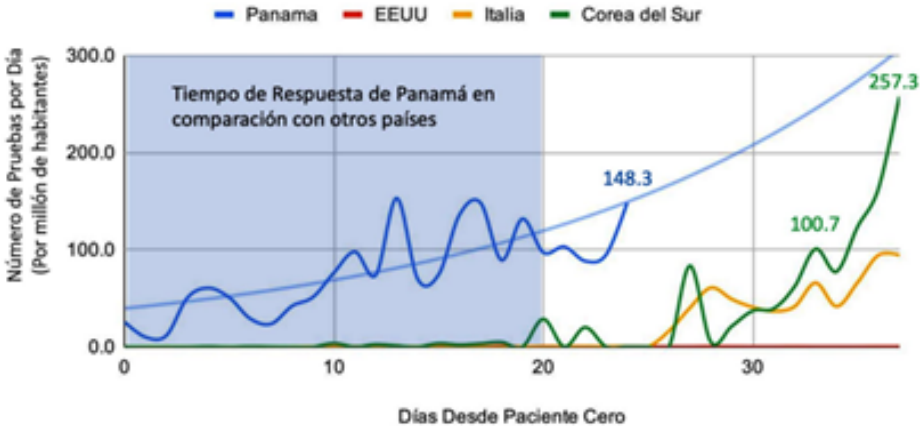

Figure N°1: Number of COVID - 19 tests performed by country (per million population) Source: Panama Situation Report N°7 - April 06, 2020 - PAHO/WHO (paho.org).

On April 10, Panama had projected three possible scenarios for COVID-19 infection, according to the effective R0. A first scenario with an R0= 3.21, which was the one before applying quarantine restrictions; in addition to two hypothetical scenarios with R0 of 2.58 and 1.5. This model showed that, although the measures implemented had a significant impact compared to the situation of not having applied any strategy, it was of caution, since hospitalization and ICU services could be saturated.

Phase N°2: Entry into force of traceability, together with the gradual lifting of the block quarantine.

By June 2020, the country presented the following indicators, at hospital level, as well as those related to the management of patients infected by the new Coronavirus (Panama Situation Report N°20 - June 30, 2020 - PAHO/WHO (paho.org).

SITUATION IN NUMBERS - PANAMA					
CONFIRMED CASES		DEATHS		BEDS IN ROOM	
EXISTING	NEW	PREVIOUS	NEW	GENERAL	ICU
35,550	765	631	11	687	139

Table N°2: Situation in numbers - Panama. Source: PAHO, www.paho.org

In June, the Intrahospital Control Center (CCI) was created due to the marked increase in hospitalizations, to such an extent that hospitals were converted to provide exclusive care for patients with COVID-19 (PAHO, 2020).

During this period, the mortality rate increased and the percentage of positivity of those who died of COVID-19 was 1.9%. In addition, there was a rate of 774.9 infected per 100,000 inhabitants. At that time, the country ranked third among the five countries in the Americas with the highest incidence rate, above the values for the region, which was 495.1 per 100,000 inhabitants (PAHO in 2020).

If we take into consideration the increase in the different epidemiological markers, by June 27 there were 564 deaths, of which 19.6% had at least one risk factor. In contrast to the 13.9% of deaths without these factors, this difference is statistically significant. This means that there was a higher risk of death among those with risk factors, R.R. = 1.61 (95%CI: 1.38-1.87) (PAHO in 2020).

		Death		TOTAL
		Yes	NO	
Risk Factor	Yes	314	1.284	1.598
	No	250	1.793	2.043
TOTAL		564	3.077	3.641

Table N° 3: Sample risk, according to presence of risk factors. Panama, June 27, 2020. Source: Panama Situation Report N°20 - June 30, 2020 - PAHO/WHO (paho.org).

For this month, the situation of infection by COVID-19 worsened in the metropolitan health region. Areas such as: San Miguelito, North and West Panama, presented a high mortality rate; therefore, strategies began to be formulated to control the infection situation in these parts of the country, which, in themselves, lack good sanitary measures and have high levels of population density (PAHO in 2020).

The Ministry of Health inaugurated the Operations Center for Community Control and Traceability (COCTC), to treat COVID-19 in the district of San Miguelito. And it would be the first of many centers, whose objective is to follow up on detected cases and their contacts, due to the fact that these are areas with high overcrowding and poverty. This initiative would help to control the increase of cases in this region.

With these figures, the authorities focused on priority groups (centers with a high concentration of people, such as: shelters for the homeless, migrants, prisons, nursing homes, poor and marginalized population centers or those living in overcrowded conditions), in order to halt the advance of the new Coronavirus. (PAHO in 2020).

By July 17, 2020, specific actions were established, such as: The strengthening of traceability with follow-up, with greater medical and social support; in addition to providing treatment to contacts and family members of confirmed cases, as well as, changes in the communication strategy, by the State. (PAHO in 2020).

Phase N°3: Application of traceability as a control strategy.

By September 9, 2020, the health authorities, based on the epidemiological behavior, informed the population that traceability had become a basic tool in the fight against COVID-19; since the percentage of positivity had improved, showing a decrease of between 12 and 14% (PAHO in 2020). The data indicate the following epidemiological situation:

SITUATION IN NUMBERS - PANAMA					
CONFIRMED CASES		**DEATHS**		**BEDS IN ROOM**	
EXISTING	NEW	PREVIOUS	NEW	GENERAL	ICU
101,745	704	2166	11	5225	183

Table N°4: Situation in numbers - Panama. Source: Panama Situation Report N°33 - September 28, 2020 - PAHO/WHO (paho.org).

For the month of July, an average of 1,057 and 159 patients were registered in the respective services, both in the ward and in the ICU. In August, there were the highest values of patients hospitalized in the ward, with an average of 1,428, with stability of patients in ICU at 158. From the 22nd of that same month, there was a downward trend of these hospitalized patients with 1,115 patients until September 13; while patients in ICU remained stable at 157 (PAHO, 2020) (Figure N°2).

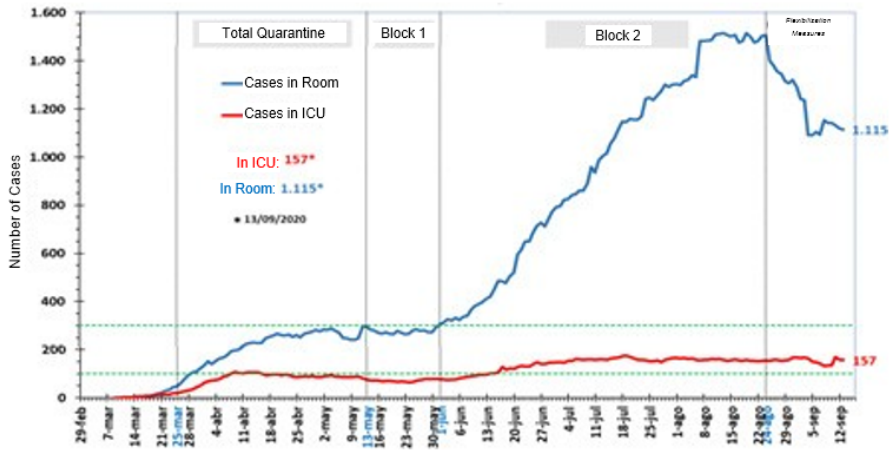

Figure N°2: Number of cases confirmed by COVID-19, hospitalized in ward and ICU, by day. Panama, March 9 to September 13, 2020. Source: Panama Situation Report N°34 - October 5, 2020. - PAHO/WHO (paho.org)

When the measures adopted were made more flexible, the behavior of the epidemic curve in September showed an average of 674 new cases per day, contrary to that observed in July, which was 1,023; and for August, it was 940. It was evident that the agent was slowing down in terms of new infections, which possibly indicated that traceability was paying off. However, by that time, other parallel joint measures were being taken, such as the application of curfews and quarantines in certain districts with high RT. (PAHO, 2020).

Deaths showed a marked downward trend in the reporting of deaths, because, for the month of August, between 7 and 31 deaths were reported per day, with an average of 19 per month. While, from August 18 to September 12, a stable trend was maintained, with a minimum of 9 and a maximum of 17 deaths, in that month; and an average of 11, in the last week, until September 12 (PAHO, 2020) (Figure N°3).

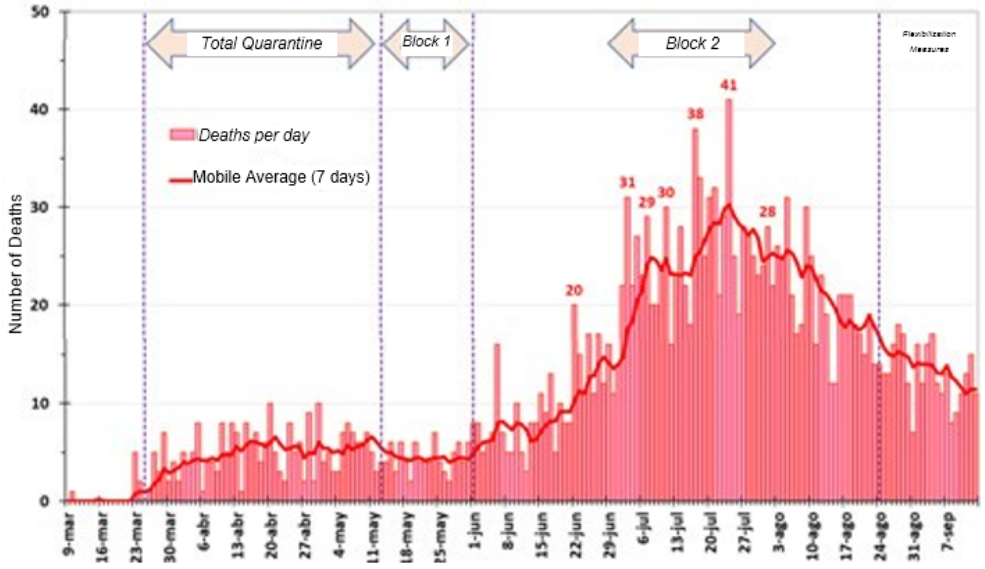

Figure No. 3: Deaths from COVID-19 in Panama, by reporting date. March 9 to September 13, 2020.Source: Panama Situation Report N°35 - October 11, 2020 - PAHO/WHO (paho.org).

As of September 13, the total percentage of deaths, among those confirmed by COVID-19, was 2.1%, remaining among the countries of the Americas with the lowest lethality and below the expected in the region, which for those months was 3.5% (PAHO, 2020).

Once the data on mortality, hospital occupancy and others have been analyzed, we are going to determine how effective traceability has been in terms of the Effective Reproduction Index or RT; where the expected, for each country, is to keep the indicator below 1. For this month, the COVID-19 had been circulating in Panama for almost six months.

The point of analysis is given taking into account that this value was more than 5.5, which decreased progressively and remained around 1.0 during the month of May until June 11, when the RT=1.63 (95%CI: 1.56 - 1.71), one of the highest recorded in the period; subsequently, from July 17 to 26, the figures remained close to 1.

In the week of July 18 there was a decrease to RT=1.23 (95%CI: 1.20 - 1.26); on July 25 it reached RT=1.16 (95%CI: 1.13 - 1.18). In the month of August a constant decrease in RT was observed; thus: On August 1 a RT=1.13 (95%CI: 1.10 - 1.16), on August 8 a RT=1.07 (95%CI: 1.04 - 1.09); then, on August 15 to a RT=0.99 (95%CI: 0.97 - 1.02); then on August 23 it continued to decrease to a RT=0.94 (95%CI: 0.92 - 0.97); on August 29 with a RT=0.96

(95%CI: 0.94 - 0.98).

On September 6, the RT was 0.87 (95%CI: 0.85 - 0.89) and on September 12, it was 0.90 (95%CI: 0.87 - 0.92). Only the province of Los Santos presented an Rt above 1 (RT=1.43); Veraguas with an RT=1.0 and the remaining 13 regions (86.7%), showed an RT below 1, between 0.58 and 0.94.

At the end of November and beginning of December, traceability was really tested as a measure to contain outbreaks and resurgences of the disease. For those months, the country showed the following indicators:

SITUATION IN NUMBERS - PANAMA					
CONFIRMED CASES		**DEATHS**		**BEDS IN ROOM**	
EXISTING	NEW	PREVIOUS	NEW	GENERAL	ICU
164,729	1,276	3,060	21	5,388	149

Table No. 5: Situation in numbers - Panama Source: PAHO, www.paho.org

At the end of November 2020, there were significant increases in the number of cases, increasing 116% with respect to previous months, from 4,579 to 9,876; showing a significant increase in the number of cases since SE 44 (November 5), increasing the rate of infection of the new Coronavirus.

This situation seriously hindered the traceability actions to try to contain the advance of the pandemic in the Central American nation; because, in our isthmus, there were, on average, four (4) contacts for each confirmed case; that is to say, in addition to the 9,876 cases, in which isolation had to be ensured for 14 days, 39,504 potential contacts should be followed up.

This meant that, with the 321 unified traceability teams that, at that time, were formed in the 15 health regions, each one would have to follow up 123 cases per week; that is, 18 cases per day, a technically impossible task; therefore, it was not possible to follow up 100% of the detected cases, increasing the risk of resurgences.

As for the mortality rate, the Panamanian population had a high rate of deaths, especially in the elderly; in addition, if they were patients with underlying diseases. This situation caused our country to present the second highest fatality rate, behind Guatemala.

Panama Oeste, for these dates, showed 3 indicators of overflow (brown color), according to what was reported by the COVID -19 Contingency Plan. The traceability teams exposed the urgency of the lack of beds in the Intensive Care Unit and the Respiratory Care Unit, less than 15%, in eight provinces, with RT greater than 1. The other regions were at risk of this situation (green color).

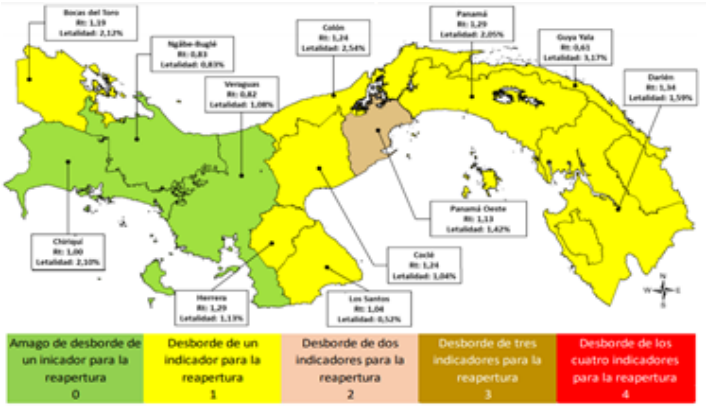

Figure N°4: COVID-19 in the provinces of Panama - RT and lethality, November 28, 2020.

Source: PAHO, www.paho.org

CONCLUSIONS

Panama has been characterized in recent years as the fastest growing country in the Central American region, but despite this, it continues to show marked inequality.

COVID-19 has not only put the health system to the test, but has also posed challenges and changes in health care models. Traceability led to an inter-institutional effort, where, for the first time in Panama, various state entities, both security and social care, civic clubs and municipal governments, aligned themselves in search of a common goal: to identify the contacts of positive patients, provide them with care, food and basic needs, so that the advance of the virus does not reach hospital levels.

It is true that the effort made by the health entities in Panama, such as MINSA and CSS, should be praised; but it is also true that this strategy was implemented as a result of a complex situation, where once again, the low level of investment in Primary Health Care comes to light.

Prevention measures were effective at the beginning of the pandemic; however, any mechanism implemented in the context of COVID-19 requires the support and collaboration

of the community.

The efforts of the Panamanian State are focused on certain areas, leaving aside not only other regions in the interior of the country, but also the structural base does not allow the attention of other pathologies.

Traceability has contributed to control the levels of contagion, since, taking into account what was observed during the development of this study, we can state that the levels of contagion were progressively decreasing, in the same way, community participation was a great collaboration to achieve this objective.

Traceability was insufficient in the months when the measures were made more flexible, as well as the amount of resources and staff to deal with the high number of infections and the search for their contacts.

SARS-CoV-2 poses a very complex scenario, where every strategy, before the arrival of vaccines, is aimed at reducing contagion. Traceability is a tool that, if implemented with a greater amount of resources, would allow the country to have a better impact.

In addition, it should be considered that, as the pandemic progresses, this agent shows an important variation at the molecular level, which translates into greater contagiousness and mortality rate.

This situation shows the lack of infrastructure; therefore, it would have to be evaluated whether the impact was due to this mechanism or to the improvement in the installed hospital capacity.

Currently, no studies of this type have been carried out in Panama, so it is not possible to have a point of comparison, as far as what this research has shown with others that have been carried out previously.

Conflict of interest.

The authors of this publication declare that they have no conflict of interest among themselves or with any other institution. The identity of the people taken into account for the realization of this study has been respected.

BIBLIOGRAPHIC REFERENCES

- Barrio Cortés, J., & et al. (marzo de 2021). Atención primaria en el domicilio en el marco de la pandemia COVID-19. Elsevier. doi: https://doi.org/10.1016/j.aprim.2020.12.004
- BBC NEWS. (09 de julio de 2020). BBC NEWS. Obtenido de s. https://www.bbc.com/mundo/noticiasamerica-latina-53313897
- Filgueria, F., & et al. (2020). América Latina ante la crisis del COVID-19: vulnerabilidad socioeconómica y respuesta social. Cepal Series Políticas Sociales, 149. Obtenido de http://hdl.handle.net/11362/46484
- Giovanella, L., & et al. (2021). ¿Es la atención primaria de salud integral parte de la respuesta a la pandemia de Covid-19 en Latinoamérica? 1-25. doi: doi.org/10.1590/1981-7746-sol00310
- González R., M. (junio de 2020). Características iniciales de las políticas de control de la pandemia de Covid-19 en América Latina. Gaceta Médica de Caracas, 207-216. Obtenido de: https://www.researchgate.net/publication/342259904_Caracteristicas_iniciales_de_las_politicas_de_control_de_la_pandemia_de_Covid-19_en_America_Latina
- Guillen, A. (21 de julio de 2020). Sistema Sanitario Panameño. pág. 1.
- Gutiérrez-Aguilar, R., & et al. (03 de marzo de 2020). Modelo de umbral de reducción de tasa diaria de casos COVID-19 para evitar el colapso hospitalario en Chile. Obtenido de Medwave: https://www.medwave.cl/link.cgi/medwave/revisiones/Analisis/7871.act?ver=sindiseno.
- Henríquez - Márquez, K. I., & et al. (2021). Prevención e identificación temprana de casos sospechosos COVID-19 en el primer nivel de atención en Centro América. ELSEVIER, 115-116. doi:https://doi.org/10.1016/j.aprim.2020.06.004
- J. A. Sánchez-Duque, L. A.-V.-M. (2020). Enfermedad por coronavirus 2019 (COVID-19) en América Latina: papel de la atención primaria en la preparación y respuesta. 369-372.
- Joost Hopman, M., & et al. (16 de marzo de 2020). Managing COVID-19 in Low- and Middle-Income Countries. JAMA Network, 1545-1546. doi:doi:10.1001/jama.2020.4169
- Levy-Carciente, E. K. (18 de marzo de 2021). Cedice. Obtenido de Cedice: https://cedice.org.ve/observatoriogp/portfolio-items/gasto-de-salud-en-america-latina

- Llor, C., & et al. (mayo de 2020). Coronavirus y atención primaria. Elsevier, 294–296. doi:https://dx.doi.org/10.1016%2Fj.aprim.2020.03.002
- MINSA. (22 de julio de 2020). Ministerio de Salud de Panamá. Obtenido de Ministerio de Salud de Panamá: http://minsa.b-cdn.net/sites/default/files/general/comunicado_ndeg_149.pdf
- MINSA. (enero de 2020). Ministerio de Salud Panamá. Obtenido de Ministerio de Salud Panamá: http://www.minsa.gob.pa/sites/default/files/destacado/plan_coronavirus.pdf
- MINSA. (04 de julio de 2020). MINISTERIO DE SALUD PANAMÁ. Obtenido de MINISTERIO DE SALUD PANAMÁ: http://minsa.b-cdn.net/sites/default/files/general/comunicado_ndeg_131.pdf
- MINSA. (22 de julio de 2020). MINSA concreta esfuerzo de clubes cívicos para el equipo de trazabilidad. Obtenido de Ministerio de Salud de Panamá: https://yomeinformopma.org/info_detail/150
- MINSA. (17 de marzo de 2020). Yo me informo MINSA. Obtenido de Ministerio de Salud: https://yomeinformopma.org/info_detail/11
- Molero-García, J., & et al. (26 de diciembre de 2020). Aspectos básicos de la COVID-19 para el manejo desde la atención primaria. Elsevir, 53 (101966). doi:https://doi.org/10.1016/j.aprim.2020.12.007
- Molina, U. C. (11 de agosto de 2020). TVN media-Noticias. Obtenido de https://www.tvn-2.com/contenido_exclusivo/Atencion-primaria-covid-19-Panama-salud-debil-sistema_0_5712178726.html
- OMS. (7 de octubre de 2020). Organización Mundial de la Salud. Obtenido de Brote de enfermedad por coronavirus (COVID-19): orientaciones para el público: https://www.who.int/es/emergencies/diseases/novel-coronavirus-2019/advice-for-public?gclid=CjwKCAjw8cCGBhB6EiwAgORey-n0vGC1qJTRLpBCg2rMyLM5CIahrbsokalIlDmicLCSp-X9jKLVQRoC9ZQQAvD_BwE
- OPS. (23 de abril de 2020) Nota técnica. La adaptación del primer nivel de atención en el contexto de la pandemia de la COVID-19: intervenciones, modalidades y ámbitos. Obtenido de https://iris.paho.org/bitstream/
- OPS. (31 de marzo de 2020). Informe de la situación de Panamá N°6. Obtenido de Organización Panamericana de la Salud: https://www.paho.org/es/documentos/covid-19-informe-situacion-panama-ndeg6-marzo-31-2020
- OPS. (06 de abril de 2020). COVID-19 - Informe de la situación de Panamá N°7.

Obtenido de Organización Panamericana de la Salud: https://www.paho.org/es/documentos/covid-19-informe-situacion-panama-ndeg7-abril-06-2020

- OPS. (10 de marzo de 2020). Informe de la situación de la Covid-19 de Panamá N°1. Obtenido de Organización Panamericana de Salud: https://www.paho.org/es/documentos/covid-19-informe-situacion-panama-ndeg1-marzo-10-2020
- OPS. (11 de marzo de 2020). Informe de la situación de la Covid-19 de Panamá N°2. Obtenido de Organización Panamericana de la Salud: https://www.paho.org/es/documentos/covid-19-informe-situacion-panama-ndeg2-marzo-11-2020
- OPS. (13 de marzo de 2020). Informe de la situación de la Covid-19 de Panamá N°4. Obtenido de Organización Panamericana de la Salud: https://www.paho.org/es/documentos/covid-19-informe-situacion-panama-ndeg4-marzo-13-2020
- OPS. (2021). Respuesta colaborativa e integrada en Panamá ante la COVID-19. Respuesta colaborativa e integrada en Panamá ante la COVID-19, 85.
- Pallarés Carratalá, V., & et al. (agosto de 2020). La pandemia por la COVID-19: una oportunidad para cambiar la forma de atender a nuestros pacientes. Elsevier, 3-5. doi:https://doi.org/10.1016/j.semerg.2020.05.002
- Prensa Libre. (24 de marzo de 2020). Panamá reporta la primera muerte por Coronavirus en Centroamérica. Obtenido de https://www.prensalibre.com
- Rivera Gutiérrez, R., & et al. (26 de mayo de 2021). COVID-19 en Panamá y el mundo: una revisión de la literatura. Revista Médico Científica, 37-60. doi:https://doi.org/10.37416/rmc.v32i1.553
- Rodríguez-Morales, A., & et al. (17 de marzo de 2020). Preparación y control de la enfermedad por coronavirus 2019 (COVID-19) en América Latina. Acta Médica Peruana, 3-7. doi:http://dx.doi.org/10.35663/amp.2020.371.909
- Sánchez-Duque, J. A., & et al. (17 de abril de 2020). Enfermedad por coronavirus 2019 (COVID-19) en América Latina: papel de la atención primaria en la preparación y respuesta. ELSEVIER, 369–372. doi:https://doi.org/10.1016/j.aprim.2020.04.001
- Serrano-Cumplido, A., & et al. (agosto de 2020). COVID-19. La historia se repite y seguimos tropezando con la misma piedra. 48-54. doi:https://doi.org/10.1016/j.semerg.2020.06.008
- Solera Albero, J., & et al. (mayo de 2020). La Atención Primaria de Salud: Más necesaria que nunca en la crisis del Coronavirus. 468-472. doi:https://dx.doi.org/10.19230/jonnpr.3655
- Taget, A. (2021). El impacto de la pandemia en la región centroamericana y los

posibles cambios post pandemia. PENSAMIENTO PROPIO, 193-226. Obtenido de http://www.cries.org/wp-content/uploads/2021/01/011-Tager.pdf

- Urzúa, A., & et al. (abril de 2020). La Psicología en la prevención y manejo del COVID-19. Aportes desde la evidencia inicial. TERAPIA PSICOLÓGICA, 103-118. doi:http://dx.doi.org/10.4067/S0718-48082020000100103